

**PROPOSED TERRA POWER SOLUTIONS RIEBEECK EAST WIND
ENERGY PROJECT
MAKANA LOCAL MUNICIPALITY
EASTERN CAPE PROVINCE OF SOUTH AFRICA**

**(Please Note: In all future reports, this project will be referred to as
MAKANAONE WIND ENERGY PROJECT
An amended application has been submitted to the DEA)**

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DRAFT ENVIRONMENTAL SCOPING REPORT

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EXECUTIVE SUMMARY

Background

Terra Power Solutions (Pty) Limited (the applicant) is a company based in Grahamstown which is involved in the development of numerous wind and solar energy projects throughout South Africa.

The proposed wind farm is located in the Makana Local Municipality, Cacadu District Municipality, Eastern Cape Province, South Africa. According to Terra Power Solutions (Pty) Ltd, available wind data in South Africa shows the Riebeeck East farms to have favourable wind conditions sufficient to support a wind farm. This has been confirmed by on site wind monitoring that has been on-going since early 2011. The facility will be located on seven properties, namely: Hilton Farm, Table Hill North, Kruisfontein, Brack Kloof, Table Hill, Slaaikraal Farm and Hounslow. It is situated approximately 22km east of Riebeeck East and 15km west of Grahamstown.

The erection of 77 wind turbines is proposed. The model and size of the turbine selected will depend on on-going wind measurement, the outcome of the EIA process and long term monitoring, and on other technical and financial considerations. The final turbine type selected will be between 100 and 140 metres high, and have a power output of between 2 and 3 MW. The facility will have a generating output ranging between 120 and 140 MW. A wind turbine consists of a vertical tower, hub and three blades. Additional infrastructure required to support the wind farm includes: 6 metre wide access roads, underground cabling running adjacent to the roads, a substation and an on-site storage shed. From the substation, the power generated will be fed into the Eskom grid via the 132 kV line traversing the site.

Project motivation

Most of South Africa's energy comes from non-renewable sources like coal, petroleum, natural gas, propane, and uranium; however the proponents of renewable energy sources like biomass, geothermal energy, hydropower, solar energy, and wind energy is a major factor that the South African sector need to consider greatly. It is estimated that approximately 1% only of the country's electricity is currently generated from renewable energy sources. The energy sector in South Africa alone emits approximately 380 988.41 Green House Gases (GHGs) (Eastern Cape Climate Change Conference, 2011).

South Africa's total emissions was estimated to be 461 million tonnes CO₂ equivalent in the year 2000. Approximately 83% of these emissions were associated with energy supply and consumption (380 988.41 GHGs), 7% from industrial processes, 8% from agriculture, and 2% from waste. This poses great threat to the environment and livelihoods of citizens.

Eskom currently generates 95% of the electricity used in South Africa with a 40.87 GW net maximum installed capacity. By the year 2020 an additional 20 GW generation capacity would be required and up to 40 GW by 2030 to sustain the energy demands in the country. There is however a political will to change the energy mix to reduce the dependency of the economy on fossil fuels and facilitate the uptake of renewable energy resources.

The first step towards a solution in terms of climate change came in the form of the United Nations Convention on Climate Change 1994 (UNFCCC) and its associated Kyoto protocol 1997, adopted at the third session of COP 3, where countries agreed to reduce their greenhouse gas emissions to the levels they were at in 1990 by the year 2012. The protocol was first opened for signature from 16 March 1998 to 15 March 1999 at United Nations Headquarters, New York and by that date the Protocol had received 84 signatures. For the protocol to be ratified at least 55 of the 176 UN countries had to sign the protocol and these had to represent more than 55% of 1990 global carbon dioxide emissions.

So far, there are 141 nations, including South Africa, that have ratified the protocol (Borchert, 2007). The Kyoto Protocol is very similar in principles to the UNFCCC, but places a heavier burden on developed nations under the principle of “common but differentiated responsibilities” as well as asserting binding targets for 37 industrialized countries and the European community for reducing emissions. The Kyoto Protocol also offers supplementary means of meeting targets via the use of three market-based mechanisms, namely emissions trading, clean development mechanisms and joint implementation.

Unfortunately it is quite unlikely that signing a treaty will stop global warming. Even if all the nations that have signed do achieve their targets it will mean a reduction of only 5.2% below 1990 levels. To stabilize global warming below the 2°C level this figure would have to be between 50 and 90% (Borchert, 2007). South Africa has put in place a long term mitigation scenario (LTMS) by which the country aims to develop a plan of action which is economically viable and internationally aligned to the world effort on climate change. The scenario period (2003-2050) South Africa will aim to take action to mitigate GHG emissions by 30% to 40% by the year 2050.

This is a reduction of between 9000 tons and 17 500 tons of CO₂ by 2050. In January 2010, South Africa pledged to the UNFCCC, a 34% and 42% reduction against business as usual emissions growth trajectory by the year 2020 and 2025 respectively. Renewable energies need to be pursued vigorously not only to aid in reducing greenhouse gas concentrations but also because coal and other fossil fuels will not always be around, since they are non-renewable. The White Paper on Renewable Energy (2003) lays the foundation for prioritizing the implementation of renewable energy and sets a target, as a policy objective, of ten thousand gigawatt-hours (GWh) of renewable energy contribution to the final energy demand in South Africa by 2013.

According to Terra Power Solutions, this project is desirable as it will contribute to government and private sector energy generation targets. Under the IPP Producer Procurement Programme, South Africa will seek to procure the first 3725 MW of renewable capacity by 2016 (1850 MW of on-shore wind) to meet the renewable energy target of 4000 MW by 2014 and 9000 MW by 2030. Fossil fuels supply 90% of South Africa’s energy needs with demands on energy supply expected to increase by 3.5% in the next 20 years.

Legal Requirements

The EIA process is guided by regulations made in terms of Chapter 5 of the National Environmental Management Act No. 107 of 1998 (NEMA). The regulations (GNR. 543) set out the procedures and criteria for the submission, processing and consideration of and decisions on applications for the environmental authorisation of activities. Three lists of activities, published on 02 August 2010, as Government Notice Numbers R.544 to 546, define the activities that require, either a Basic Assessment (applies to activities with limited environmental impacts (GN.R. 544) or within a prescribed geographical area – province (GN.R. 546)), or a Scoping and Environmental Impact Assessment (applies to activities which are significant in extent and duration (GN.R. 545)). The activities triggered by the proposed wind farm development are listed in Table 1 below.

Table 1: Listed activities potentially triggered by the proposed Terra Power Solutions Riebeeck East Wind Energy Project

Indicate the number and date of the relevant notice: Activity No (s) (in terms of the relevant notice) Describe each listed activity as per project description¹:

Listing Notice 1 of R544 EIA Regulations dated 18 June 2010	(1)	<p>The construction of facilities or infrastructure for the generation of electricity where:</p> <ul style="list-style-type: none"> (i) the electricity is more than 10 megawatts but less than 20 megawatts; or (ii) the output is 10 megawatts or less but the total extent of the facility covers an area in excess of 1 hectare. <hr/> <p>Establishment of a wind farm for the generation of electricity</p>
Listing Notice 1 of R544 EIA Regulations dated 18 June 2010	(10)	<p>The construction of facilities or infrastructure for the transmission and distribution of electricity-</p> <ul style="list-style-type: none"> (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; (ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more. <hr/> <p>Establishment of a substation</p>
Listing Notice 1 of R544 EIA Regulations dated 18 June 2010	(18)	<p>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:</p> <ul style="list-style-type: none"> (i) a watercourse; <hr/> <p>A 33kV underground cable will connect the turbines and the electrical substation. This cable is likely to cross one or more of the watercourses occurring on the farm portions.</p>
Listing Notice 1 of R544 EIA Regulations dated 18 June 2010	(23)	<p>The transformation of undeveloped, vacant or derelict land to –</p> <ul style="list-style-type: none"> (i) residential, retail, commercial, recreational, industrial or institutional use, inside an urban area, and where the total area to be transformed is 5 hectares or more, but less than 20 hectares, or (ii) residential, retail, commercial, recreational, industrial or institutional use, outside an urban area and where the

¹ Please note that this description should not be a verbatim repetition of the listed activity as contained in the relevant Government Notice, but should be a brief description of activities to be undertaken as per the project description

		<p>total area to be transformed is bigger than 1 hectare but less than 20 hectares; - Except where such transformation takes place for linear activities</p> <hr/> <p>Development of land</p>
Listing Notice 1 of R544 EIA Regulations dated 18 June 2010	(38)	<p>The expansion of facilities for the transmission and distribution of electricity where the expanded capacity will exceed 275 kilovolts and the development footprint will increase</p> <hr/> <p>Expansion of electrical substation</p>
Listing Notice 2 of R545 EIA Regulations dated 18 June 2010	(1)	<p>The construction of facilities or infrastructure for the generation of electricity where the electricity output is 20 megawatts or more.</p> <hr/> <p>Establishment of a wind farm for the generation of electricity where the maximum output of the facility will be 140MW.</p>
Listing Notice 2 of R545 EIA Regulations dated 18 June 2010	(8)	<p>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.</p> <hr/> <p>Development of a substation</p>
Listing Notice 2 of R545 EIA Regulations dated 18 June 2010	(15)	<p>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:</p> <ul style="list-style-type: none"> (i) linear development activities; or (ii) agriculture or afforestation where activity 16 in this Schedule will apply. <hr/> <p>Development of land.</p>
Listing Notice 3 of R546 EIA Regulations dated 18 June 2010	(4)	<p>The construction of a road wider than 4 metres with a reserve less than 13,5 metres</p> <ul style="list-style-type: none"> (a) In Eastern Cape, Free State, KwaZulu-Natal, Limpopo, Mpumalanga and Northern Cape provinces: (ii) Outside urban areas, in : (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; <hr/> <p>Access Roads within the site during operation will be 6 meters wide. During the construction phase, these will be larger due to the size of the trucks required to transport the turbines</p>
Listing Notice 3 of R546 EIA Regulations dated 18 June 2010	(10)	<p>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. (see GNR 546 for specific thresholds)</p> <hr/> <p>Storage</p>

<p>Listing Notice 3 of R546 EIA Regulations dated 18 June 2010</p>	<p>(12)</p>	<p>The clearance of an area of 300 square metres or more of vegetation where 75% or more of the vegetation cover constitutes indigenous vegetation: (a) Within an critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; (b) Within critical biodiversity areas identified in bioregional plans; (c) Within the littoral active zone or 100 metres inland from high water mark of the sea or estuary, whichever distance is greater, excluding where such removal will occur behind the development setback line on even in urban areas.</p> <hr/> <p>Clearing of land for development</p>
<p>Listing Notice 3 of R546 EIA Regulations dated 18 June 2010</p>	<p>(13)</p>	<p>The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetation cover constitutes indigenous vegetation, except where such vegetation is required for: (1) the undertaking of a process or activity included in the list of waste management activities published in terms of section 19 of the National Environmental Management : Waste Act, 2008 (Act No. 59 of 2008), in which case the activity is regarded to be excluded from this list (2) the undertaking of a linear activity falling below the thresholds mentioned in Listing Notice 1 in terms of GN No. 544 of 2010. (<u>see GNR 546 for specific thresholds</u>)</p> <hr/> <p>Clearing of land for development</p>
<p>Listing Notice 3 of R546 EIA Regulations dated 18 June 2010</p>	<p>(14)</p>	<p>The clearance of an area of 5 hectares or more of vegetation where 75% or more of the vegetation cover constitutes indigenous vegetation, except where such vegetation is required for: (1) purposes of agriculture or afforestation inside areas identified in spatial instruments adopted by the competent authority for agriculture or afforestation purposes (2) the undertaking of a process or activity included in the list of waste management activities published in terms of section 19 of the National Environmental Management : Waste Act, 2008 (Act No. 59 of 2008), in which case the activity is regarded to be excluded from this list (3) the undertaking of a linear activity falling below the thresholds in Notice 544 of 2010. (<u>see GNR 546 for specific thresholds</u>)</p> <hr/> <p>An ecological specialist study will establish for certain how much of the existing vegetation is indigenous. Our assumption based on previous experience is that this activity is applicable.</p>
<p>Listing Notice 3 of R546 EIA Regulations dated 18 June 2010</p>	<p>(19)</p>	<p>The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.</p> <p>(a) In Eastern Cape, Free State, KwaZulu-Natal, Limpopo, Mpumalanga and Northern Cape provinces: (ii) Outside urban areas, in: (bb) National Protected Area Expansion Strategy Focus areas; (cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act</p>

		<p>and as adopted by the competent authority;</p> <p>(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p> <p>(gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve;</p> <p>(ii) Areas on the watercourse side of the development setback line or within 100 metres from the edge of a watercourse where no such setback line has been determined.</p> <hr/> <p>New roads will be constructed to allow installation and servicing of the facility</p>
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Because the proposed development triggers listed activities from GNR.545, it will require a full Scoping and EIA. This process is regulated by Part 3 of Chapter 3 of the 2010 EIA Regulations and described in detail further on in this report. It is important to note that, in addition to the requirements for an authorisation in terms of the NEMA, there may be additional legislative requirements that need to be considered prior to commencing with the activity, for example: the National Heritage Resources Act (Act No 25 of 1999), the National Water Act (Act No 36 of 1998), Aviation Act (Act No 74 of 1962) as amended, White Paper on Energy Policy for South Africa (Energy White Paper), White Paper on Renewable Energy Policy (Renewable Energy White Paper), the Integrated Energy Plan for the Republic of South Africa (March, 2003), and others.

The Environmental Impact Assessment

Coastal & Environmental Services (CES), a well-established specialist environmental consulting firm with offices in Grahamstown, East London, and Port Elizabeth have been appointed by Terra Power Solutions (Pty) Ltd as Environmental Assessment Practitioner (EAP) to conduct the Environmental Impact Assessment (EIA).

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

The EIA process is divided into two key phases - Scoping and Environmental Impact Assessment. This Environmental Scoping Report (ESR) presents the outcomes of the first phase of the environmental impact assessment process. The Scoping Process has been undertaken to identify and describe:

- The nature of the proposed project;
- The legal, policy and planning context for the proposed project;
- Important biophysical and socio-economic characteristics of the affected environment;
- Potential environmental issues or impacts, so they may be addressed in the EIA phase;
- Feasible alternatives that must be assessed in the EIA phase;
- The Plan of Study (POS) for the EIA phase.

Provision was made in the Scoping Phase for the involvement of Interested and Affected Parties (I&APs) in the forthcoming EIA process.

Project Description

The term wind energy describes the process by which wind turbines convert the kinetic energy in the wind into mechanical power and a generator can then be used to convert this mechanical power into electricity. Typical turbine subsystems include:

- A rotor or blades – the portion of the wind turbine that collects energy from the wind and converts this wind energy into rotational shaft energy to turn the generator.
- A nacelle (enclosure) containing a drive train, usually including a gearbox (some turbines do not require a gearbox) and a generator which converts the turning motion of a wind turbine's blades (mechanical energy) into electricity.
- A tower, to support the rotor and drive train - the tower on which a wind turbine is mounted is not only a support structure, but it also raises the wind turbine so that its blades safely clear the ground and so can reach the stronger winds at higher elevations.
- Electronic equipment such as controls, electrical cables, ground support equipment, and interconnection equipment.
- Turbine step-up transformer which can be indoor or outdoor, depending on the turbine model.

The ultimate size of the wind turbines will depend on further technical assessments but will typically consist of rotor turbines (3 x 60m blades) with rotor diameters of 120 meters mounted atop a 100 - 140 meter high steel or hybrid steel/concrete tower. As with all projects of this nature being developed by Independent Power Producers (IPP's) the electricity will be fed into the national Eskom grid.

Typically, the development of the wind farm is divided into various phases:-

- *Pre-feasibility:* Terra Power Solutions (Pty) Ltd conduct surveys to ensure obvious issues surrounding the project should not impact on the progress and the final acceptance of the project. This includes visits to local authorities, civil aviation authorities, identifying local communities, wind resource evaluation from existing data, grid connectivity, environmental impact assessment, logistical and project phasing requirements.
- *Feasibility:* Terra Power Solutions (Pty) Ltd will firm up and carry out thorough investigations to establish the actual costs, and economic viability of the project by designing the financial model with financial institutions, verifying wind resources by on-site measurement, ensuring grid connection is economical and feasible in the timeframes of the project, identifying possible off-takers for the electricity.
- *Wind Measurement:* Prior to the establishment of the full facility, it will be necessary to erect, a number of wind measurement masts to gather wind speed data and correlate these measurements with other meteorological data in order to produce a final wind model of the proposed project site. The measurement campaign will last not less than 12 months in order to ensure verifiable data is used for the economics of the project.
- *Implementation:* Building of a wind farm comprises-

Civil works:

1. Roads: An internal road network will be constructed for access to each turbine and to the substation during the construction phase by construction vehicles and equipment (bulldozers, trucks, cranes, etc.).
2. Platforms: A temporary area of 40 m x 25 m will be established for each turbine to allow the turbine erection and enough spacing for the cranes. At the end of construction, the platforms will be reduced and the permanently occupied area will be about 20 m x 20 m.
3. Turbine foundations: These will be of approximately 15 m x 15 m x 2.5 m.
4. Cabling: Underground 22kV electrical cables will be entrenched adjacent to the access roads (about 1m in depth) to connect the turbines to the electrical substation to be

constructed on site.

5. Civil works for the 22/66 kV electrical substation, including relevant buildings.

Erection/commissioning:

1. Wind turbine erection: Each turbine will be erected by utilising suitable cranes.
2. Electrical equipment: Step-up transformer, switchgears, busbars and ancillary equipment will be installed in the electrical substation.
3. Commissioning and startup: Once connected to the Eskom distribution grid, the commissioning of the wind farm with all relevant functional tests will be carried out up until the final start-up of the wind farm.

Commercial operation

During the period when the turbines are operational, there are only a few crews who carry out routine maintenance requiring only light vehicles to access the site. Only major breakdowns would necessitate the use of cranes and trucks.

➤ *Timing Estimation:*

The overall wind farm construction schedule will be about 12-18 months. This is dependant on the delivery times of the turbine components and main equipment. Described below is a typical schedule:

- Platforms/Roads/cables laydown = 20 weeks;
 - Turbines foundations = 10 weeks for each foundation (including 8 weeks to let the foundation concrete dry);
 - Civil works for the substation = 12 weeks;
 - Wind turbines/electrical substation erection = 2 turbines/week (in good low wind weather conditions);
 - Substation erection: 8 weeks; and
 - Commissioning and electrical connection = 4 weeks.
- *Refurbishment and rehabilitation of the site after operation:* Current wind turbines are designed to last for over 25 years and this is the figure that has been used to plan the life span of a modern wind farm. If refurbishment is economical, the facility life span could be expanded by another 25 years. Decommissioning of the wind energy facility at the end of its lifespan will be undertaken in agreement with the landowners and according to the land use agreement.

The Affected Environment

Climate

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

There is data available for climatic conditions in Grahamstown, which is close to the study site. The mean annual temperature is 16.4°C with an average maximum temperature of 20°C and an average minimum temperature of 9°C (Stone et al. 1998). The average annual rainfall for Grahamstown is 681mm and falls in a bimodal pattern with the most rain falling in Autumn and Spring (Stone et al. 1998). Rainfall reliability is poor and long lasting droughts are common (Palmer 2004).

Geology and Topography

The Eastern Cape Province contains a wide variety of landscapes, from the stark Karoo (the semi-desert region of the central interior) to mountain ranges and gentle hills rolling down to the sea. The climate and topography give rise to the great diversity of vegetation types and habitats found in the region. The mountainous area on the northern border of the Eastern Cape forms part of the Great Escarpment.

Vegetation and floristic

The vegetation of the Eastern Cape is complex and is transitional between the Cape and subtropical floras, and many taxa of diverse phyto-geographical affinities reach the limits of their distribution in this region. The region is best described as a tension zone where four major biomes converge and overlap.

Vegetation

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

There are two vegetation classifications pertinent to the area. These are the National vegetation map developed by Mucina and Rutherford and the Subtropical Ecosystem Planning (STEP) Project. Each of these projects and descriptions of the relevant vegetation types are described below.

National Vegetation Map: Mucina and Rutherford

Mucina and Rutherford (2006) have developed the National Vegetation map as part of a South African National Biodiversity Institute (SANBI) funded project: “It was compiled in order to provide floristically based vegetation units of South Africa, Lesotho and Swaziland at a greater level of detail than had been available before.” The map was developed using a wealth of data from several contributors and has allowed for the best national vegetation map to date, the last being that of Acocks developed over 50 years ago. This map forms the base of finer scale bioregional plans such as STEP. This SANBI Vegmap project has two main aims:

- “to determine the variation in and units of southern African vegetation based on the analysis and synthesis of data from vegetation studies throughout the region, and
- to compile a vegetation map. The map was to accurately reflect the distribution and variation on the vegetation and indicate the relationship of the vegetation with the environment. For this reason the collective expertise of vegetation scientists from universities and state departments were harnessed to make this project as comprehensive as possible.”

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

Mucina and Rutherford (2006) define the following vegetation types from which source these descriptions are derived: Bisho Thornveld, Kowie thicket, Suurberg Quartzite Fynbos, Suurberg Shale Fynbos, Albany Broken Veld, Great Fish Norsveld

Subtropical Ecosystem Planning (STEP) Project

The Subtropical Ecosystem Planning (STEP) Project aims to identify priority areas that would ensure the long-term conservation of the subtropical thicket biome and to ensure that the conservation of this biome is considered in the policies and practices of the private and public sector that are responsible for land-use planning and the management of natural resources in the region (Pierce *et al.* 2005). STEP identifies five vegetation types in this region.

Pierce and Mader (2006) define the following vegetation types from which source these descriptions are derived:

Zuurberg Grassy Fynbos, Grahamstown Grassland Thicket, Eastern Lower Karoo, Saltaire Karroid Thicket, Fish Noorsveld, Albany Valley Thicket and Inland Thornveld.

Fauna

Amphibians and Reptiles

The Eastern Cape is home to 133 reptile species including 21 snakes, 27 lizards and eight chelonians (tortoises and turtles). The majority of these are found in Mesic Succulent Thicket and riverine habitats

Birds

Nine bird species are endemic to South Africa, but there are no Eastern Cape endemics. However, there are 62 threatened species within the Eastern Cape Province (Barnes, 2000). Most of these species occur in grasslands or are associated with wetlands, indicating a need to conserve what is left of these ecosystems (Barnes, 2000).

Socio-economic profile: Makana Local Municipality

The proposed Grahamstown Wind Energy Project is to be developed within the Makana Local Municipality (MLM). The proposed facility will be situated approximately 22km east of Riebeeck East and 15km west of Grahamstown, and be located on seven properties, namely: Hilton Farm, Table Hill North, Kruisfontein, Brack Kloof, Table Hill, Slaaikraal Farm and Hounslow. The surrounding area is not densely populated. However, it is still highly likely that the development of the project will have direct socio-economic impacts on the municipal area and its population.

The Makana municipal area extends over 4 379 km² and is bounded by the cities of Port Elizabeth to the west, and East London to the east. According to the South African Community Survey of 2007 (StatsSA, 2007)², the municipality's population declined from an estimation of 75 302 in 2001 to about 70 059 in 2007. The MLM IDP 2010³ cites Quantec's numeration of the population in 2007 as 70 706. The area primarily consists of three nodal points namely Grahamstown, Riebeeck East and Alicedale. Grahamstown is the largest of the nodes both economically and in terms of population size (the greater Grahamstown area accounts for approximately 81% of the municipality's population), and serves as the administrative hub. Rhodes University (RU) is a dominant feature in the economic social landscape of the city, and therefore the MLM at large. By contrast, Alicedale is a small town that used to serve as an important national railway juncture in the past, but current economic activity is restricted to tourism primarily in the form of the Bushman Sands Hotel. Lastly, Riebeeck East has traditionally been an agrarian economy, which is still reflected in the current status quo.

² StatsSA. 2007. Community Survey 2007: Basic Results for the Eastern Cape. Pretoria: Statistics South Africa.

³ Makana Local Municipality Integrated Development Plan Review 2010/2011

Makana has a population density of 16.1 people per square kilometre, which is high when compared to the district population density of 6.6 people per square kilometre. This indicates a high level of urbanization in the local municipality. Despite the overall plateau in population growth, informal settlement populations increased. This may indicate migration from farms and areas in the Grahamstown periphery to the core, in the search for economic opportunities and improved service provision (MLM IDP 2010:15).

Public Participation Process

At the inception of the project a public participation process (PPP) was undertaken to allow Interested and Affected Parties (I&APs) to voice their concerns and raise issues regarding the proposed project. The key elements of the process included:-

- Development and distribution of a Background Information Document (BID) to all neighbouring landowners and other relevant stakeholders such as DWA, SAHRA, WESSA, etc.;
- Informing potential I&APs and neighbours of the proposed development through newspaper advertisements and site notice boards, and
- A public meeting will be held during this reports review period. All parties will be informed of the date, venue and time.

During the Scoping Phase the public participation process (PPP) continues. All I&APs will be notified in regards to the availability of the Draft Scoping Report for review. Furthermore the DSR will be made available in easily accessible locations prior to the start of the review period.

A public meeting will be held, where the EAP will present the details of this report to all I&APs. Time will then be available for questions. If the reader is unaware of the details of the public meeting, please contact Justin Green: j.green@cesnet.co.za.

Issues and Concerns

An extensive list of the issues identified and raised during the public consultation process, and responses thereto by the EAP, is provided in Appendix C of this report.

Identification of Alternatives

Since the core business area of the project proponent is wind farm development for the generation of electricity, the fundamental alternative of a development other than to construct and operate a wind farm is therefore not viable in this case, and will not be considered further in the EIA. Modifications or variations to the design of the wind farm that will facilitate the reduction or minimisation of environmental impacts i.e. incremental alternatives will be investigated, including modifications to the design or layout, technology and operational aspects of the proposed project.

The EIA Phase will also examine the impact of no development (i.e. the “No Go” option). The no-go alternative will be used as a baseline throughout the environmental assessment process against which potential impacts will be compared in an objective manner and will be fully assessed in the EIR.

The Way Forward – EIA Phase

This Draft Scoping Report (DSR) includes the outline of a Plan of Study (PoS) for the EIA phase, which includes Terms of Reference (ToR) for specialist studies as they are currently envisaged and the methodology that will be used to assess impacts and rate their significance. After taking into account the comments received from all stakeholders during the review period, the Scoping

Report will be finalised and submitted to DEA, who will then approve or recommend amendments to the PoS. Consultation with DEA will be on going throughout this EIA. However, it is anticipated that DEA will provide relevant comment with respect to the adequacy of this Plan of Study for the EIA, as it informs the content of the Environmental Impact Report (EIR) and sufficiency thereof. The following specialist studies are proposed for the EIA Phase of the assessment:-

- Agricultural Impact Assessment
- Avifauna (Bird) Impact Assessment
- Bat Impact Assessment
- Ecological Impact Assessment (incorporating flora and fauna)
- Heritage, Archaeological Impact Assessment
- Noise Impact Assessment
- Palaeontological Impact Assessment
- Visual Impact Assessment

The significance of impacts will be assessed based on specialist input using a standardised rating methodology. “Significance” includes the spatial and temporal scales of impacts, the likelihood of impacts occurring, and the severity of impacts or potential benefits.

An EIR will be prepared that will describe the nature of the proposed project and its environmental setting, summarise the results of the specialist studies, and recommend practical and reasonable mitigation measures to avoid, minimise or offset any negative impacts from the development. In this regard the EIA Phase will actively engage and contribute to the planning process so as to mitigate environmental impacts through improved design and layout. The overall objective of the EIR is to provide DEA with sufficient information about the proposed project and its associated environmental and social impacts on which to make an informed decision.

An Environmental Management Programme (EMPr) will be prepared that provide practical and actionable management, monitoring and institutional measures to be undertaken during the construction, operation and decommissioning of the proposed wind energy facility. Such measures are designed to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels. The public participation process initiated in the Scoping Phase will continue throughout the EIA Phase.

In this regard a critical outcome of the EIA phase will be the Draft EIR and Draft EMPr. These reports will be released for public review and comment, and will also be presented to I&APs during public meetings, before they are finalised and presented to DEA. An environmental authorisation may be granted or rejected by the authority based on the review of these reports. The decision will be advertised, and registered I&APs will also be informed in writing and given the opportunity to appeal the decision.

TABLE OF CONTENTS

1. INTRODUCTION 1

1.1. Background to the study 1

1.2. The environmental impact assessment process 1

1.3. Motivation for the activity 7

1.4. Scoping phase 8

1.5. The scoping report 9

1.6. Details and expertise of the environmental assessment practitioner 10

2. PROJECT DESCRIPTION 13

2.1. Location and site description of the proposed development 13

2.2. Detailed description of the Terra Power Solutions Riebeeck East wind energy project 16

2.2.1. Production of electricity from wind 16

2.2.2. Stages of wind farm development 16

2.2.3. Timing estimation 22

2.2.4. Refurbishment and rehabilitation of the site after operation 22

3. RELEVANT LEGISLATION 24

3.1. International 24

3.1.1. The 1992 United Nations Framework Convention on Climate Change (FCCC) 24

3.1.2. The Kyoto Protocol (2002) 24

3.2. National 24

3.2.1. The Constitution Act (108 of 1996) 24

3.2.2. The National Environmental Management Act (NEMA) (107 of 1998) 25

3.2.3. The National Environment Management: Biodiversity Act (10 of 2004) 26

3.2.4. The National Forests Act (84 of 1998) 27

3.2.5. National Heritage Resources Act (25 of 1999) 27

3.2.6. Atmospheric Pollution Prevention Act 45 of 1965 27

3.2.7. National Environmental Management: Air Quality Act (39 of 2004) 28

3.2.8. The White Paper on Energy Policy for South Africa (Energy White Paper) 28

3.2.9. The White Paper on Renewable Energy Policy (Renewable Energy White Paper) 28

3.2.10. Electricity Regulation Act (Act No. 4 of 2006) 29

3.2.11. Electricity Regulation on New Generation Capacity (Government Gazette No 32378 of 5 August 2009) 30

3.2.12. Aviation Act (Act No. 74 of 1962): 13th Amendment of the Civil Aviation Regulations 1997 31

3.2.13. Occupational Health and Safety Act (85 of 1993) 33

3.3. Municipal by-laws 35

4. DESCRIPTION OF THE AFFECTED ENVIRONMENT 37

4.1. The bio-physical environment 37

5. PUBLIC PARTICIPATION PROCESS 60

5.1. Notifying interested and affected parties of the eia 60

5.2. Public review period of draft esr and meetings 61

6. ISSUES IDENTIFIED DURING SCOPING 62

6.1. Possible environmental issues & impacts 62

7. ALTERNATIVES 73

7.1. Fundamental alternatives 73

7.2. Incremental alternatives 74

8. PLAN OF STUDY FOR EIA 75

8.1. EIA phase 75

8.2. Specialist studies 76

8.3. Methodology for assessing the significance of impacts 80

8.4. Environmental impact report 83

8.5. Ppp for the eia phase 84

8.6. Consideration by the competent authority for environmental authorisation and appeals process 86

9. REFERENCES 87

APPENDIX A: THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS 89

APPENDIX B: DEA ACKNOWLEDGEMENT OF RECEIPT 93

APPENDIX C: PUBLIC PARTICIPATION 97

APPENDIX D: THE COEGA WIND TURBINE (FOR ILLUSTRATION PURPOSES) 119

APPENDIX E: SPECIES LIST OF POTENTIAL SPECIES OF SPECIAL CONCERN THAT COULD POSSIBLY OCCUR AT THE STUDY SITE (SIBIS, 2012)	121
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LIST OF FIGURES

Figure 1-1: The EIA process under current legislation (NEMA 1998)	6
Figure 2-1: Location of the proposed Terra Power Solutions Riebeeck East Wind Energy facility.....	14
Figure 2-2: Layout of the facility indicating the preliminary position of all infrastructure components.	15
Figure 2-3: Illustration of the main components of a typical wind turbine	17
Figure 2-4: The main dimensions for the foundation of a 3MW/100m high wind turbine.....	20
Figure 4-1: Mucina and Rutherford vegetation map of the study area	43
Figure 4-2: STEP vegetation map of the study area.....	44
Figure 4-3: The Albany Centre of Endemism, also known as the ‘Albany Hotspot’, has long been recognised as an important centre of plant species diversity and endemism (From van Wyk and Smith 2001).....	45
Figure 4-4: Important Bird Areas (IBAs), Protected areas and Protected Area Expansion Focus Areas surrounding the project site	51
Figure 4-5: Wetlands surrounding the proposed project site	52
Figure 4-6: Critical Biodiversity Areas (CBA) for the proposed project site.	52
Figure 4-7: STEP conservation status of study site.....	53
Figure 4-8: An indication of the locality of Makana Local Municipality.	54

LIST OF TABLES

Table 1-1: Listed activities potentially triggered by the proposed Wind Energy Project	2
Table 4-1: Summary of the status of the Possible Species of Special Concern occurring in the Proposed Riebeeck East Wind Energy Facility area.....	46
Table 4-2: Plant species likely to occur in the Riebeeck East area that are critically Endangered (CR) on the South African Red Data List (Source: SIBIS 2012).....	46
Table 4-2: Threatened and endemic reptiles likely to occur in the Grahamstown and Riebeeck East region (Source: Branch, 1998)	47
Table 4-3: Threatened and endemic frogs likely to occur in the Grahamstown/Riebeeck East area (Source: CSIR, 2004).....	48
Table 4-4: Threatened bird species likely to be encountered in Grahamstown/Riebeeck East Area and surrounds (Source: SABIF, 2012).....	48
Table 4-5: Threatened large to medium-sized mammals in the Eastern Cape Province (Source: Smithers, 1986).....	49
Table 4-6: Bat species that occur in the Grahamstown and Riebeeck East area which are likely to be affected by the wind turbines (Apps, 2000).....	49
Table 4.6: Conservation and planning tools considered for the proposed project	50
Table 4-7: Sectoral production and employment in the Eastern Cape economy	55
Table 4-8: Educational status of the MLM	57
Table 4-9: Access to basic services.....	58
Table 4-10: Employment Sectors of the MLM.....	58
Table 4-11: Synthesis of socio-economic profile of Makana Local Municipality.....	59
Table 6-1: Issues and impacts that can be identified in the planning and design phase of the proposed project	63
Table 6-2: Issues and impacts potentially relevant to the construction phase of the proposed project	65
Table 6-3: Issues and impacts potentially relevant to the operational phase of the proposed project	68
Table 6-4: Issues and impacts potentially relevant to the decommissioning phase of the proposed project	71
Table 7-1: Matrix indicating land uses contemplated to occur in conjunction with development of a wind farm	74
Table 8-1: Criterion used to rate the significance of an impact.....	81
Table 8-2: The matrix that will be used for the impacts and their likelihood of occurrence	82
Table 8-3: The significance rating scale	82
Table 8-4: Volumes that will be generated in the EIA phase for the proposed project	83

LIST OF PLATES

Plate 2-1: Concrete pouring of a turbine foundation – note the tower base collar in the foreground.....	21
Plate 2-3: Assembly and erection of the tower sections using cranes	22
Plate 4-1: An Angulate tortoise (<i>Chersina angulata</i>) found in the Grahamstown and Riebeeck East area. .	47

LIST OF ABBREVIATIONS

BID:	Background Information Document
CES:	Coastal and Environmental Services
CITES:	Convention on International Trade in Endangered Species
DEA:	Department of Environmental Affairs
DWA	Department of Water Affairs
EAP:	Environmental Assessment Practitioner
EIA:	Environmental Impact Assessment
EIR:	Environmental Impact Report
EMPr:	Environmental Management Programme
ESR:	Environmental Scoping Report
GNR:	Government Notice Regulation
ha:	Hectare
I&APs:	Interested and Affected Parties
IPP:	Independent Power Producer
kV	Kilovolt
Ltd:	Limited
MW:	Mega Watts
NEMA:	National Environmental Management Act 107 of 1998 as amended in 2006
NERSA:	National Energy Regulator of South Africa
PNCO:	Provincial Nature Conservation Ordinance
PoS:	Plan of Study
PPA:	Power Purchase Agreement
PPP:	Public Participation Process
RDB:	Red Data Book
REFIT:	Renewable Energy Feed In Tariff
SSC:	Species of Special Concern
ToR:	Terms of Reference
WT:	Wind Turbine

1. INTRODUCTION

1.1. BACKGROUND TO THE STUDY

Terra Power Solutions (Pty) Limited (the applicant) is a company based in Grahamstown which is involved in the development of numerous wind and solar energy projects throughout South Africa.

The proposed wind farm is located in the Makana Local Municipality, Cacadu District Municipality, Eastern Cape Province, South Africa. According to Terra Power Solutions (Pty) Ltd available wind data in South Africa shows the Riebeeck East farms to have favourable wind conditions sufficient to support a wind farm. This has been confirmed by on site wind monitoring that has been on-going since early 2011. The facility will be located on seven properties, namely: Hilton Farm, Table Hill North, Kruisfontein, Brack Kloof, Table Hill, Slaaikraal Farm and Hounslow. It is situated approximately 22km east of Riebeeck East and 15km west of Grahamstown.

The erection of 77 wind turbines is proposed. The model and size of the turbine selected will depend on on-going wind measurement, the outcome of the EIA process and long term monitoring, and on other technical and financial considerations. The final turbine type selected will be between 100 and 140 metres high, and have a power output of between 2 and 3 MW. The facility will have a generating output ranging between 120 and 140 MW. A wind turbine consists of a vertical tower, hub and three blades. Additional infrastructure required to support the wind farm includes: 6 metre wide access roads, underground cabling running adjacent to the roads, a substation and an on-site storage shed. From the substation, the power generated will be fed into the Eskom grid via the 132 kV line traversing the site.

The ultimate size of the wind turbines will depend on further technical assessments but will typically consist of rotor turbines with rotor diameters up to a maximum of 120 meters. The towers will have a nacelle or transformer hub between 100 and 140 meters above ground with a blade tip height of between 160 and 200 meters above ground.

Improvement of the existing road infrastructure and study area access routes will be required for the construction phase.

In accordance with the requirements of the National Environmental Management Act No. 107 of 1998, and relevant Environmental Impact Assessment (EIA) regulations made in terms of this Act (Government Notice No R.543) promulgated in 2010, the proposed project requires a full Scoping and EIA process to be conducted.

Coastal & Environmental Services (CES) have been appointed by Terra Power Solutions (Pty) Limited as Environmental Assessment Practitioner (EAP) to conduct the EIA process.

1.2. THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The EIA process is guided by regulations made in terms of Chapter 5 of the National Environmental Management Act No. 107 of 1998 (NEMA), published as Government Notice No R.543 in Government Gazette No 33306 of 2 August 2010. The regulations set out the procedures and criteria for the submission, processing and consideration of and decisions on applications for the environmental authorisation of activities.

Three lists of activities, published on 2 August 2010, as Government Notice Numbers R.544, R.545 and R.546, define the activities that require, respectively, a Basic Assessment (applies to activities with limited environmental impacts), or a Scoping and Environmental Impact Assessment (applies to activities which are significant in extent and duration).

The activities triggered by the proposed wind energy project are listed in Table 1-1 below.

Table 1-1: Listed activities potentially triggered by the proposed Wind Energy Project
 Indicate the number and date of the relevant notice: Activity No (s) (in terms of the relevant notice) Describe each listed activity as per project description⁴:

Listing Notice 1 of R544 EIA Regulations dated 18 June 2010	(1)	<p>The construction of facilities or infrastructure for the generation of electricity where:</p> <p>(iii) the electricity is more than 10 megawatts but less than 20 megawatts; or</p> <p>(iv) the output is 10 megawatts or less but the total extent of the facility covers an area in excess of 1 hectare.</p> <hr/> <p>Establishment of a wind farm for the generation of electricity</p>
Listing Notice 1 of R544 EIA Regulations dated 18 June 2010	(10)	<p>The construction of facilities or infrastructure for the transmission and distribution of electricity-</p> <p>(iii) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;</p> <p>(iv) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more.</p> <hr/> <p>Establishment of a substation</p>
Listing Notice 1 of R544 EIA Regulations dated 18 June 2010	(18)	<p>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:</p> <p>(iii) a watercourse;</p> <hr/> <p>A 33kV underground cable will connect the turbines and the electrical substation. This cable is likely to cross one or more of the watercourses occurring on the farm portions.</p>
Listing Notice 1 of R544 EIA Regulations dated 18 June 2010	(23)	<p>The transformation of undeveloped, vacant or derelict land to –</p> <p>(iii) residential, retail, commercial, recreational, industrial or institutional use, inside an urban area, and where the total area to be transformed is 5 hectares or more, but less than 20 hectares, or</p> <p>(iv) residential, retail, commercial, recreational, industrial or institutional use, outside an urban area and where the total area to be transformed is bigger than 1 hectare but less than 20 hectares; -</p> <p>Except where such transformation takes place for linear activities</p> <hr/> <p>Development of land</p>
Listing Notice 1 of R544 EIA Regulations dated 18 June 2010	(38)	<p>The expansion of facilities for the transmission and distribution of electricity where the expanded capacity will exceed 275 kilovolts and the development footprint will increase</p> <hr/> <p>Expansion of electrical substation</p>
Listing Notice 2 of R545 EIA Regulations dated 18 June 2010	(1)	<p>The construction of facilities or infrastructure for the generation of electricity where the electricity output is 20 megawatts or more.</p>

⁴ Please note that this description should not be a verbatim repetition of the listed activity as contained in the relevant Government Notice, but should be a brief description of activities to be undertaken as per the project description

		Establishment of a wind farm for the generation of electricity where the maximum output of the facility will be 140MW.
Listing Notice 2 of R545 EIA Regulations dated 18 June 2010	(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. <hr/> Development of a substation
Listing Notice 2 of R545 EIA Regulations dated 18 June 2010	(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: (iii) linear development activities; or (iv) agriculture or afforestation where activity 16 in this Schedule will apply. <hr/> Development of land.
Listing Notice 3 of R546 EIA Regulations dated 18 June 2010	(4)	The construction of a road wider than 4 metres with a reserve less than 13,5 metres (b) In Eastern Cape, Free State, KwaZulu-Natal, Limpopo, Mpumalanga and Northern Cape provinces: (iv) Outside urban areas, in : (ff) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; <hr/> Access Roads within the site during operation will be 6 meters wide. During the construction phase, these will be larger due to the size of the trucks required to transport the turbines
Listing Notice 3 of R546 EIA Regulations dated 18 June 2010	(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. (see GNR 546 for specific thresholds) <hr/> Storage
Listing Notice 3 of R546 EIA Regulations dated 18 June 2010	(12)	The clearance of an area of 300 square metres or more of vegetation where 75% or more of the vegetation cover constitutes indigenous vegetation: (a) Within an critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; (b) Within critical biodiversity areas identified in bioregional plans; (c) Within the littoral active zone or 100 metres inland from high water mark of the sea or estuary, whichever distance is greater, excluding where such removal will occur behind the development setback line on even in urban areas. <hr/> Clearing of land for development

<p>Listing Notice 3 of R546 EIA Regulations dated 18 June 2010</p>	<p>(13)</p>	<p>The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetation cover constitutes indigenous vegetation, except where such vegetation is required for:</p> <p>(1) the undertaking of a process or activity included in the list of waste management activities published in terms of section 19 of the National Environmental Management : Waste Act, 2008 (Act No. 59 of 2008), in which case the activity is regarded to be excluded from this list</p> <p>(2) the undertaking of a linear activity falling below the thresholds mentioned in Listing Notice 1 in terms of GN No. 544 of 2010. (<u>see GNR 546 for specific thresholds</u>)</p> <hr/> <p>Clearing of land for development</p>
<p>Listing Notice 3 of R546 EIA Regulations dated 18 June 2010</p>	<p>(14)</p>	<p>The clearance of an area of 5 hectares or more of vegetation where 75% or more of the vegetation cover constitutes indigenous vegetation, except where such vegetation is required for:</p> <p>(1) purposes of agriculture or afforestation inside areas identified in spatial instruments adopted by the competent authority for agriculture or afforestation purposes</p> <p>(2) the undertaking of a process or activity included in the list of waste management activities published in terms of section 19 of the National Environmental Management : Waste Act, 2008 (Act No. 59 of 2008), in which case the activity is regarded to be excluded from this list</p> <p>(3) the undertaking of a linear activity falling below the thresholds in Notice 544 of 2010. (<u>see GNR 546 for specific thresholds</u>)</p> <hr/> <p>An ecological specialist study will establish for certain how much of the existing vegetation is indigenous. Our assumption based on previous experience is that this activity is applicable.</p>
<p>Listing Notice 3 of R546 EIA Regulations dated 18 June 2010</p>	<p>(19)</p>	<p>The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.</p> <p>(a) In Eastern Cape, Free State, KwaZulu-Natal, Limpopo, Mpumalanga and Northern Cape provinces:</p> <p>(ii) Outside urban areas, in:</p> <p>(bb) National Protected Area Expansion Strategy Focus areas;</p> <p>(cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;</p> <p>(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p> <p>(gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve;</p> <p>(ii) Areas on the watercourse side of the development setback line or within 100 metres from the edge of a watercourse where no such setback line has been determined.</p> <hr/> <p>New roads will be constructed to allow installation and servicing of the facility</p>

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

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

It is important to note that in addition to the requirements for an authorisation in terms of the NEMA, there may be additional legislative requirements which need to be considered prior to commencing with the activity, for example: the National Heritage Resources Act (Act No 25 of 1999), the National Water Act (Act No 36 of 1998), Aviation Act (Act No 74 of 1962) as amended, White Paper on Energy Policy for South Africa (Energy White Paper), White Paper on Renewable Energy Policy (Renewable Energy White Paper), the Integrated Energy Plan for the Republic of South Africa (March, 2003) etc. These are discussed in detail in Chapter 3 of this report.

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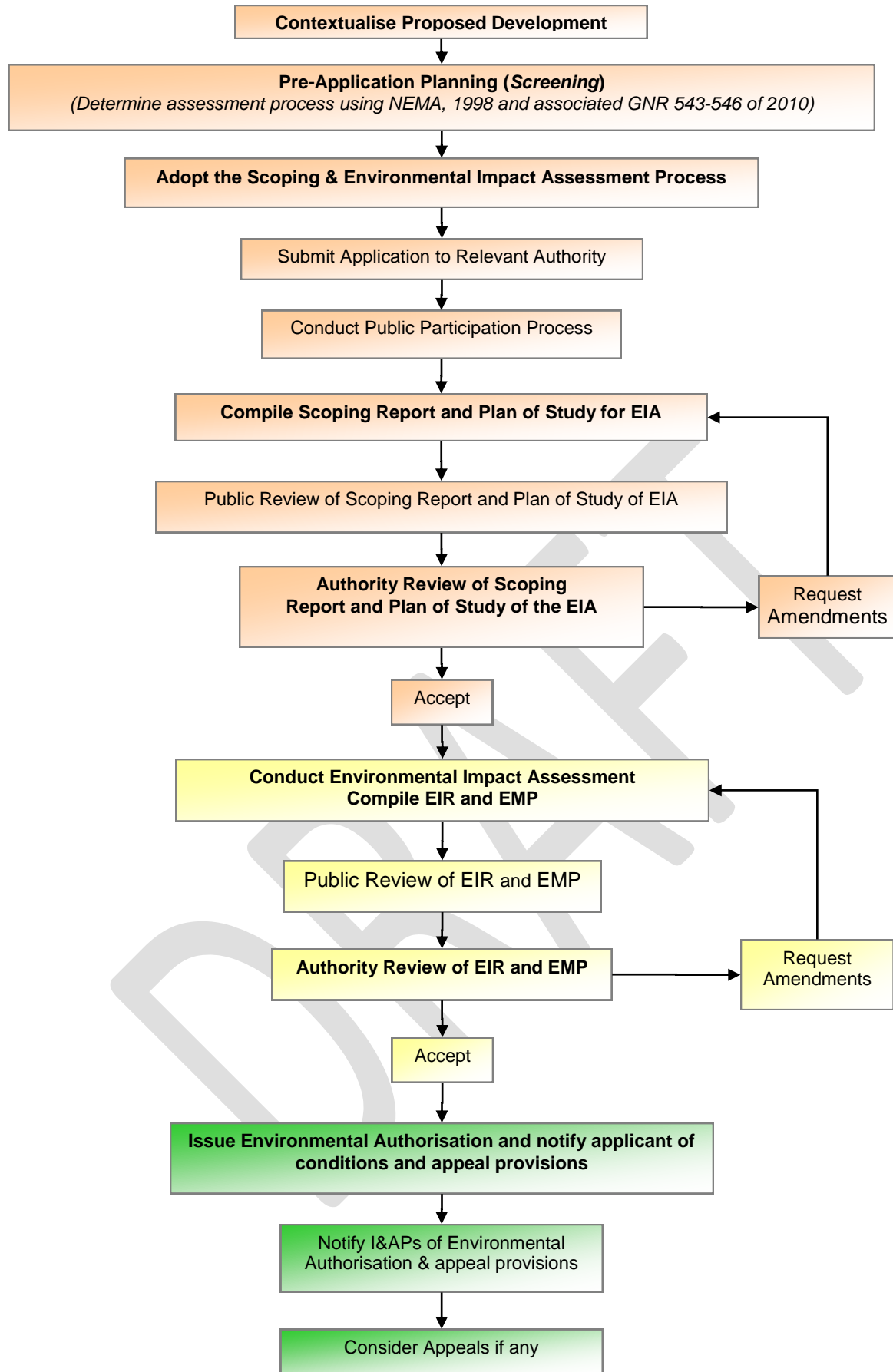


Figure 1-1: The EIA process under current legislation (NEMA 1998)

1.3. MOTIVATION FOR THE ACTIVITY

According to regulation 28 (1) of the EIA regulations (2010), *A scoping report must include –*
ii) a description of the need and desirability of the proposed activity

Electricity supply

Most of South Africa's energy comes from non-renewable sources like coal, petroleum, natural gas, propane, and uranium; however the proponents of renewable energy sources like biomass, geothermal energy, hydropower, solar energy, and wind energy is a major factor that the South African sector need to consider greatly. It is estimated that approximately 1% only of the country's electricity is currently generated from renewable energy sources. The energy sector in South Africa alone emits approximately 380 988.41 Green House Gases (GHGs) (Eastern Cape Climate Change Conference, 2011).

South Africa's total emissions was estimated to be 461 million tonnes CO₂ equivalent in the year 2000. Approximately 83% of these emissions were associated with energy supply and consumption (380 988.41 GHGs), 7% from industrial processes, 8% from agriculture, and 2% from waste. This poses great threat to the environment and livelihoods of citizens.

Eskom currently generates 95% of the electricity used in South Africa with a 40.87 GW net maximum installed capacity. By the year 2020 an additional 20 GW generation capacity would be required and up to 40 GW by 2030 to sustain the energy demands in the country. There is however a political will to change the energy mix to reduce the dependency of the economy on fossil fuels and facilitate the uptake of renewable energy resources.

The first step towards a solution in terms of climate change came in the form of the United Nations Convention on Climate Change 1994 (UNFCCC) and its associated Kyoto protocol 1997, adopted at the third session of COP 3, where countries agreed to reduce their greenhouse gas emissions to the levels they were at in 1990 by the year 2012. The protocol was first opened for signature from 16 March 1998 to 15 March 1999 at United Nations Headquarters, New York and by that date the Protocol had received 84 signatures. For the protocol to be ratified at least 55 of the 176 UN countries had to sign the protocol and these had to represent more than 55% of 1990 global carbon dioxide emissions.

So far, there are 141 nations, including South Africa, that have ratified the protocol (Borchert, 2007). The Kyoto Protocol is very similar in principles to the UNFCCC, but places a heavier burden on developed nations under the principle of "common but differentiated responsibilities" as well asserting binding targets for 37 industrialized countries and the European community for reducing emissions. The Kyoto Protocol also offers supplementary means of meeting targets via the use of three market-based mechanisms, namely emissions trading, clean development mechanisms and joint implementation.

Unfortunately it is quite unlikely that signing a treaty will stop global warming. Even if all the nations that have signed do achieve their targets it will mean a reduction of only 5.2% below 1990 levels. To stabilize global warming below the 2°C level this figure would have to be between 50 and 90% (Borchert, 2007). South Africa has put in place a long term mitigation scenario (LTMS) by which the country aims to develop a plan of action which is economically viable and internationally aligned to the world effort on climate change. The scenario period (2003-2050) South Africa will aim to take action to mitigate GHG emissions by 30% to 40% by the year 2050.

This is a reduction of between 9000 tons and 17 500 tons of CO₂ by 2050. In January 2010, South Africa pledged to the UNFCCC, a 34% and 42% reduction against business as usual emissions growth trajectory by the year 2020 and 2025 respectively. Renewable energies need to be pursued vigorously not only to aid in reducing greenhouse gas concentrations but also because coal and other fossil fuels will not always be around, since they are non-renewable. The White Paper on Renewable Energy (2003) lays the foundation for prioritizing the implementation of

renewable energy and sets a target, as a policy objective, of ten thousand gigawatt-hours (GWh) of renewable energy contribution to the final energy demand in South Africa by 2013.

There is a need to generate additional local power in the province. According to the applicant this project is desirable as it will contribute to the government and private sector energy generation target. Under the IPP Producer Procurement Programme, South Africa will seek to procure the first 3725 MW of renewable capacity by 2016 (1850 MW of on-shore wind) to meet the renewable energy target of 4000 MW by 2014 and 9000 MW by 2030. The establishment of the proposed wind farm will contribute to strengthening the existing electricity grid for the area and will aid the government in achieving its goal of a 30% share of all new power generation being derived from Independent Power Producers (IPPs).

Climate change

South Africa's use of renewable resources is currently limited and highly fossil fuel dependent. The benefits of "green" electricity such as wind turbines, as opposed to traditional coal powered stations, is the reduction of Carbon Dioxide (CO₂) and Sulphur Dioxide (SO₂) emissions and the lack of water required for the operation thereof. Localised electricity production can also compensate for voltage losses resulting from transmitting this power over long distances from Mpumalanga Province where most coal fired power stations are located (and the bulk of South Africa's energy generation capacity resides).

In addition to the above-mentioned potential benefits (e.g. electricity supply and climate change), the proposed project site was selected due to:

- Good wind resources suitable for the installation of a large wind energy facility.
- Proximity to connectivity opportunities such as the 132 kV Eskom overhead line traversing the proposed development site
- The site is easily accessible from gravel roads off the R400 and R344 (which is in close proximity to the N2 Highway) which will facilitate in the transportation of wind turbines and construction to the site.
- The immediate surrounding area is not densely populated.

Social development

The long term presence in in the Riebeeck East area (minimum 25 years) will allow for the identification and implementation of a socially responsible scheme during the operation phase of the facility. The implementation of such a scheme is a requirement of the Department of Energy for all IPPs under its procurement programme. IPPs bidding to the Department of Energy are required to submit detailed plans for social upliftment. This process follows the EIA process. A limited number of jobs will be created during the construction phase, as the erection of these structures is a rather specialised process.

1.4. SCOPING PHASE

The proposed project is currently in the Scoping Phase. The aim of this phase is to determine, in detail, the scope of the EIA required for the proposed activities. The principal objectives of the Scoping Phase in accordance with the regulatory requirements are to:

- Describe the nature of the proposed project;
- Enable preliminary identification and assessment of potential environmental issues or impacts to be addressed in the subsequent EIA phase;
- Define the legal, policy and planning context for the proposed project;
- Describe important biophysical and socio-economic characteristics of the affected environment;
- Undertake a public participation process that provides opportunities for all Interested and

- Affected Parties (I&APs) to be involved;
- Identify feasible alternatives that must be assessed in the EIA phase; and
- Define the Plan of Study (PoS) for the EIA phase.

1.5. THE SCOPING REPORT

This report is the first of a number of reports that will be produced in the EIA process (see Figure 1-1 above). The scoping report has been produced in accordance with the requirements as stipulated in Section 28 of the EIA regulations (GNR 543), which clearly outlines the content of a scoping report, and Sections 54-57 which cover the activities necessary for a successful Public Participation Process (PPP). Section 1.5.1 below provides the detailed structure of this scoping report and section 1.5.2 that follows outlines the limitations and assumptions under which this report was compiled.

Structure

The structure of the report is as follows:

Chapter 1 - Introduction: Provides background information on the proposed project, a brief description of the EIA process required by NEMA and its associated regulations, and describes the key steps in the EIA process that have been undertaken thus far, and those that will be undertaken in the future. The details and expertise of the Environmental Assessment Practitioner (EAP) who prepared this report are also provided in this Chapter.

Chapter 2 – Project description: Provides a description of the proposed development, the property on which the development is to be undertaken and the location of the development on the property. The technical details of the process to be undertaken are also provided in this Chapter.

Chapter 3 – Relevant Legislation: Identifies all the legislation and guidelines that have been considered in the preparation of this scoping report.

Chapter 4 – Description of the affected environment: Provides a brief overview of the bio-physical and socio-economic characteristics of the site and its environs that may be affected by the proposed development compiled largely from published information, but supplemented by information from a site visit.

Chapter 5 – Public Participation Process: Provides details of the public participation process conducted in terms of Regulation 28(a) including:

- The measures undertaken thus far to notify I&APs of the application;
- Proof that notice boards, advertisements and notices notifying potential I&APs of the application have been displayed, placed or given;
- A list of all persons and organisations that were identified and registered in terms of Regulation 57 as I&APs in relation to the application.

Chapter 6 – Issues identified during Scoping: Provides a description of the key issues that have been identified by the project team and through discussions with I&APs thus far in the Scoping Phase, and that will be assessed in the EIA phase.

Chapter 7 - Alternatives: Provides a brief discussion of feasible and reasonable alternatives to the proposed project that have been identified and considered, some of which will be investigated further in the EIA Phase.

Chapter 8 - Plan of Study: Sets out the proposed approach to the environmental impact assessment of the proposed project including:

- A description of the scope of work that will be undertaken as part of the EIA phase, including any specialist reports or specialised processes, and the manner in which the

described scope of work will be undertaken;

- An indication of the stages at which the competent authority will be consulted;
- A description of the proposed methodology for assessing the environmental issues and alternatives, including the option of not proceeding with the proposed development;
- Particulars of the public participation process that will be conducted during the EIA phase; and
- Any specific information required by the authority.

References: Cites any texts referred to during preparation of this report.

Appendices: Containing all supporting information

Assumptions and Limitations

This report is based on currently available information and, as a result, the following limitations and assumptions are implicit in it:

- Descriptions of the natural and social environments are based on limited fieldwork and available literature. More information will be provided in the EIA phase based on the outcomes of the specialist studies.
- The report is based on a project description taken from preliminary design specifications and site layouts for the proposed wind energy facility that have not yet been finalised and are likely to undergo a number of iterations and refinements before they can be regarded as definitive. All potential turbine array alternatives will, however, be contained within the property boundaries of the study area.
- The preliminary turbine site layout and associated infrastructure will be presented in the EIA phase and subject to the necessary specialist assessments. It is anticipated that this preliminary layout will be further refined as per the outcomes of these studies and overall EIA findings.

1.6. DETAILS AND EXPERTISE OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

According to regulation 17 of the EIA regulations (2010), An EAP must –

(a) be independent; and

(b) have expertise in conducting environmental impact assessments, including knowledge of the Act, these Regulations and any guidelines that have relevance to the proposed activity

In fulfillment of the above-mentioned legislative requirement, provided below are the details of the Environmental Assessment Practitioner (EAP) that prepared this draft scoping report as well as the expertise of the individual members of the study team.

Details of the EAP

Coastal and Environmental Services (CES)

Physical Address: 67 African Street, Grahamstown 6139

Postal Address: P.O. Box 934, Grahamstown 6140

Telephone: +27 46 622 2364

Fax: +27 46 622 6564

Website: www.cesnet.co.za

Email: info@cesnet.co.za

Expertise of the EAP

CES is one of the largest specialist environmental consulting firms in southern Africa. Established in 1990, and with offices in Grahamstown and East London, we primarily specialise in assessing the impacts of development on the natural, social and economic environments. CES's core

expertise lies in the fields of strategic environmental assessment, environmental management plans, environmental management systems, ecological/environmental water requirements, environmental risk assessment, environmental auditing and monitoring, integrated coastal zone management, social impact assessment and state of environment reporting.

In addition to adhering to all relevant national legislative requirements, CES is often required to review and summarise for specific projects, acquisition of equity funding from the majority of financial institutions demands that developments must meet certain minimum standards that are generally benchmarked against the Policy and Performance Standards of the International Finance Corporation and the World Bank Operational Directives and Policies. CES has worked on large projects in South Africa, Mozambique, Malawi, Kenya, Madagascar and Egypt and has been acknowledged by international lenders such as the World Bank and the International Finance Corporation, and the large mining companies continue to approach us as their preferred environmental consultant for this type of project.

The Project Team

Provided below are short *curriculum vitae* (CVs) of each of the team members involved in the proposed project EIA to date.

Mr Marc Hardy

(Role: Report Leader)

Marc holds a M.Phil in Environmental Management from Stellenbosch University's School of Public Management and Planning. His professional interests include environmental impact reporting for linear, energy and bulk infrastructure projects, strategic environmental policy development and reporting – mostly relating to Environmental Management Framework's (EMF's) - compliance monitoring and environmental auditing. Marc has, amongst others, been project manager for the Dinokeng EMF (Gauteng), the Milnerton Refinery to Ankerlig Power Station Liquid Fuels Transportation Infrastructure Project, numerous Eskom Transmission and Distribution power line and substation EIA's countrywide, mining EMPR compliance audits, compliance audits for Camden, Grootvlei and Komati Power Stations and the hazardous waste management facility for the Coega Development Corporation (Coega IDZ). Before entering the consulting field he gained extensive experience in the EIA regulatory field whilst in the employ of the Gauteng Department of Agriculture, Conservation and Environment - being responsible for the review of infrastructure projects like the Gautrain Rapid Rail system and representing the Department on various EMF project steering committees. He is currently managing numerous EIA processes for wind energy developments countrywide, as well as renewable energy and mining projects throughout Africa.

Mr Jadon Schmidt

(Role: Project Manager)

Jadon holds a BSc degree in Geology and Botany, a BSc Honours degree in Botany (both from NMMU) and an MBA from Rhodes University with a core environmental management & sustainability focus. His MBA thesis addressed resource economic issues of marine protected areas. He is currently completing an MSc in estuarine ecology dealing specifically with sea level rise impacts on sediment and vegetation dynamics. Climate change, wetland ecology, renewable energy and resource economics are among his professional interests. Jadon is currently project leader/project manager for several EIAs in the large infrastructure & renewable energy sectors.

Dr Chantel Bezuidenhout

(Role: Report Review)

Chantel holds MSc and PhD degrees in Botany (estuarine ecology) and a BSc degree in Botany and Geography from NMMU. Chantel's main focus is estuarine ecology and she has done extensive work on 13 systems from the Orange River Mouth in the Northern Cape to the Mngazi Estuary in the Transkei. As a result she has been involved in a number of ecological reserve determination studies including the Kromme, Seekoei and Olifants systems. Chantel has been an Environmental Consultant for approximately 5 years and as such has been focused on environmental management and impact assessment. Chantel is well versed in environmental legislation and has been involved in number of environmental impact assessments and management plans in South Africa, Zambia and Madagascar. She is currently employed in the Grahamstown office of CES.

Ms Leigh-Ann DeWet

(Role: Ecological Report Review)

Environmental Consultant/Botanical Specialist. Leigh-Ann holds a BSc (Botany and Entomology) as well as a BSc (Hons) and MSc in Botany from Rhodes University. She conducts vegetation sensitivity assessments, in turn to aid and guide developments and thereby minimising their impacts on sensitive vegetation.

Ms Tarryn Martin

(Role: Ecological Report Production)

Tarryn holds a BSc (Botany and Zoology), a BSc (Hons) in African Vertebrate Biodiversity and a MSc with distinction in Botany from Rhodes University. Tarryn's Master's thesis examined the impact of fire on the recovery of C₃ and C₄ Panicoid and non-Panicoid grasses within the context of climate change. She has spent time at Rhodes University working as a research assistant and has spent many years working within the corporate tourism industry as a project manager. Her research interests include biodiversity conservation, ecotourism and climate change.

Mr Justin Green

(Role: Report Production)

Justin has a BSc. degree in Zoology and Entomology as well as a Post Graduate Diploma in Enterprise Management from Rhodes University. Justin's research interests include a broad range of environmental conservation focussing on African mammology and estuarine ecology with the main focus on invertebrate faunal community structure.

Mr Thomas King

(Role: Report Production and mapping)

Thomas holds a BSc degree with specialisation in Zoology from the University of Pretoria and an Honours degree in Biodiversity and Conservation from Rhodes University. As part of his Honours degree, Thomas was trained in Geographical Information Systems (GIS) and Community Based Natural Resource Management (CBNRM) in addition to the required biological sciences courses. His honours thesis investigated the rate at which Subtropical Thicket recovers naturally after heavy grazing by ostriches (*Struthio camelus*).

2. PROJECT DESCRIPTION

According to regulation 28 (1) of the EIA regulations (2010), *A scoping report must include –*

- (b) a description of the proposed activity;*
- (d) a description of the property on which the activity is to be undertaken and the location of the activity on the property, or if it is –*
 - (i) a linear activity, a description of the route of the activity; or*
 - (ii) an ocean-based activity, the coordinates where the activity is to be undertaken*

In line with the above-mentioned legislative requirement, this chapter identifies the location and size of the site of the proposed wind energy project, and provides a description of its various components and arrangements on the site.

2.1. LOCATION AND SITE DESCRIPTION OF THE PROPOSED DEVELOPMENT

The proposed wind farm is located in the Makana Local Municipality, Cacadu District Municipality, Eastern Cape Province, South Africa. According to Terra Power Solutions (Pty) Ltd available wind data in South Africa shows the Riebeeck East farms to have favourable wind conditions sufficient to support a wind farm. This has been confirmed by on site wind monitoring that has been on-going since early 2011. The facility will be located on seven properties, namely: Hilton Farm, Table Hill North, Kruisfontein, Brack Kloof, Table Hill, Slaaikraal Farm and Hounslow. It is situated approximately 22km east of Riebeeck East and 15km west of Grahamstown.

These farms are currently used for the grazing of cattle and sheep. The location of the project site is depicted in Figure 2-1 on the following page. A more detailed description of the activities associated with the proposed wind energy facility is contained in Section 2.2.

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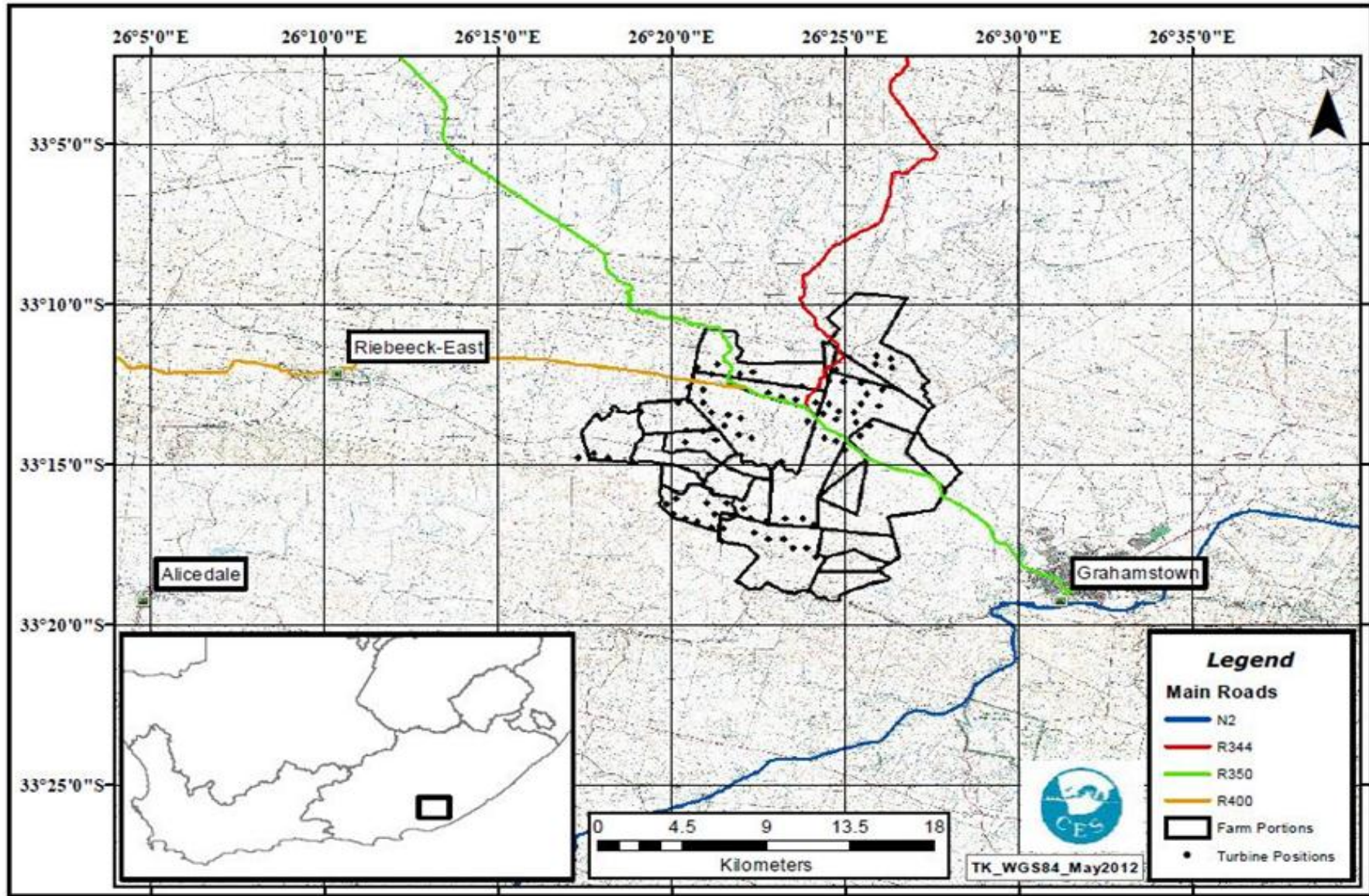


Figure 2-1: Location of the proposed Terra Power Solutions Riebeeck East Wind Energy facility.

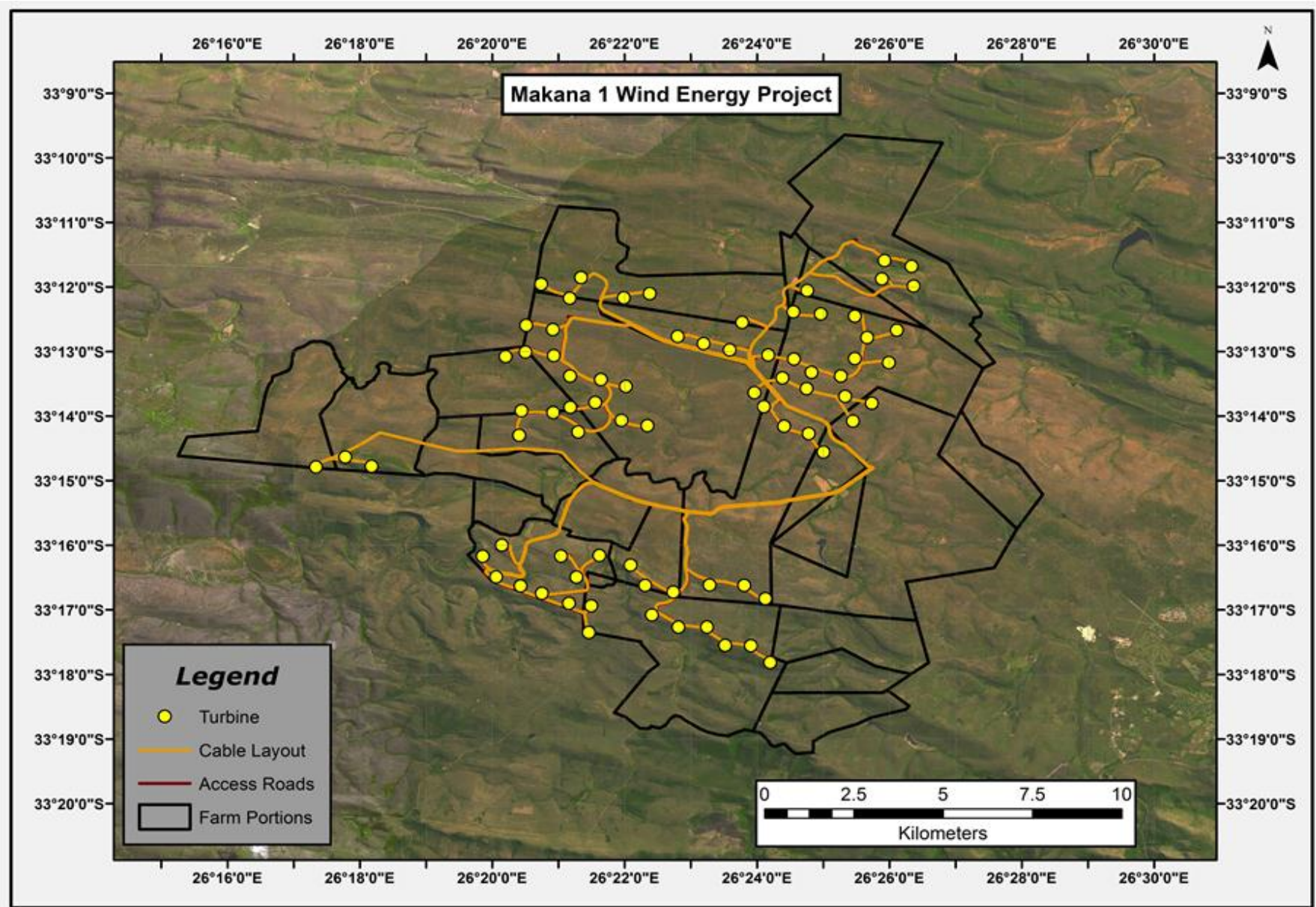


Figure 2-2: Layout of the facility indicating the preliminary position of all infrastructure components.

2.2. DETAILED DESCRIPTION OF THE TERRA POWER SOLUTIONS WIND ENERGY PROJECT

The wind farm which will be spread over seven adjacent property portions in the Grahamstown and Riebeeck East area. The seven land portions are planned to host up to 77 turbines, each with a nominal power output ranging between 2 - 3 Mega Watts (MW). The maximum total potential output of the wind farm would be 120 to 140 MW, which will serve to further support the regional and national power balance.

The ultimate size of the wind turbines will depend on further technical assessments but will typically consist of rotor turbines (3 x 60 m length blades) with rotor diameters of around 120 meters mounted atop a 100 - 140 meter high steel (or hybrid steel/concrete) tower. Other infrastructure components associated with the proposed wind energy facility are *inter alia*:

- Concrete foundations to support the wind turbine towers.
- Internal access roads to each turbine - approximately 6 meters wide.
- Underground cables connecting the wind turbines.
- 22/66kV electrical substation.
- Possible upgrading of existing roads for the transportation of the turbines to the wind energy facility.
- Buildings to house the control instrumentation and backup power support, as well as a store room for the maintenance equipment.

2.2.1. Production of electricity from wind

Wind energy is a form of solar energy. Winds are caused by the uneven heating of the atmosphere by the sun, the irregularities of the earth's surface, and rotation of the earth. Wind flow patterns are modified by the earth's terrain, bodies of water, and vegetation. This wind flow or motion energy (kinetic energy) can be used for generating electricity. The term "wind energy" describes the process by which wind is used to generate mechanical power or electricity. Wind turbines convert the kinetic energy in the wind into mechanical power and a generator can then be used to convert this mechanical power into electricity. A typical wind turbine consists of (refer to Figure 2-3):

- A rotor, with 3 blades, which react with the wind and convert the energy into rotational motion;
- A nacelle which houses the equipment at the top of the tower;
- A tower, to support the nacelle and rotor;
- Electronic equipment i.e. controls, transformers, electrical cables and switchgear, ground support equipment, and interconnection equipment; and
- Turbine step-up transformer which can be indoor or outdoor, depending on the turbine model.

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

2.2.2. Stages of wind farm development

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

- Pre-feasibility
- Feasibility
- Wind Measurement

- Implementation

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

Pre-feasibility

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

Feasibility

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

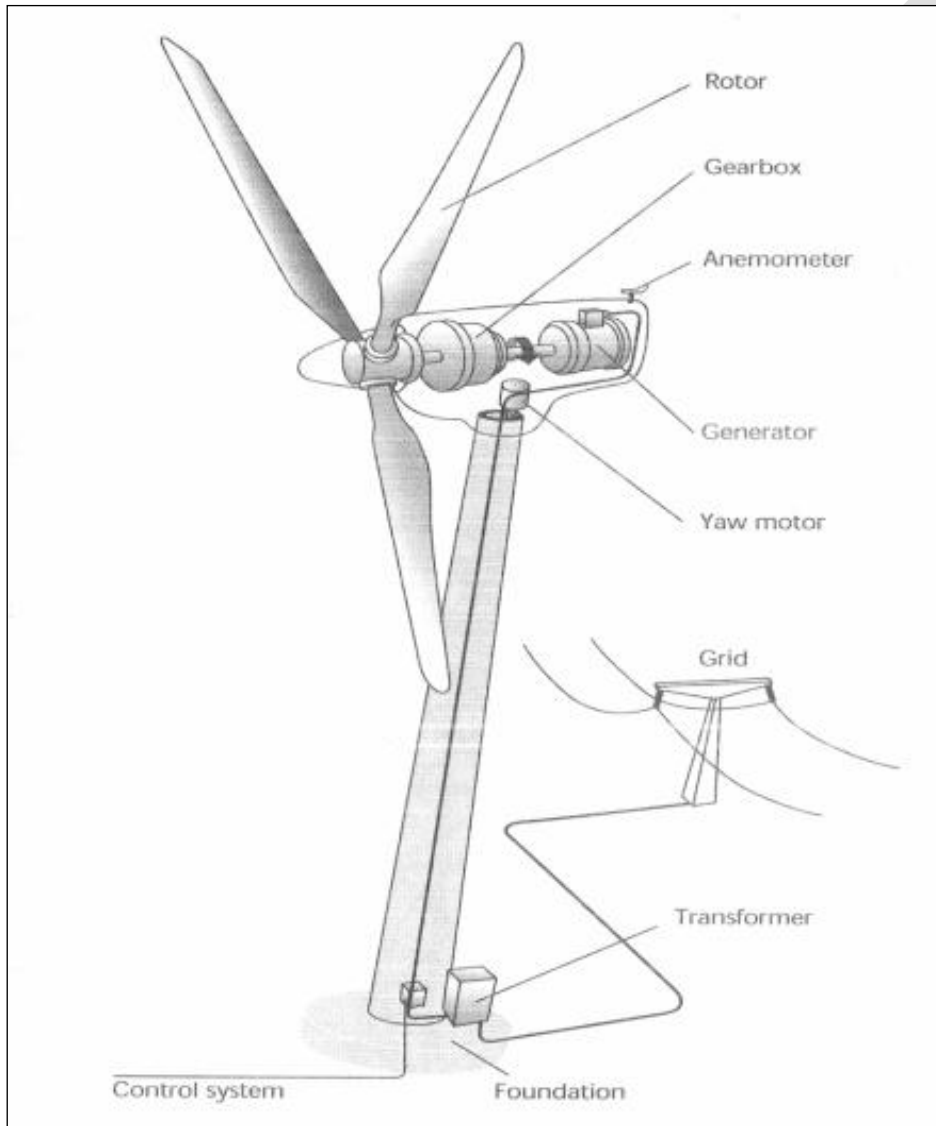


Figure 2-3: Illustration of the main components of a typical wind turbine

Note that the transformer in the figure above would normally be inside the tower (probably at the base).

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Wind Measurement

It is necessary to erect a wind measurement mast to gather wind speed data and correlate these measurements with other meteorological data in order to produce a final wind model of the proposed project site. A measurement campaign of at least 12 months in duration is necessary to ensure verifiable data is obtained. The project proponent has already erected a mast in the project study area (early 2011) and has commenced with the data capturing campaign. This data will advise on the economics of the project and finalise the positions of the wind turbines. The 80-meter mast is a guyed lattice tower designed specifically for wind resource measurements. The mast is 'marked' as per the requirements of the Civil Aviation Authority.

Implementation

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

- Civil works
- Erection/commissioning
- Operational

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

1. Civil works

A temporary 'construction platform' is required at each turbine foundation site to ensure safe and stable access by heavy machinery and equipment (bulldozers, trucks, cranes etc.) during the construction phase. These platforms will be connected by access roads (if none currently exists) that must meet the following requirements:

- Approximately 5 m width with 0.5 m clearance on either side of the road (total of 6 m clearance);
- 30 cm pebble bed;
- Maximum 10% slope; and
- Curve radius of at least 25 m (this will depend on turbine supplier transportation specifications).

Once the wind farm is operational, the construction platforms can be partially rehabilitated to reduce the final cumulative area of the total development footprint of the individual turbines.

Geotechnical studies and foundation works

A detailed geotechnical study of the area is always undertaken for safety purposes, usually after the environmental authorisation has been secured. This comprises drilling, penetration and pressure assessments. For the purpose of the foundations, approximately 500 m³ of substrate would need to be excavated for each turbine of the dimensions described above.

These excavations are then filled with steel-reinforced concrete (Plate 2-1). The foundations can vary according to the quality of the soil.

The main dimensions for the foundation of a 3MW/100m high wind turbine are shown in Figure 2-4 with underground foundation, tower base, above ground foundation, and ground level.

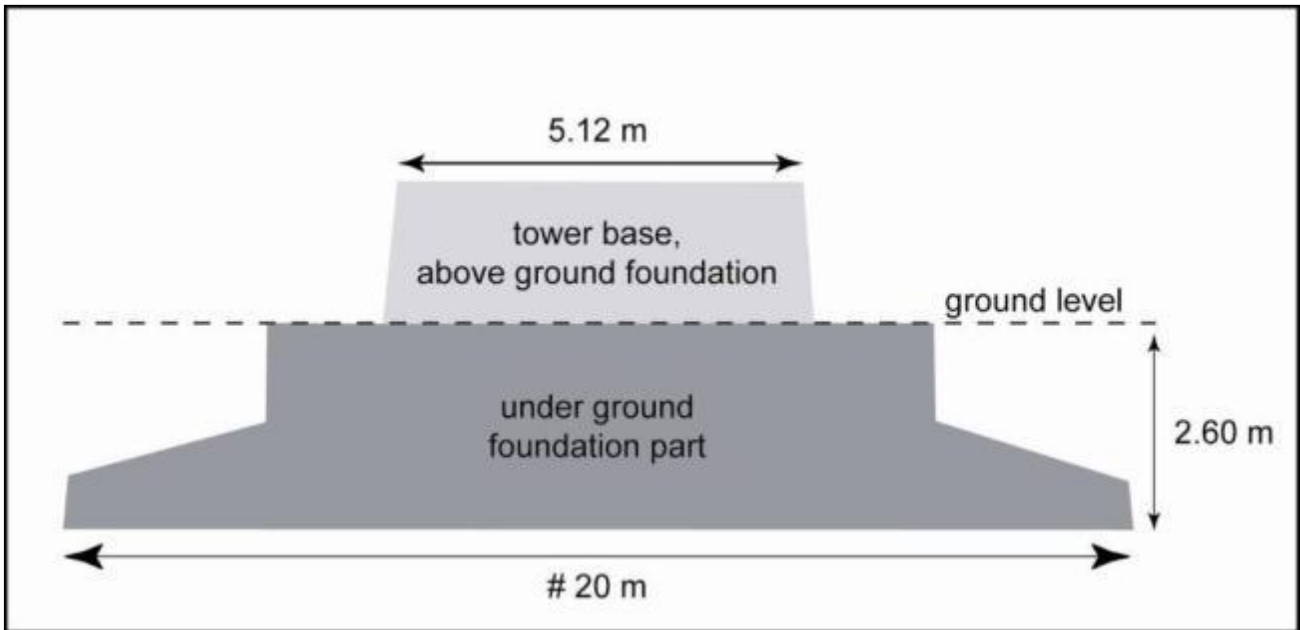


Figure 2-4: The main dimensions for the foundation of a 3MW/100m high wind turbine

Electrical cabling and substation

Electrical and communication cables will be entrenched (approximately 1 m deep) and routed adjacent to the access roads.

The 22/66 kV substation will comprise an area of about 5,000 m² (0.5 ha) which will be fenced. Standard foundations for the electrical equipment will be constructed. The provisional general area for the substation is indicated in Figure 2-2.



Plate 2-1: Concrete pouring of a turbine foundation – note the tower base collar in the foreground

2. Erection/commissioning

Turbine erection

The process is quick (around 3 days per turbine) if the weather conditions permit. This phase is the most complex and costly and utilises heavy lift cranes in the assembly process (Plate 2-3).

Electrical connection

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

The existing electrical network that traverses the study area is depicted in Figure 2-2.

The interconnection of the wind farm to the Eskom Distribution electrical grid will require the construction of a 22/66 kV substation on the project site which will step up the 22 kV turbine supply. Various substation site alternatives will be presented in the EIR phase.

3. Operational phase

During the period when the turbines are operational, on-site human activity drops to a minimum,

and includes routine maintenance requiring only light vehicles to access the site. Only major breakdowns would necessitate the use of cranes and trucks.

2.2.3. Timing estimation

Based on existing publications, the development, construction and implementation of a wind farm of these approximate dimensions would require about 12-18 months, depending on the delivery times of the main equipment. Described below is a typical schedule:

- Platforms/Roads/cable laydown = 20 weeks;
- Turbines foundations = 10 weeks for each foundation (including 8 weeks to let the foundation concrete dry);
- Civil works for the substation = 12 weeks;
- Wind turbines/electrical substation erection = 2 turbines/week (in good low wind weather conditions);
- Substation erection = 8 weeks; and
- Commissioning and electrical connection = 4 weeks.



Plate 2-3: Assembly and erection of the tower sections using cranes

2.2.4. Refurbishment and rehabilitation of the site after operation

Current wind turbines are designed to last for over 25 years and this is the figure that has been used to plan the life span of a modern wind farm. Should the refurbishment of the wind farm be financially, environmental and socially viable, the life span can be extended by another 25 years. Terra Power Solutions undertakes to dismantle all wind turbines and foundations to a depth of 1 meter underground. The excavation will be backfilled with soil, and grass will be replanted in order

restore the site's appearance to its original state within a matter of weeks. The only residual material is the deeper concrete works below surface.

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3. RELEVANT LEGISLATION

According to regulation 28 (1) and (2) of the EIA regulations (2010), *A scoping report must include –*
 1(f) *an identification of all legislation and guidelines that have been considered in the preparation of the scoping report*
 (2) *In addition, a scoping report must take into account any guidelines applicable to the kind of activity which is the subject of the application.*

In line with the above-mentioned legislative requirement, the development of the proposed wind energy project described in Chapter 2 above will be subject to the requirements of a number of laws both international and national. These include:

3.1. INTERNATIONAL

3.1.1. *The 1992 United Nations Framework Convention on Climate Change (FCCC)*

The FCCC is a framework convention which was adopted at the 1992 Rio Earth Summit. South Africa signed the FCCC in 1993 and ratified it in August 1997 (Glazewski, 2005). The stated purpose of the FCCC is to, “*achieve....stabilisation of greenhouse gas concentrations in the atmosphere at concentrations at a level that would prevent dangerous anthropogenic interference with the climate system*”, and to thereby prevent human-induced climate change by reducing the production of greenhouse gases defined as, “*those gaseous constituents of the atmosphere both natural and anthropogenic, that absorb and re-emit infrared radiation*”.

Relevance to the proposed project:

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

3.1.2. *The Kyoto Protocol (2002)*

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

Relevance to the proposed project:

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

3.2. NATIONAL

3.2.1. *The Constitution Act (108 of 1996)*

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

- a) *To an environment that is not harmful to their health or well-being; and*
- b) *To have the environment protected for the benefit of present and future generations,*

through reasonable legislative and other measures that:

- i. Prevent pollution and ecological degradation;
- ii. Promote conservation; and
- iii. Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

Relevance to the proposed project:

- Obligation to ensure that the proposed development will not result in pollution and ecological degradation; and
- Obligation to ensure that the proposed development is ecologically sustainable, while demonstrating economic and social development.

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

The objective of NEMA is: “To provide for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for coordinating environmental functions exercised by organs of state; and to provide for matters connected therewith.”

A key aspect of NEMA is that it provides a set of environmental management principles that apply throughout the Republic to the actions of all organs of state that may significantly affect the environment. The proposed development has been assessed in terms of possible conflicts or compliance with these principles. Section 2 of NEMA contains principles (see Box 1) relevant to the proposed project, and likely to be utilised in the process of decision making by DEA.

BOX 1: NEMA ENVIRONMENTAL MANAGEMENT PRINCIPLES

(2)	Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.
(3)	Development must be socially, environmentally and economically sustainable.
(4)(a)	Sustainable development requires the consideration of all relevant factors including the following: <ol style="list-style-type: none"> i. That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied; ii. That pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied; iii. That waste is avoided, or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner.
(4)(e)	Responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle.
(4)(i)	The social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment.
(4)(j)	The right of workers to refuse work that is harmful to human health or the environment and to be informed of dangers must be respected and protected.
(4)(p)	The costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.
(4)(r)	Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.

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

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

Relevance to the proposed project:

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

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

This Act provides for the management and conservation of South Africa’s biodiversity within the framework of the National Environmental Management Act 107 of 1998 (see Box 2). In terms of the Biodiversity Act, the developer has a responsibility for:

- a) *The conservation of endangered ecosystems and restriction of activities according to the categorisation of the area (not just by listed activity as specified in the EIA regulations).*
- b) *Application of appropriate environmental management tools in order to ensure integrated environmental management of activities thereby ensuring that all developments within the area are in line with ecological sustainable development and protection of biodiversity.*
- c) *Limit further loss of biodiversity and conserve endangered ecosystems.*

The objectives of this Act are:

- d) *To provide, within the framework of the National Environmental Management Act, for –*
 - (i) *The management and conservation of biological diversity within the Republic;*
 - (ii) *The use of indigenous biological resources in a sustainable manner.*

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

Relevance to the proposed project:

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

BOX 2: MANAGEMENT AND CONSERVATION OF SOUTH AFRICA’S BIODIVERSITY WITHIN THE FRAMEWORK OF NEMA

CHAPTER 4

Provides for the protection of species that are threatened or in need of national protection to ensure their survival in the wild;

- to give effect to the Republic’s obligations under international agreements regulating international trade in specimens of endangered species; and
- ensure that the commercial utilization of biodiversity is managed in an ecologically sustainable way.

CHAPTER 5 (Part 2)

Section 73	<p>A person who is the owner of land on which a listed invasive species occurs must:</p> <ul style="list-style-type: none"> a) notify any relevant competent authority, in writing, of the listed invasive species occurring on that land; b) take steps to control and eradicate the listed invasive species and to prevent it from spreading; and c) take all required steps to prevent or minimise harm to biodiversity.
Section 75	<ul style="list-style-type: none"> • Control and eradication of a listed invasive species must be carried out by means of methods that are appropriate for the species concerned and the environment in which it occurs. • Any action taken to control and eradicate a listed invasive species must be executed with caution and in a manner that may cause the least possible harm to biodiversity and damage to the environment. • The methods employed to control and eradicate a listed invasive species must also be directed at the offspring, propagating material and re-growth of such invasive species in order to prevent such species from producing offspring, forming seed, regenerating or re-establishing itself in any manner.

3.2.4. The National Forests Act (84 of 1998)

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

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

Relevance to the proposed project:

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

3.2.5. National Heritage Resources Act (25 of 1999)

The protection of archaeological and palaeontological resources is the responsibility of a provincial heritage resources authority and all archaeological objects, palaeontological material and meteorites are the property of the State. *“Any person who discovers archaeological or palaeontological objects or material or a meteorite in the course of development must immediately report the find to the responsible heritage resources authority, or to the nearest local authority offices or museum, which must immediately notify such heritage resources authority”*.

Relevance to the proposed project:

- An archaeological impact assessment must be undertaken during the detailed EIR phase of the proposed project.
- No person may alter or demolish any structure or part of a structure, which is older than 60 years or disturb any archaeological or palaeontological site or grave older than 60 years without a permit issued by the relevant provincial heritage resources authority.
- No person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter or deface archaeological or historically significant sites.

3.2.6. Atmospheric Pollution Prevention Act 45 of 1965

This Act is currently the central legislation for the prevention of air pollution. Part IV deals with dust control – *“Whenever dust originating on any land in a dust controlled area is causing a nuisance to persons residing or present in the vicinity of that land, the owner or occupier may be required to take the prescribed steps or adopt the “best practicable means” for the abatement of the dust”*.

This Act applied until the more recent National Environmental Management: Air Quality Act (see section 3.2.7 below) came into force.

Relevance to the proposed project:

- The “best practicable means” for the abatement of dust during construction if approved have to be taken.
- All appliances used for preventing or reducing to a minimum the escape into the atmosphere of noxious or offensive gases have to be properly operated and maintained and the best practice means for achieving this implemented.

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

As with the Atmospheric Pollution Prevention Act 45 of 1965, the objective of the new Air Quality Act is to protect the environment by providing the necessary legislation for the prevention of air pollution.

3.2.8. The White Paper on Energy Policy for South Africa (Energy White Paper)

The White Paper on the Energy Policy for South Africa (Energy White Paper) is an overarching document which sets out the government’s official policy on the supply and consumption of energy for the next decade. One of the main goals of the White Paper is to create energy security by diversifying the energy supply and energy carriers. Currently, much of South Africa’s energy is derived from extremely expensive imported fuels and coal-powered energy generation, which could be threatened by climate change response measures of developed countries (refer to section 3.1 above). The White Paper points out that, South Africa has abundant energy sources and it stresses that, “*all possible energy carriers should be tapped to ensure economic growth and development*”. Many of the sectors contributing to the Gross Domestic Product (GDP) are practically driven by these energy carriers. In fact, according to Glazwesky (2005), industry as a whole consumes approximately 40% of the total electricity generated, making it the chief energy source for South Africa’s economic growth and development.

In addition to the above the Energy White Paper notes that there is currently insufficient renewable energy data and lack of transparency in publicly sharing the data. Information on renewable energy system applications, system standards, installation and performance guides, technical and economic characteristics, and identifying human training capacity is essential as the government commits to a healthier environment as part of their agenda. The position of the Energy White Paper on renewable energy is based on the integrated resource planning principle of, “*ensuring that an equitable level of national resources is invested in renewable technologies, given their potential and compared to investments in other energy supply options*”, and this has subsequently been elaborated by the White Paper on Renewable Energy (see section 3.2.9 that follows).

Relevance to the proposed project:

- The proposed Wind Farm project is a direct consequence of the Government’s White Paper on Energy Policy and the requirements therein to improve energy security of supply through diversification, as well as the demonstration and introduction of cleaner energy technologies and the promotion of competition and empowerment in the electricity market.

3.2.9. The White Paper on Renewable Energy Policy (Renewable Energy White Paper)

The White Paper on the Renewable Energy Policy (Renewable Energy White Paper) complements the White Paper on Energy Policy discussed in section 3.2.8 above, by pledging “*Government Support for the development, demonstration and implementation of renewable energy sources for both small and large scale applications*”. It sets out the policy principles, goals and objectives to achieve, “*An energy economy in which modern renewable energy increases its share of energy*”

consumed and provides affordable access to energy throughout South Africa, thus contributing to sustainable development and environmental conservation". The Department of Minerals and Energy (DME) (now the Department of Energy) embarked on an Integrated Energy Plan (IEP) to develop the renewable energy resources, while taking safety, health and the environment into consideration. The government set a target of, "10 000 GWh (0.8Mtoe) renewable energy contribution to final energy consumption by 2013, to be produced mainly from biomass, wind, solar and small-scale hydro". Four strategic areas that needed to be addressed to create the appropriate enabling environment for the promotion of renewable energy were identified. These included:

- Financial instruments;
- Legal instruments;
- Technology development, and;
- Awareness raising, capacity building and education.

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

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

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

Relevance to the proposed project:

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

3.2.10. Electricity Regulation Act (Act No. 4 of 2006)

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

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

Relevance to the proposed project:

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

3.2.11. Electricity Regulation on New Generation Capacity (Government Gazette No 32378 of 5 August 2009)

On 5 August 2009 the government of the Republic of South Africa promulgated the Electricity Regulations on New Generation Capacity (Government Gazette No 32378) which were made by the Department of Energy in terms of the Electricity Regulation Act 2006 (see 3.2.11 above), and are applicable to:- (a) all types of generation technology including renewable generation and co-generation technology (i.e. landfill gas, small hydro (less than 10 MW), wind and concentrated solar power (with storage)) but excluding nuclear power generation technology; (b) base load, mid-merit and peak generation; and (c) take effect from the date of promulgation, unless otherwise indicated.

The objectives of these regulations are:

- The regulation of entry by a buyer and an Independent Power Producer (IPP) into a power purchase agreement;
- The facilitation of fair treatment and the non-discrimination between IPP generators and the buyer;
- The facilitation of the full recovery by the buyer of all costs incurred by it under or in connection with the power purchase agreement and an appropriate return based on the risks assumed by the buyer there under and, for this purpose to ensure the transparency and cost reflectivity in the determination of electricity tariffs;
- The establishment of rules and guidelines that are applicable in the undertaking of an IPP bid programme and the procurement of an IPP for purposes of new generation capacity;
- The provision of a framework for the reimbursement by the regulator, of costs incurred by the buyer and the system operator in the power purchase agreement, and;
- The regulation of the framework of approving the IPP bid programme, the procurement process, the RFP process, and the relevant agreements to be concluded.

The Guidelines describe the basic structure of the REFIT programme, including the roles of various parties in the programme, namely National Energy Regulator of South Africa (NERSA), Eskom and renewable energy generators. Pursuant to the Guidelines, Eskom's "Single Buyer Office" is to be appointed as the Renewable Energy Purchasing Agency (REPA), the exclusive buyer of power under the REFIT programme. Generators participating in the REFIT scheme are required to sell power generated by renewable technologies to Eskom as the REPA under a Power Purchase Agreement, and are entitled to receive regulated tariffs, based on the particular generation technology. NERSA is tasked with the administration of the REFIT programme, including setting the tariffs and verifying that generation is genuinely from renewable energy sources.

While the Regulations deal generally with procurement under an IPP bid programme (defined in the Regulations to mean a bidding process for the procurement of new generation capacity and/or ancillary services from IPPs), and specify the use of a bidding process involving requests for prequalification, requests for proposals and negotiations with the preferred bidder, the Regulations set out a special process for the procurement of renewable energy and cogeneration under the REFIT programme, described in Regulation 7. This Regulation states that NERSA is to, "develop rules related to the criteria for the selection of "renewable energy IPPs... that qualify for a licence" and sets out a list of matters that the criteria prescribed by NERSA should take account of. These include:

- Compliance with the integrated resource plan and the preferred technologies;

- Acceptance by the IPP of a standardised power purchase agreement;
- Preference for a plant location that contributes to grid stabilisation and mitigates against transmission losses;
- Preference for a plant technology and location that contributes to local economic development;
- Compliance with legislation in respect of the advancement of historically disadvantaged individuals;
- Preference for projects with viable network integration requirements;
- Preference for projects with advanced environmental approvals;
- Preference for projects demonstrating the ability to raise finance;
- Preference for small distributed generators over centralized generators; and
- Preference for generators that can be commissioned in the shortest time.

According to Dewey & LeBouef (August, 2009), it appears, therefore, that successful REFIT projects may not be selected through a conventional bidding process, but instead, applications will be selected on the basis of prescribed criteria. Just what such criteria are, and how they will be applied and weighted is not yet clear, but it is expected that this will be set out in the rules to be developed by NERSA as required by Regulation 7(2)(a).

Relevance to the proposed project:

- The proposed wind energy project is required to comply with any guidelines relating to the IPP bid programme and the REFIT programme.

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

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

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

- **Wind farm placement:** Due to the potential of wind turbine generators to interfere on radio navigation equipment, *no wind farm should be built closer than 35km from an aerodrome.* In addition, much care should be taken to consider visual flight rules routes, proximity of known recreational flight activity such as hang gliders, en route navigational facilities etc.
- **Wind farm Markings:** *Wind turbines shall be painted bright white to provide the maximum daytime conspicuousness. The colours grey, blue and darker shades of white should be avoided altogether. If such colours have been used, the wind turbines shall be supplemented with daytime lighting, as required.*
- **Wind farm Lighting:**
 - Wind farm (3 or more units) lighting: *In determining the required lighting of a wind farm, it is important to identify the layout of the wind farm first.* This will allow the proper approach to be taken when identifying which turbines need to be lit. Any special consideration to the site’s location in proximity to aerodromes or known corridors, as well as any special terrain considerations, must be identified and addressed at this time. Details are as follows:
 - Not all wind turbine units within an installation or wind farm need to be lit. Definition of the periphery of the installation is essential. Lighting of interior wind turbines is of lesser importance unless they project above the

peripheral units. This can be the case when higher ridges or plateaus are present within the wind farm area.

- Obstruction lights within a group of wind turbines should have unlighted separations or gaps of no more than 800 m if the integrity of the group appearance is to be maintained. This is especially critical if the arrangement of objects is essentially linear, as is the case with most wind turbine groups.
 - Any array of flashing or pulsed obstruction lighting, intended to warn of a group of wind turbines forming an entity (i.e., a line, string, or series of units), shall be synchronized to flash simultaneously. If an installation consists of a number of widespread, but obviously separated areas or entities more than 1500 m from each other, it is not necessary that all such areas flash synchronously.
 - Night time wind turbine obstruction lighting should consist of medium intensity type B aviation red flashing lights. Minimum intensities of 2000 candela for night-time red flashing or strobe lights are required. *Note: Steady-burning obstruction lights shall not be used.*
 - White medium intensity type A strobe lights may be used in lieu of the preferred medium intensity type B strobe lights, but must be used alone without any red lights, and must be positioned in the same manner as the red flashing lights.
 - Since the hub of the wind turbine unit is frequently as large as the nacelle (body) itself, a top-mounted obstruction light should be raised well above the surface of the nacelle so that it may be easily seen from directly in front of the turbine. Placement of the light fixtures on the turbine nacelle should be accomplished to ensure that they are visible from 360 degrees, with particular attention being made to ensure that the hub of the turbine rotor in no way blocks the light from an aircraft approaching the windward side of the turbine at the same elevation as the turbine hub.
 - When possible, antennas or towers of heights over 45 m that are within the turbine farm area should be incorporated into the lighting plan for the site, as they offer tall, unobstructed platforms on which lighting fixtures can be mounted and should be included in the synchronization and spacing calculations.
 - Each turbine should only require one fixture if the site is monitored, and that *a failed light fixture can be replaced within the next working day*. Failure to replace a failed fixture, which is essential to maintaining the 800 m-separation requirement, will result in an unsafe gap in the lighting configuration. *If the facility does not possess the capability to replace fixtures within the next working day, each turbine shall be fitted with two separate fixtures*. A well-balanced lighting plan has all the light fixtures within the wind farm flash at the same time, thus delineating the farm as one large obstruction and navigation between the turbines should be discouraged. The synchronisation function can be accomplished through various means, either by radio frequency devices, hard-wired control cables, or independently mounted global positioning system synchroniser units. The site developer can decide the selection of the units, as long as the end result is that all lights flash perceivably at the same time. If the developer fails to synchronise the fixtures, the developer will be required to add additional fixtures at closer spacing. The very basis of the lighting standards for wind farms is centered on the synchronous flashing of the perimeter lighting.
- **Turbine Lighting Assignment:** *The following guidelines should be followed to determine which turbines, need to be equipped with lighting fixtures. Again, the placement of the lights is contingent upon which type of configuration is being used.*
 - Linear: A light should be placed on each turbine positioned at each end of the line or string of turbines. From those end turbines, lights should then be positioned

such that the next lit turbine is no more than 800 m, from the last lit turbine. This pattern should continue until the end of the string is reached. If the last segment is significantly short, it may be practical to move the lit turbines back one or two turbines towards the starting point to present a nice, well-balanced string of lights. A high concentration of lights, in close proximity, should be avoided.

- Cluster: A starting point should be selected along the outer perimeter of the cluster. This turbine should be lit, and then, continuing along the outer perimeter of the farm, a light should be placed on the next turbine with the maximum gap between the lit turbines being no more than 800 m. This pattern should continue around the perimeter of the cluster, and end at the starting point. If it appears that the lights are crowded at the ending point, the lit turbines may be moved back by one turbine to present a balanced lighting presentation. If it is determined that the distance across the cluster is of a distance greater than 1500 m, or the terrain may vary within the cluster (+30 m from the perimeter elevations), it may be appropriate to place a few lit turbines at strategic locations throughout the centre of the cluster. This will prevent pilots from believing they may be able to climb over the outer perimeter and descend down into the centre of the cluster. Discretion should be used when placing these lights to maintain a well-balanced, safe lighting configuration.
- Grid: Initially, each of the defined corners of the grid layout should be selected for lighting, and then, using the same concept of the cluster configuration, lights should be placed on turbines along the outer limits of the farm so that the maximum spacing between lit turbines is no more than 800 m. If it appears as though the end of the lighting strings may be crowded, it may be necessary to move the lights back one or two turbines to create an even lighting configuration. If the grid is more than 1500 m wide across the centre of the group of turbines, it may be appropriate to position one or two lights within the centre of the configuration to again provide warning to pilots attempting to climb over the outer limits of the grid, and descending into the centre of the grid. Elevation should also be considered.
- Special Instances: On occasion, if one or two turbines may be positioned at locations that do not lend themselves to the linear, cluster, or grid layouts, the following guidelines should be followed. If the turbine protrudes from the general limits of the wind farm, the turbine should automatically receive a lighting fixture. If another turbine is collocated with the first turbine, it does not require any lighting as long as it is within 150 m from the lit turbine and not positioned on the outboard side of the lit turbine. If these requirements cannot be met, both turbines, in this case, would need to be illuminated.

Due to requirements of the Act to ensure the safety of aircrafts, the project proponent will engage directly with the Civil Aviation Authority regarding the structural details of the facility.

3.2.13. Occupational Health and Safety Act (85 of 1993)

The objective of this Act is to provide for the health and safety of persons at work (See Box 3). In addition, the Act requires that, “*as far as reasonably practicable, employers must ensure that their activities do not expose non-employees to health hazards*” (Glazewski, 2005: 575). The importance of the Act lies in its numerous regulations, many of which will be relevant to the proposed wind energy project. These cover, among other issues, noise and lighting.

Relevance to the proposed project:

- The developer must be mindful of the principles and broad liability and implications contained in the OHSA and mitigate any potential impacts.

BOX 3: HEALTH AND SAFETY OF PERSONS AT WORK ACCORDING TO THE OCCUPATIONAL HEALTH AND SAFETY ACT

8: GENERAL DUTIES OF THE EMPLOYERS TO THEIR EMPLOYEES	
(1)	Every employer shall provide and maintain, as far as is reasonably practicable, a working environment that is safe and without risk to the health of his employees.
(2)	Without derogating from the generality of an employer's duties under subsection (1), the matters to which those duties refer include in particular- <ul style="list-style-type: none"> a) The provision and maintenance of systems of work, plant and machinery that, as far as is reasonably practicable, are safe and without risks to health; b) Taking such steps as may be reasonably practicable to eliminate or mitigate any hazard or potential hazard to the safety or health of employees, before resorting to personal protective equipment; d) Establishing, as far as is reasonably practicable, what hazards to the health or safety of persons are attached to any work which is performed, any article or substance which is produced, processed, used, handled, stored or transported and any plant or machinery which is used in his business, and he shall, as far as is reasonably practicable, further establish what precautionary measures should be taken with respect to such work, article, substance, plant or machinery in order to protect the health and safety of persons, and he shall provide the necessary means to apply such precautionary measures; e) Providing such information, instructions, training and supervision as may be necessary to ensure, as far as is reasonably practicable, the health and safety at work of his employees; f) As far as is reasonably practicable, not permitting any employee to do any work or to produce, process, use, handle, store or transport any article or substance or to operate any plant or machinery, unless the precautionary measures contemplated in paragraphs (b) and (d), or any other precautionary measures which may be prescribed, have been taken; g) Taking all necessary measures to ensure that tire requirements of this Act are complied with by every person in his employment or on premises under his control where plant or machinery is used; h) Enforcing such measures as may be necessary in the interest of health and safety; i) Ensuring that work is performed and that plant or machinery is used under the general supervision of a person trained to understand the hazards associated with it and who have the authority to ensure that precautionary measures taken by the employer are implemented; and authority as contemplated in Section 37 (1) (b).
14: GENERAL DUTIES OF EMPLOYEES AT WORK	
Every employee shall at work:-	
(a)	Take reasonable care for the health and safety of himself and of other persons who may be affected by his acts or omissions;
(b)	As regards any duty or requirement imposed on his employer or any other person by this Act, cooperate with such employer or person to enable that duty or requirement to be performed or complied with;
(c)	Carry out any lawful order given to him, and obey the health and safety rules and procedures laid down by his employer or by anyone authorized thereto by his employer, in the interest of health or safety;
(d)	If any situation which is unsafe or unhealthy comes to his attention, as soon as practicable report such situation to his employer or to the health and safety representative for his workplace or section thereof, as the case may be, who shall report it to the employer; and
(e)	If he is involved in any incident which may affect his health or which has caused an injury to himself, report such incident to his employer or to anyone authorized thereto by the employer, or to his health and safety representative, as soon as practicable but not later than the end of the particular shift during which the incident occurred, unless the circumstances were such that the reporting of the incident was not possible, in which case he shall report the incident as soon as practicable thereafter.
15: DUTY NOT TO INTERFERE WITH, DAMAGE OR MISUSE THINGS	
[S. 15 substituted by S. 3 of Act No. 181 of 1993.]	
	No person shall intentionally or recklessly interfere with, damage or misuse anything which is provided in the interest of health or safety.

Other relevant legislation

Other legislation that may be relevant to the proposed wind energy project includes:-

National:

- The Telecommunication Act (1966) which has certain requirements with regard to potential impacts on signal reception;
- The Environment Conservation Act No 73 of 1989 (ECA) Noise Control Regulations, which specifically provide for regulations to be made with regard to the control of noise, vibration and shock, including prevention, acceptable levels, powers of local authorities and related matters;
- The Conservation of Agricultural Resources Act 43 of 1983 controls and regulates the conservation of agriculture and lists all regulated invasive species;
- The Development Facilitation Act 67 of 1995 provides for development and planning;
- The Environmental Conservation Act 73 of 1989 provides for effective protection, control and utilisation of the environment;
- The Mountain Catchment Areas Act 63 of 1970 provides for catchment conservation;
- The National Water Act 36 of 1998 regulates all matters relating to water including drainage lines;
- The Physical Planning Act 135 of 1991 provides land use planning;
- The Tourism Act 72 of 1993 provides for the promotion of tourism and regulates the tourism industry;
- The Skills Development Act 97 of 1998 promotes the development of skills; and
- Nature and Environmental Conservation Ordinance (No. 19 of 1974), which lists species of special concern which require permits for removal.

Other national legislation that may be relevant to the proposed Terra Power Solutions wind energy project includes:-

- The **Telecommunications Act (1966)** as amended, which has certain requirements with regard to potential impacts on signal reception.
- The **Environment Conservation Act No 73 of 1989 (ECA) Noise Control Regulations**, which specifically provide for regulations to be made with regard to the control of noise, vibration and shock, including prevention, acceptable levels, powers of local authorities and related matters.

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

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

3.3. MUNICIPAL BY-LAWS

Certain activities related to the proposed development may, in addition to national legislation, be subject to control by municipal by-laws. Relevant by-laws will be identified as part of the various specialist studies during the EIA Phase. Some of these conditions reflect the requirements of the Makana Local Municipality and, among others, relate to noise levels. In addition, there will be certain requirements related to the health and safety during construction and approval of method statements, particularly for excavation work.

At this stage in the EIA process the above list should not be regarded as definitive or exhaustive, and it is probable that additional legislative requirements will be identified as the process progresses. In this regard, the Terms of Reference for most of the specialist studies will include the

need for a review of all relevant legislation pertaining to the proposed development

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4. DESCRIPTION OF THE AFFECTED ENVIRONMENT

According to regulation 28 (1) of the EIA regulations (2010), *A scoping report must include –*

(e) a description of the environment that may be affected by the activity and the manner in which activity may be affected by the environment

In line with the above-mentioned legislative requirement, this chapter provides a description of the natural and socio-economic environments that could potentially be impacted by the proposed Riebeeck East wind energy project.

The study site occurs between the city of Grahamstown and the town of Riebeeck East in the Eastern Cape Province, South Africa. Previous studies undertaken in Grahamstown, have included detailed descriptions of the general characteristics of the area in terms of climate, topography and geology, and therefore only a synthesis of this information is provided in this chapter (Section 4.1).

Descriptions of the flora are based on a survey of the relevant literature to determine what could be expected to be found on or near the site. A socio-economic profile of the Makana region - the area that will be most directly affected by the construction and operation of the proposed Riebeeck East wind energy project is presented in Section 4.2 of this chapter. The profile includes basic demographic data on the municipal area.

4.1. THE BIO-PHYSICAL ENVIRONMENT

4.1.1. Climate

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

There is data available for climatic conditions in Grahamstown, which is close to the study site. The mean annual temperature is 16.4°C with an average maximum temperature of 20°C and an average minimum temperature of 9°C (Stone *et al.* 1998). The average annual rainfall for Grahamstown is 681mm and falls in a bimodal pattern with the most rain falling in Autumn and Spring (Stone *et al.* 1998). Rainfall reliability is poor and long lasting droughts are common (Palmer 2004).

4.1.2. Geology and Topography

The Eastern Cape Province contains a wide variety of landscapes, from the stark Karoo (the semi-desert region of the central interior) to mountain ranges and gentle hills rolling down to the sea. The climate and topography give rise to the great diversity of vegetation types and habitats found in the region. The mountainous area on the northern border of the Eastern Cape forms part of the Great Escarpment.

Another part of the escarpment lies just north of Bisho, Somerset East and Graaff-Reinet. In the south of the province, the Cape Folded Mountains start between East London and Port Elizabeth and continue westward into the Western Cape. Like KwaZulu-Natal, the Eastern Cape is characterised by a large number of short, deeply incised rivers flowing parallel to each other.

Most of the Eastern Cape rock formations are sedimentary, with rock types such as sandstone, mudstone, limestone, conglomerate and tillite being relatively common (CEN 1997). Grahamstown and Riebeeck East are underlain by folded rocks of the Cape and Karoo supergroups, in the eastern area of the Cape fold Belt (Jacob *et al.* 2004). The Cape Supergroup rocks comprise the Witteberg group whilst those of the Karoo Supergroup comprise Dwyka and Ecca groups (Jacob *et al.* 2004). The Witteberg group mostly consists of thin-bedded reddish-grey silt-stones and interbedded thin beds of sandstone (Rust, 1998). Importantly, a white quartzite forming the Witpoort formation occurs at the top of the group and white quartzite outcrops occur (Rust, 1998). The Dwyka group of the Karoo Supergroup consist of tillite which is a bluish-black rock when fresh and brownish tan when weathered. (Rust, 1998). The Ecca group, also forming part of the Karoo Supergroup, consists of a succession of dark grey shale units with interbedded sandstone (Rust 1998).

The general topography of the proposed wind energy facility is relatively complex, with undulating hills in the north and higher peaks that steepen as they form river valleys in the south (Plate 4-1).



Plate 4-1: A photograph illustrating the general topography of the area selected for the proposed Riebeeck East Wind Energy Facility.

Site Sensitivities and Current Land Use

A large proportion of the study area is currently used for small livestock farming, such as goats and sheep, and to a smaller extent, game farming. Initial indications are that the low lying areas of the study site are in poor condition while the higher lying ridges and incised valleys are in better condition. However, a full ecological specialist study will be conducted during the EIA phase.

4.1.3. Vegetation and Floristics

Vegetation

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

There are two vegetation classifications pertinent to the area. These are the National vegetation map developed by Mucina and Rutherford and the Subtropical Ecosystem Planning (STEP) Project. Each of these projects and descriptions of the relevant vegetation types are described below.

National Vegetation Map: Mucina and Rutherford

Mucina and Rutherford (2006) have developed the National Vegetation map as part of a South African National Biodiversity Institute (SANBI) funded project: “It was compiled in order to provide floristically based vegetation units of South Africa, Lesotho and Swaziland at a greater level of detail than had been available before.” The map was developed using a wealth of data from several contributors and has allowed for the best national vegetation map to date, the last being that of Acocks developed over 50 years ago. This map forms the base of finer scale bioregional plans such as STEP. This SANBI Vegmap project has two main aims:

- “to determine the variation in and units of southern African vegetation based on the analysis and synthesis of data from vegetation studies throughout the region, and
- to compile a vegetation map. The map was to accurately reflect the distribution and variation on the vegetation and indicate the relationship of the vegetation with the environment. For this reason the collective expertise of vegetation scientists from universities and state departments were harnessed to make this project as comprehensive as possible.”

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

Mucina and Rutherford (2006) define the following vegetation types (Figure 4-1) from which source these descriptions are derived:

Bhisho Thornveld

This vegetation type occurs in the Eastern Cape Province inland from the coast from Mthatha to North of East London as far as Fort Beaufort and occurring near Grahamstown. Bhisho Thornveld occurs on undulating planes and shallow drainage valleys. It comprises open savannah characterised by small trees of *Acacia natalitia* with a short to medium, dense, sour grassy understorey, usually dominated by *Themeda triandra*. A diversity of other woody species may occur, increasing under conditions of overgrazing. The vegetation type is wide-ranging and fire and grazing are important determinants.

This vegetation type is listed at **Least Threatened** by Mucina and Rutherford (2006). The conservation target is 25%, with only 0.2% statutorily conserved and 2% privately conserved. 20% has been transformed, mainly for cultivation, urban development or plantations.

Kowie thicket

This vegetation type is restricted to the Eastern Cape Province within river valleys close to Grahamstown. It occurs mainly on steep north-facing slopes and comprises tall thickets dominated by succulent euphorbias and aloes with an understory of shrubs and lianas including *Capparis*, *Secamone*, *Rhoicissus* and *Aloe* species. On south-facing slopes the vegetation type is a thorny thicket with low evergreen trees dominating: *Cussonia*, *Euclea*, *Hippobromus*, *Pappea*, *Ptaeroxylon* and *Scotia* as well as shrubs: *Azima*, *Carissa*, *Gymnosporia* and *Putterlickia*. This vegetation type is listed as **Least threatened** with a conservation target of 19% and 5% statutorily protected, 7% is transformed, primarily by cultivation.

Suurberg Quartzite Fynbos

This vegetation type occurs in the Eastern Cape Province along the Suurberg, Somerset East and Alicedale and around Grahamstown (Mucina & Rutherford 2006). It occurs on low rounded hills and mountains, comprising low to medium high, closed, ericoid, shrubland or grassland, with closed restioid and/or grass understory. Grassy fynbos is the most common constituent with localised patches of proteoid and ericaceous fynbos. South-facing slopes always contain fynbos whereas north-facing slopes are dominated by grassland.

This vegetation type is listed as **Least Threatened** by Mucina and Rutherford (2006). The conservation target is 23%, with 15% statutorily conserved and 16% privately conserved. Only 1% has been transformed for cultivation although over burning has become an issue and leads effectively to transformation.

Suurberg Shale Fynbos

This vegetation type occurs in the Eastern Cape Province with fragmented distribution. It occurs on low mountains or hills, supporting low to medium high, closed, ericoid shrubland or grassland, with closed restioid and/or grass understory. Graminoid fynbos with localized patches of proteoid fynbos also occurs. Few studies have actually separated this vegetation type from the Quartzite Fynbos, so the classification of this vegetation type is somewhat tentative.

Suurberg Shale Fynbos is listed as **Least Threatened** by Mucina and Rutherford (2006). The conservation target for this vegetation type is 23%, with 40% statutorily conserved and 6% privately conserved. Only 1% has been transformed.

Albany Broken Veld

This vegetation type occurs in the Eastern Cape Province with fragmented distribution. It occurs on low mountain ridges and hills with an open grassy karroid dwarf shrubland with low trees and a matrix of dwarf shrubs and grasses.

Albany Broken Veld is listed as **Least Threatened** by Mucina and Rutherford (2006). The conservation target is 16%. Only a small percentage is statutorily conserved in the Greater Addo Elephant Park while 12% is protected in private game reserves. 3% has been transformed for cultivation.

Great Fish Norsveld

This vegetation type occurs in the Eastern Cape with one large patch in the Great Fish River (north of Grahamstown) and spans a broad band from Pigott's (Carlisle) bridge in the west to Committees Drift in the east. This vegetation type is prevalent on plateaus and mildly sloping flanks of ridges supporting succulent thicket of low to medium height dominated by *Euphorbia*, *Crassula*, *Cotyledon* and *Pelargonium* species as well as *Grewia*, *Euclea*, *Gymnosporia* and *Schotia* species. Great Fish Norsveld is listed as **Least Threatened** by Mucina and Rutherford (2006). The conservation target is 19%. 3% is statutorily conserved with a further 31% conserved in private game reserves. Only 3% has been transformed for cultivation.

Subtropical Ecosystem Planning (STEP) Project

The Subtropical Ecosystem Planning (STEP) Project aims to identify priority areas that would ensure the long-term conservation of the subtropical thicket biome and to ensure that the conservation of this biome is considered in the policies and practices of the private and public sector that are responsible for land-use planning and the management of natural resources in the region (Pierce *et al.* 2005). STEP (Figure 4-2) identifies five vegetation types in this region. Pierce and Mader (2006) define the following vegetation types (Figure 4-1) from which source these descriptions are derived:

Zuurberg Grassy Fynbos

This vegetation type is mostly very grassy with restios (*Restio triticeus*) and proteas (*Protea nerifolia* and *Protea repens*) locally common on moist sites but conebushes (mostly *Leucodendron salignum*) usually present. The endemic small tree *Oldenbergia grandis* occurs characteristically on the quartzite outcrops in the East. Zuurberg Grassy Fynbos is listed as **Currently Not Vulnerable** by STEP.

Grahamstown Grassland Thicket

This vegetation type is a matrix of thicket clumps and grassland. Thicket clumps are typical of Albany Thicket, and contain taaibos (*Rhus pallens*), katdoring (*Scutia myrtina*), kiepersol (*Cussonia spicata*) and poison peach (*Diospyros dicrophylla*). The grassland matrix has many fynbos elements (*Erica* sp and *Restio triticeus*) as well as numerous species of rare localised endemic species, such as the genus *Brachystelma*. Grahamstown Grassland Thicket is listed as **Currently Not Vulnerable** by STEP.

Eastern Lower Karoo

This vegetation type is a matrix of grasses and dwarf shrubs. The dominant dwarf shrubs include *Pentzia incana*, *Felicia muricata*, *Rosenia humilis* and *Drosanthemum* spp while the dominant grasses include *Aristida diffusa* and *Eragrostis lehmanniana*. The Eastern Lower Karoo is listed as **Currently Not Vulnerable** by STEP.

Saltaire Karroid Thicket

The saltaire Karroid Thicket is characterized by fragmented clumps of thickets that form a karoo-like matrix dominated by sweet thorn (*Acacia karoo*) and bitter aloe (*Aloe ferox*) with *Becium burchellianum* and kapokbos (*Eriocephalus africanus*) characteristic shrubs. The thicket clumps are typical of Albany Thicket. The Saitaire Karroid Thicket is listed as **Currently Not Vulnerable** by STEP.

Fish Noorsveld

This vegetation type is characterized by a sparse number of trees with grass cover that is only abundant after good rain. It is easily recognised by the very high abundance of noors (*Euphorbia bothae*) and, in its pristine state, a relatively high cover of spekboom (*Portulacaria afra*). The Fish Noorsveld is listed as **Currently Not Vulnerable** by STEP.

Albany Valley Thicket

Thicket is typically impenetrable and is characterised by thorny, shrub species that are between 2-3m in height. This vegetation type is a mosaic of shrubs, small trees and succulents and is easily recognized by the abundance of tall *Euphorbia tetragona* plants that emerge above the canopy layer. Dominant trees include doppruim (*Pappea capensis*) and gwarrie (*Euclea undulata*) while

characteristic species are the succulents, *Aloe africana* and *Kalanchoe rotundifolia*. The Albany Valley Thicket is listed as **Vulnerable** by STEP.

Inland Thornveld

This vegetation type is a mosaic of sweet thorn trees (*Acacia karoo*) that grow amongst a matrix of grasses which include *Themeda triandra*, *Cymbopogon plurinodis*, *Digitaria eriantha*, *Sporobolus fimbriatus* and *Eragrostis chloromelas*. The Inlands Thornveld is listed as **Currently Not Vulnerable** by STEP.

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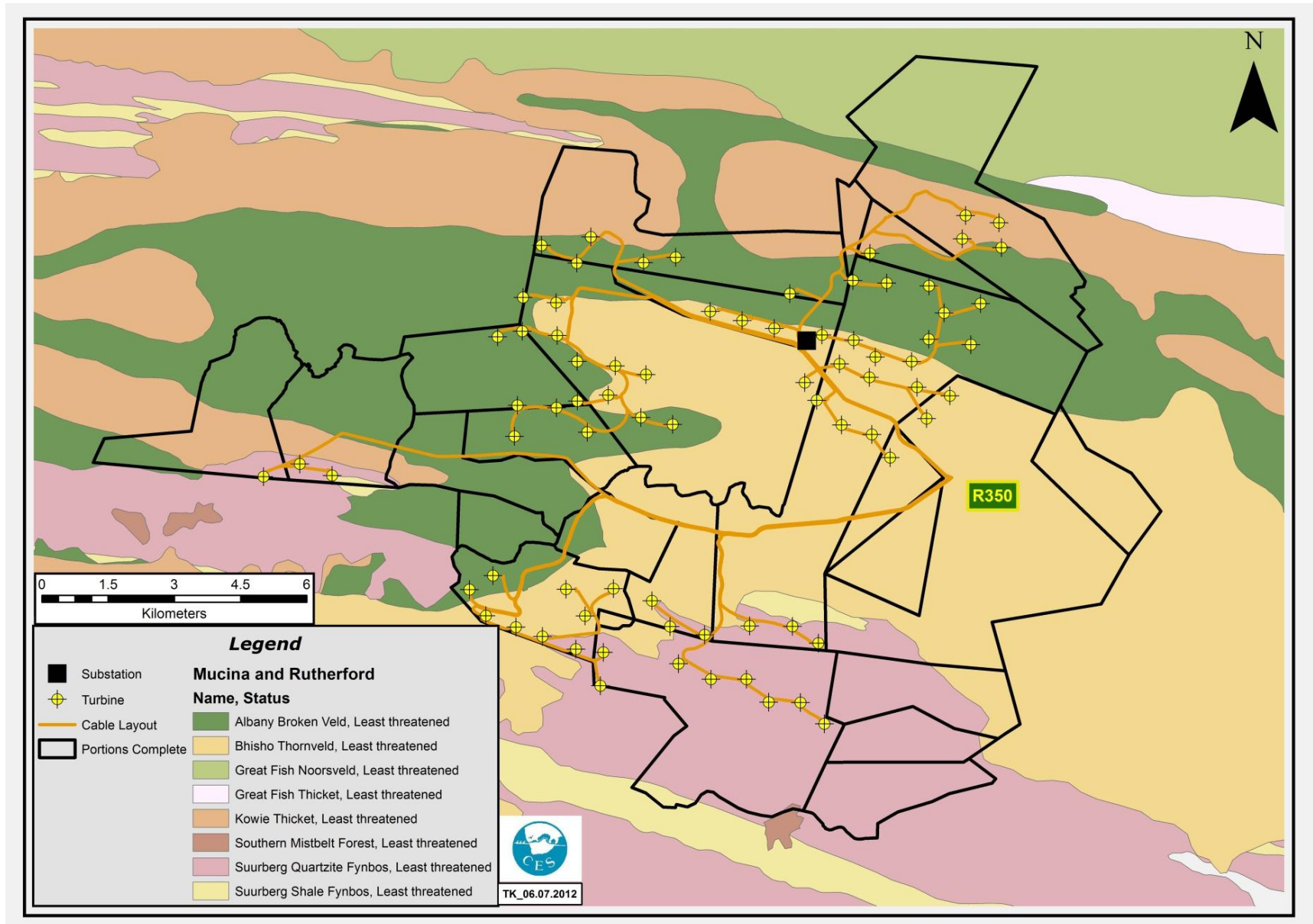


Figure 4-1: Mucina and Rutherford vegetation map of the study area

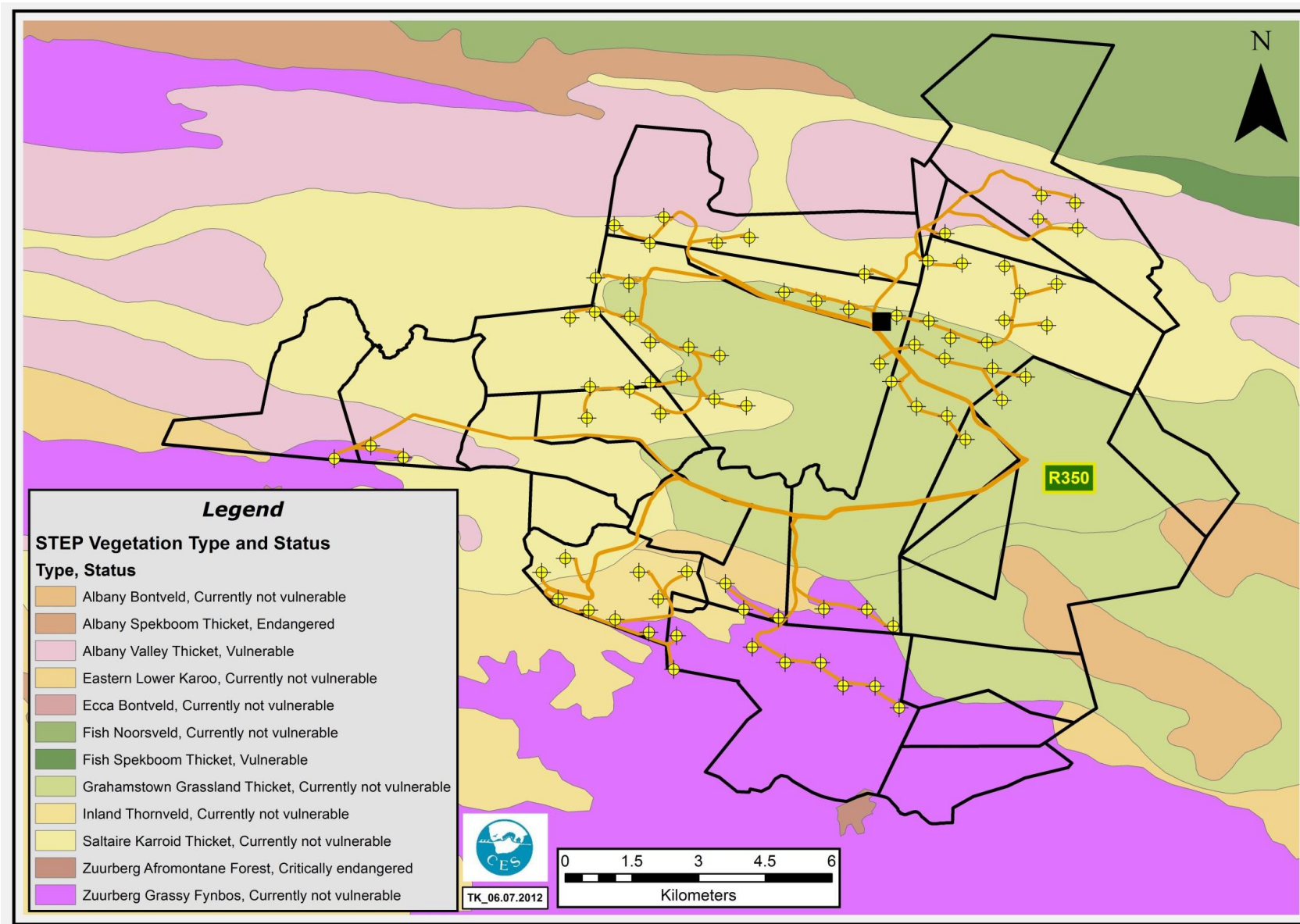


Figure 4-2: STEP vegetation map of the study area

4.1.4. Floristics

Grahamstown and Riebeeck East falls within the Albany Centre of Floristic Endemism; also known as the Albany Hotspot (Figure 4-3). This is an important centre for plant taxa, and, according to van Wyk and Smith (2001), contains approximately 4000 vascular plant species with approximately 15% either endemic or near-endemic (Victor and Dold, 2003). This area was delimited as the, ‘region bounded in the west by the upper reaches of the Sundays and Great Fish River basins, in the east by the Indian Ocean, in the south by the Gamtoos–Groot River basin, and in the north by the Kei River basin’ (Victor & Dold, 2003).

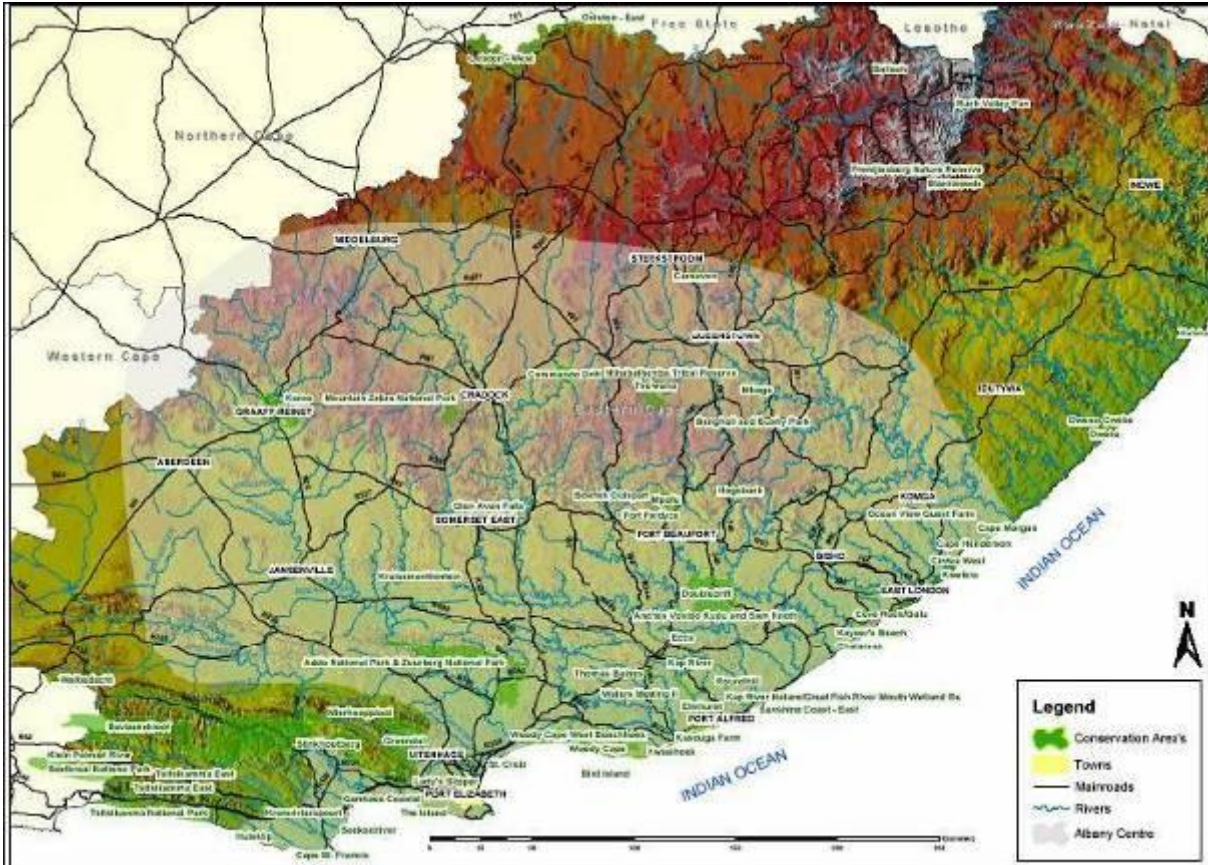


Figure 4-3: The Albany Centre of Endemism, also known as the ‘Albany Hotspot’, has long been recognised as an important centre of plant species diversity and endemism (From van Wyk and Smith 2001).

Potential Species of Special Concern (PSSC)

Potential Species of Special Concern (PSSC) include all those plants listed in terms of the IUCN, CITES and both national and provincial legislation that may occur in the area of study. If any of these species are found to occur on site, they are given the status of Confirmed Species of Special Concern (CSSC). Such a list will be produced in the EIA stage of the proposed development. The list of PSSC includes an estimated 450 species that are listed individually by the IUCN red data list, the South African National Biodiversity Institute (SANBI), the Forests Act and the Provincial Nature Conservation Ordinance (PNCO) 16 of 1974. In addition, the PNCO lists eight plant families and six plant genera that are afforded blanket protection throughout the province.

Species endemic to the area are described by Mucina and Rutherford (2006). In addition to the endemic taxa, there are also a number of species expected to be found in the study area, some of which are listed as protected by various conservation bodies (Table 4-1). A list of species that are likely to be found in the area and are classified as critically endangered on the South African Red List are included in Table 4-2. Critically endangered species are species that are facing an extremely high risk of extinction. The list is not complete as many species and taxa require

additional study. The taxa with many data deficient species include specifically the Mesembrianthemaceae family, as well as members of the Amaryllidaceae (Amaryllids), Iridaceae (Irises), Orchidaceae (Orchids) and Apocynaceae (Lianas), as well as members of the genus *Aloe*. A complete list of Potential Species of Special Concern is included in Appendix E.

Table 4-1: Summary of the status of the Possible Species of Special Concern occurring in the Proposed Riebeeck East Wind Energy Facility area.

Status	Number of Species
IUCN Red Data List (international)	
Critically Endangered (CR)	2
Data Deficient (DD)	2
LR	2
Near Threatened (NT)	2
Vulnerable (VU)	2
CITES	
Appendix I	0
Appendix II	77
SANBI Red Data List (South African)	
Critically Endangered (CR)	4
Endangered (EN)	6
Threatened	1
Rare	7
Declining	15
Vulnerable (VU)	8
Near Threatened (NT)	12
Data Deficient – insufficient information (DDD)	1
Data Deficient – Taxonomically Problematic (DDT)	10
Not Evaluated (NE)	131
Least Concern (LC)	1208
PNCO (Eastern Cape)	
Schedule 3	4
Schedule 4	266
Protected Tree Species List (South African)	6

Table 4-2: Plant species likely to occur in the Riebeeck East area that are critically Endangered (CR) on the South African Red Data List (Source: SIBIS 2012).

Scientific Name	Red Data List
<i>Amphithalea ericifolia subsp. erecta</i>	Critically Endangered (CR)
<i>Encephalartos latifrons</i>	Critically Endangered (CR)
<i>Searsia albomarginata</i>	Critically Endangered (CR)
<i>Isoetes wormaldii</i>	Critically Endangered (CR)

FAUNA

Amphibians and Reptiles

Over one hundred species of reptiles and amphibians occur on the Eastern and Southern Cape Coastal Belt (Branch, 1998). Most are generalists, and represent the transition from temperate to tropical fauna, some montane forms occur in the Cape Fold Mountains (Branch 1998).

The Eastern Cape is home to 133 reptile species including 21 snakes, 27 lizards and eight chelonians (tortoises and turtles) (Plate 4-1). The majority of these are found in Mesic Succulent

Thicket and riverine habitats. Table 4-2 provides an indication of the threatened and endemic reptile species with distribution ranges that include the Grahamstown and Riebeeck East area. Table 4-2 lists species of frogs that are endemic or of conservation concern, and occur in the Grahamstown/ Riebeeck East region.



Plate 4-1: An Angulate tortoise (*Chersina angulata*) found in the Grahamstown and Riebeeck East area.

Table 4-2: Threatened and endemic reptiles likely to occur in the Grahamstown and Riebeeck East region (Source: Branch, 1998)

Latin name	Common Name	IUCN Status	Conservation
<i>Acontias meleagris orientalis</i>	Golden legless skink	Eastern Cape endemic	
<i>Afroedura karroica</i>	Inland rock gecko	Eastern Cape Endemic	
<i>Afroedura tembulica</i>	Queenstown rock gecko	Eastern Cape Endemic	
<i>Bradypodion ventrali</i>	Southern Dwarf Chameleon	Eastern Cape Endemic	
<i>Dasypeltis scabra</i>	Common or Rhombic Egg Eater	LC	
<i>Goggia essexi</i>	Essex's Dwarf Leaf-toed Gecko	Eastern Cape Endemic (LC)	
<i>Tropidosaura Montana</i> subsp. <i>rangeri</i>	Common mountain lizard	Eastern Cape Endemic	

Amphibians are well represented in sub-Saharan Africa, from which approximately 600 species have been recorded. A relatively rich amphibian fauna occurs in the Eastern Cape, where a total of 32 species and sub-species occur. This represents almost a third of the species known from South Africa. Knowledge of amphibian species diversity in the Grahamstown/Riebeeck East region is limited and based on collections housed in national and provincial museums. It is estimated that as many as 17 species may occur. Table 4-3 lists species of frogs that are endemic or of conservation concern, and occur in the Riebeeck East region.

Table 4-3: Threatened and endemic frogs likely to occur in the Grahamstown/Riebeeck East area (Source: CSIR, 2004)

Latin name	Common name	IUCN Conservation Status
<i>Anhydrophryne rattrayi</i>	Hogsback frog	Endangered (Eastern Cape endemic)
<i>Bufo amatolicus</i>	Amatola toad	Endangered (Eastern Cape endemic)
<i>Bufo pardalis</i>	Leopard toad	Eastern Cape endemic
<i>Xenopus laevis</i>	African Clawed Frog	Least Concern

Birds

Nine bird species are endemic to South Africa, but there are no Eastern Cape endemics. However, there are 62 threatened species within the Eastern Cape Province (Barnes, 2000). Most of these species occur in grasslands or are associated with wetlands, indicating a need to conserve what is left of these ecosystems (Barnes, 2000). A number of inland species are found in this region e.g. Acacia pied barbet, common Ostrich, Cape Penduline Tit, Southern Black Korhaan and Blue Cranes. The greatest abundance of birds is found in Valley Thickets and in the Aloe flowering season with Sunbirds being extremely conspicuous.

Mountain ridges have the species of the fynbos biome e.g. Cape Sugarbirds. In the forests and on grassland slopes, Knysna Turaco, Narina Trogons, Dark-backed Weavers, Canaries and African Goshawks are some of the birds found. Many birds occur in the bushveld, savanna, bush clumps and thicket areas. Table 4-4 lists threatened bird species likely to occur in the Grahamstown/Riebeeck East area and surrounding region. The closest IBA is 24km from the study site.

Table 4-4: Threatened bird species likely to be encountered in Grahamstown/Riebeeck East Area and surrounds (Source: SABIF, 2012).

Common name	Latin name	IUCN Conservation status
The Blue Crane	<i>Anthropoides paradiseus</i>	Vulnerable
Grey Crowned Crane	<i>Balearica regulorum</i>	Endangered
Black Harrier	<i>Circus maurus</i>	Vulnerable
European Roller	<i>Coracias garrulus</i>	Near-Threatened
Denham's Bustard	<i>Neotis denhami</i>	Near-Threatened
Ludwigs Bustard	<i>Neotis ludwigii</i>	Endangered
Maccoa Duck	<i>Oxyura maccoa</i>	Near-Threatened
Martial Eagle	<i>Polemaetus bellicosus</i>	Near-Threatened
Secretary Bird	<i>Sagittarius serpentarius</i>	Vulnerable
Crowned Eagle	<i>Stephanoaetus coronatus</i>	Near-Threatened

Mammals

Large game makes up less than 15% of the mammal species in South Africa and a much smaller percentage in numbers and biomass. In developed and farming areas, such as Grahamstown and Riebeeck East, this percentage is greatly reduced, with the vast majority of mammals present being small or medium-sized. Except where reintroduced into protected areas, lions, black wildebeest, red hartebeest, buffalo, black rhinoceros, elephant, hippopotamus and reedbuck are absent. Cheetah and hunting dog are no longer found in the area and leopard and honey badger are rare (Skead, 1974). Distribution maps suggest that the antelope that are abundant are bushbuck, duiker, steenbok and kudu. Blesbok, bontebok and gemsbok have been reintroduced on some farms.

Of the cat species, the lynx (caracal) and black-footed cat are found. Jackal are also found as is the aardwolf, but it is not abundant.

Vervet monkeys are common and baboons are found in appropriate sites in kloofs and valleys. Rock dassies, genet and mongoose species are also common and aardvark occur in the region but are not abundant. Multiple rodent species are found in the area and include rats and mice, the cane rat, springhare and porcupine. A number of species of bat also occur. Table 4-5 lists large and medium sized mammals on the IUCN Red Data List that occur in the Eastern Cape Province which may be present on site.

Table 4-5: Threatened large to medium-sized mammals in the Eastern Cape Province (Source: Smithers, 1986)

Common name	Latin name	IUCN Conservation Status
Wild dog	<i>Lycaon pictus</i>	Endangered
Brown Hyaena	<i>Hyaena brunnea</i>	Rare
Aardwolf	<i>Proteles cristatus</i>	Rare
Black-footed cat	<i>Felis nigripes</i>	Rare
Serval	<i>Felis serval</i>	Rare
Leopard	<i>Panthera pardus</i>	Rare
Blue Duiker	<i>Philantomba monticola</i>	Rare
Honey Badger	<i>Mellivora capensis</i>	Vulnerable
African Wild Cat	<i>Felis lybica</i>	Vulnerable
Aardvark	<i>Orcteropus afer</i>	Vulnerable
Cape Mountain Zebra	<i>Equus zebra</i>	Vulnerable
Black Rhinoceros	<i>Diceros bicornis</i>	Vulnerable
Oribi	<i>Ourebia ourebi</i>	Vulnerable
Pangolin	<i>Manis temminckii</i>	Vulnerable
Small-spotted cat	<i>Felis nigripes nigripes</i>	Rare

4.1.5. Bats

Of specific importance for wind farm developments are the presence of bats in the area. A confounding number of bat fatalities have been found at the bases of wind turbines throughout the world. Echolocating bats should be able to detect moving objects better than stationary ones, which begs the question, why are bats killed by wind turbines (Baerwald *et al.*). Table 4-6 lists the species of bats likely to occur in Grahamstown, Riebeeck East and the surrounds, and thus will be affected by the proposed development.

Table 4-6: Bat species that occur in the Grahamstown and Riebeeck East area which are likely to be affected by the wind turbines (Apps, 2000).

Order: Chiroptera		
Common Name	Species Name	IUCN Conservation Status
Straw-coloured fruit bat	<i>Eidolon helvum</i>	Near Threatened
Egyptian fruit bat	<i>Rousettus aegypticus</i>	
Geoffrey's horseshoe bat	<i>Rhinolophus clivosus</i>	Least Concern
Cape horseshoe bat	<i>Rhinolophus capensis</i>	Least Concern
Temminck's hairy bat	<i>Myotis tricolor</i>	Least Concern
Cape serotine bat	<i>Eptesicus capensis</i>	Least Concern
Common slit-faced bat	<i>Nycteris thebaica</i>	Least Concern
Giant yellow house bat	<i>Scotophilus nigrita</i>	Least Concern
Schreiber's long-fingered bat	<i>Miniopterus schreibersi</i>	Near Threatened
Tomb bat	<i>Taphozous mauritanus</i>	Least Concern
Angola free-tailed bat	<i>Tadarida condylura</i>	Least Concern
Wahlberg's epaulated bat	<i>Epomophorus wahlbergi</i>	Least concern
Banana bat	<i>Pipistrellus nanus</i>	Least Concern
Egyptian free-tailed bat	<i>Tadarida aegyptiaca</i>	Least Concern

Lesser woolly bat	<i>Kerivoula lanosa</i>	Least Concern
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Conservation and planning tools

Several conservation planning tools are available for the area. These tools allow for the determination of any sensitive and important areas from a vegetation and faunal point of view at the scoping stage of a development. They allow for the fine-tuning of plans and turbine layouts with a view to reducing potential environmental impacts at the planning stage of the development. The tools used are outlined in Table 4.6 below.

Table 4.6: Conservation and planning tools considered for the proposed project

Tool	Motivation	Relevancy	Notes
Important Bird Area (IBA)	Important Bird Areas are globally recognized areas essential for the protection of bird species. In order to be classified as an IBA, an area must contain Globally threatened species, restricted range species, biome restricted species or congregations of species.	Irrelevant. The study site is 25km from the closest IBAs.(Figure 4-4)	An avifauna impact assessment in the EIA phase will determine the impacts of the proposed facility on Birds.
Protected Areas Expansion Strategy	The objective of the PAES is to form an overarching strategic framework for a protected area network that 'conserves a comprehensive, representative and adequate sample of biodiversity and maintains key ecological processes across the landscape and seascape.' The areas earmarked by this study should be protected.	Relevant, a portion of the project area occurs in an area earmarked for expansion. (Figure 4-4).	This will be discussed in more detail in the Ecological Impact Assessment to be carried out in the EIA phase.
Protected Areas	Protected areas are areas that are already conserved. Areas in close proximity to the proposed development may be affected by the development and thus must be taken into account.	Relevant, the study site is 8km from a protected area. (Figure 4-4)	This will be discussed further in the Avifaunal and Bat Impact Assessments that will be conducted during the EIA phase.
Wetlands	Wetlands are very important aspects of the ecosystem as they are process areas. Not only do they form habitat for both flora and fauna, they also perform vital ecosystem functions. It is for this reason that wetlands are always rated with a high sensitivity and should be conserved.	Relevant. There are numerous small watercourses at the project site. (Figure 4-5).	Wetlands will be discussed in more detail in the EIA phase.
Critical Biodiversity Areas (CBA's)	Critical Biodiversity Areas (CBAs), as defined by SANBI, are regions that are critical for the conservation of biodiversity and the maintenance of ecosystem functioning. These areas should remain in a natural state as far as possible.	Relevant. The proposed project site occurs in areas classified as Critical Biodiversity Areas (Figure 4-6).	CBAs will be discussed in more detail in the Ecological Impact Assessment in the EIA phase of the development.

STEP	The Subtropical Thicket Ecosystem Planning Project maps vegetation and assigns each of these a conservation criterion. It is very important in determining sensitivity.	Relevant. The northern section of the area of the proposed wind energy facility falls into one STEP category: Vulnerable. (Figure 4-7)	This will be discussed in further detail in the Ecological Impact Assessment
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The implications of the project on these conservation planning objectives, and the implications these hold for the project, will be subject to further discussion and assessment during the EIA phase. The intention of the Scoping phase will be to secure as much relevant comment and direction from associated government agencies and line function departments to place the project within the appropriate contexts and prescriptions of these tools.

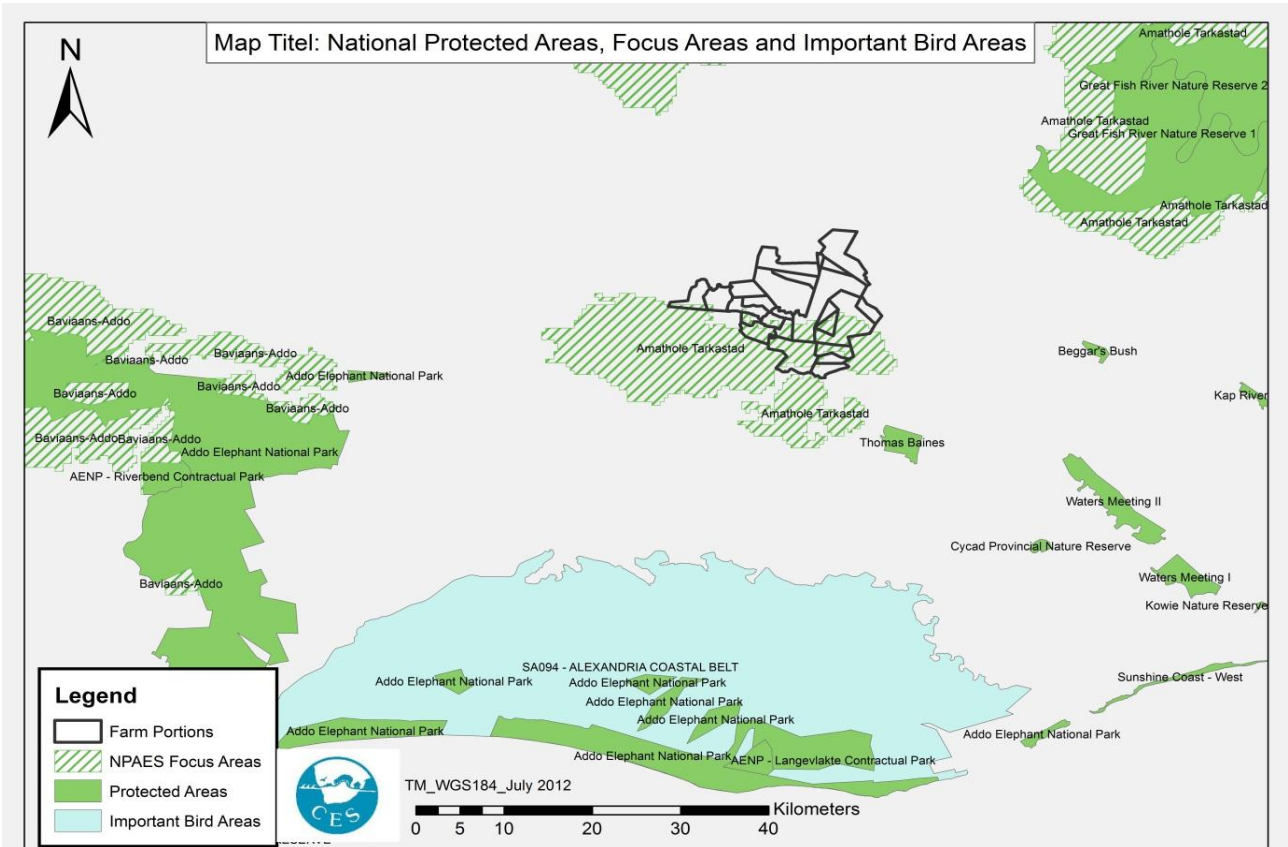


Figure 4-4: Important Bird Areas (IBAs), Protected areas and Protected Area Expansion Focus Areas surrounding the project site

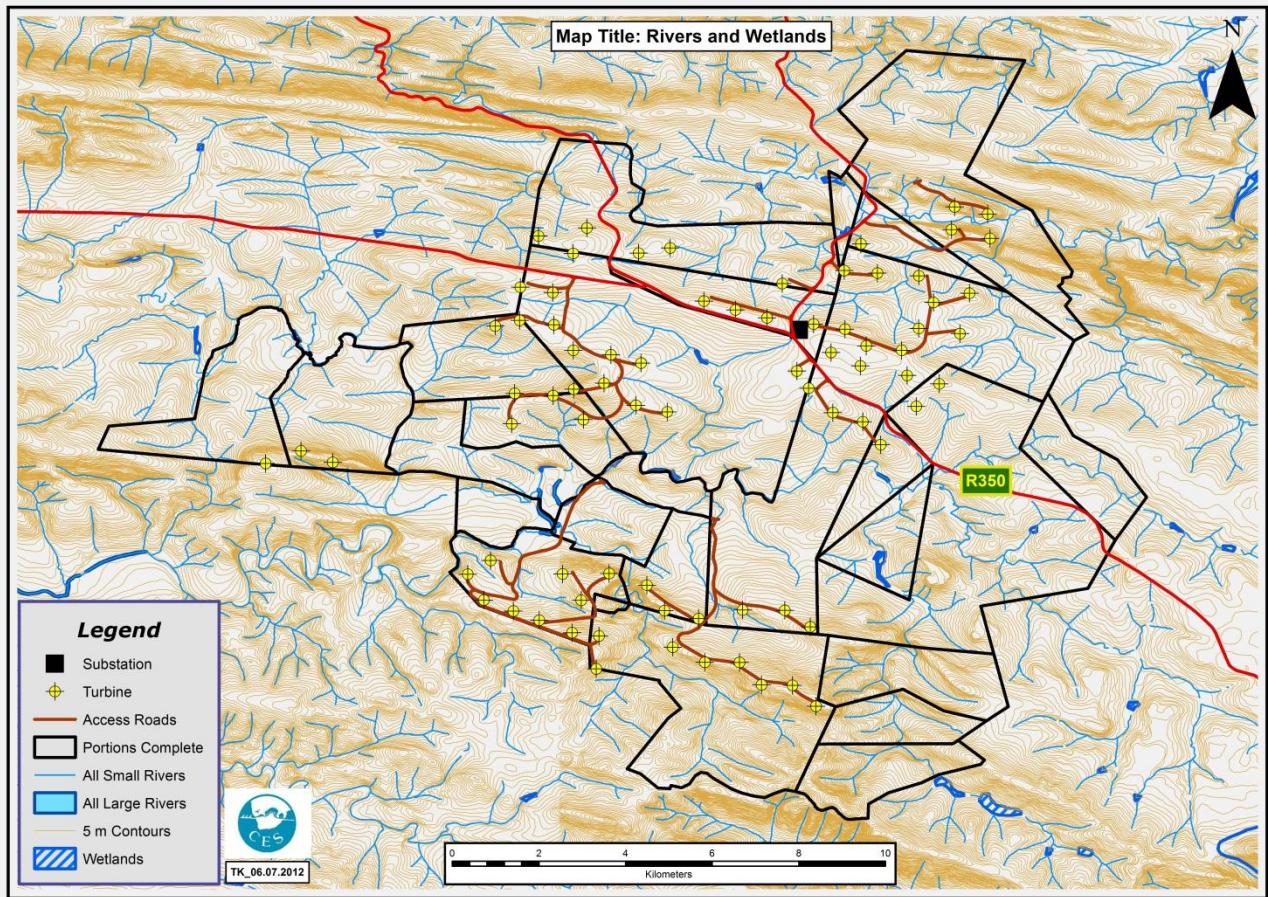


Figure 4-5: Wetlands surrounding the proposed project site

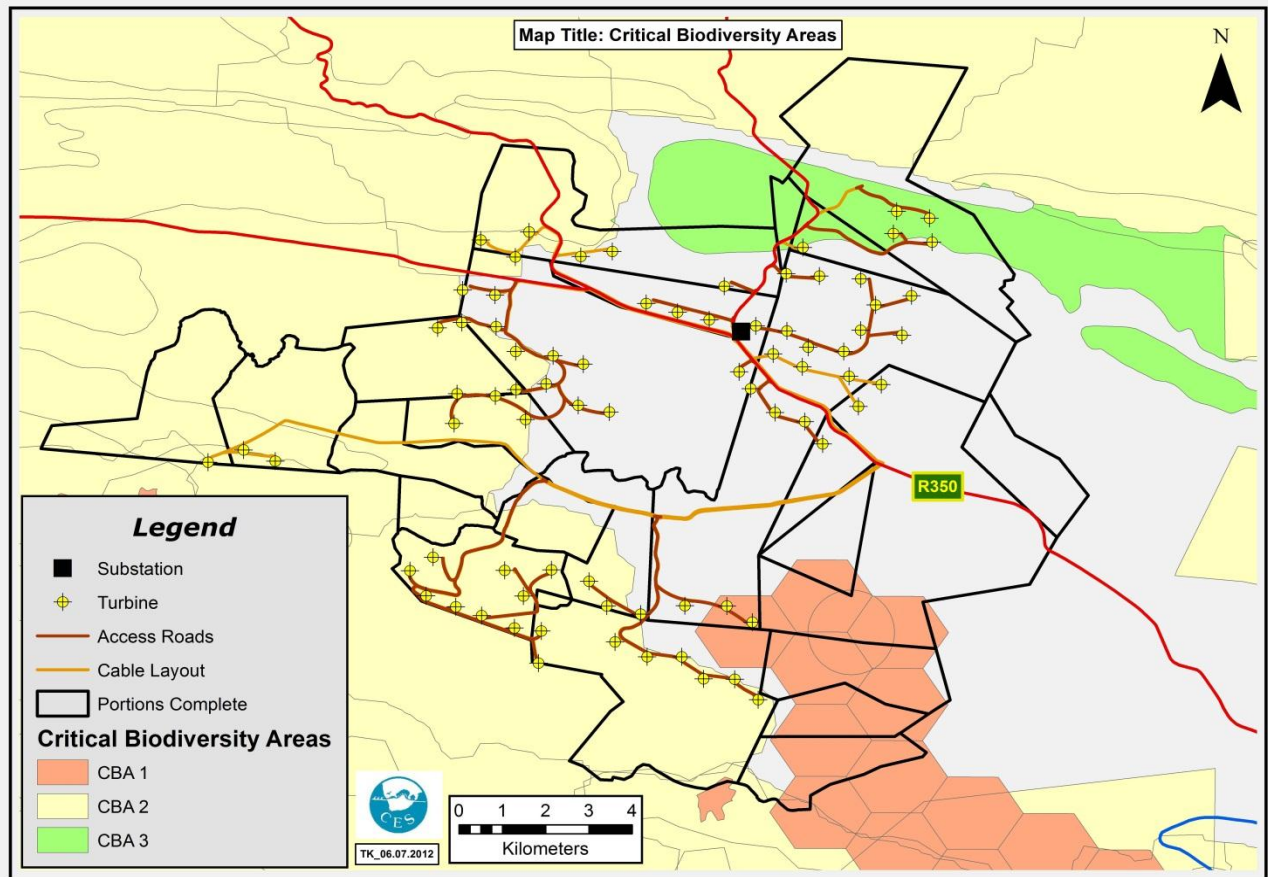


Figure 4-6: Critical Biodiversity Areas (CBA) for the proposed project site.

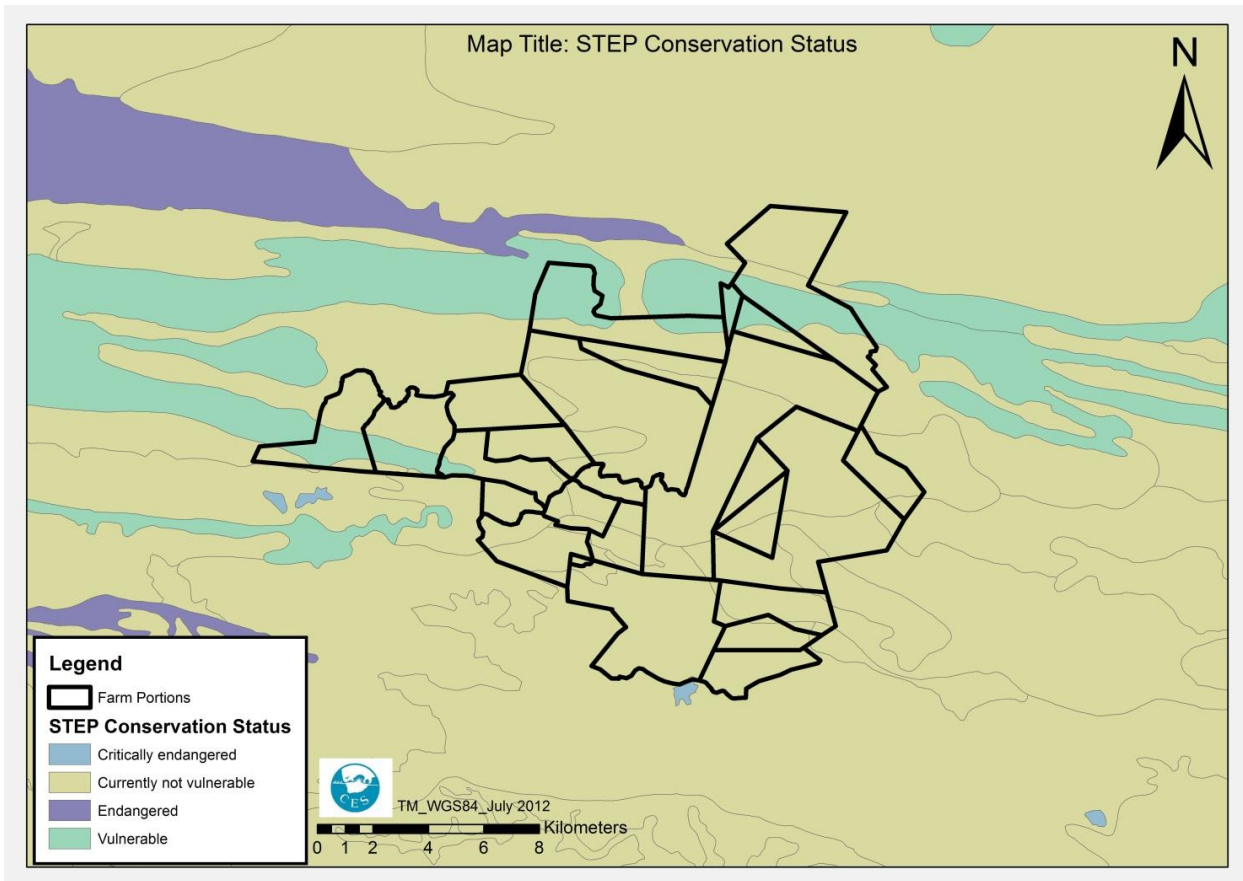
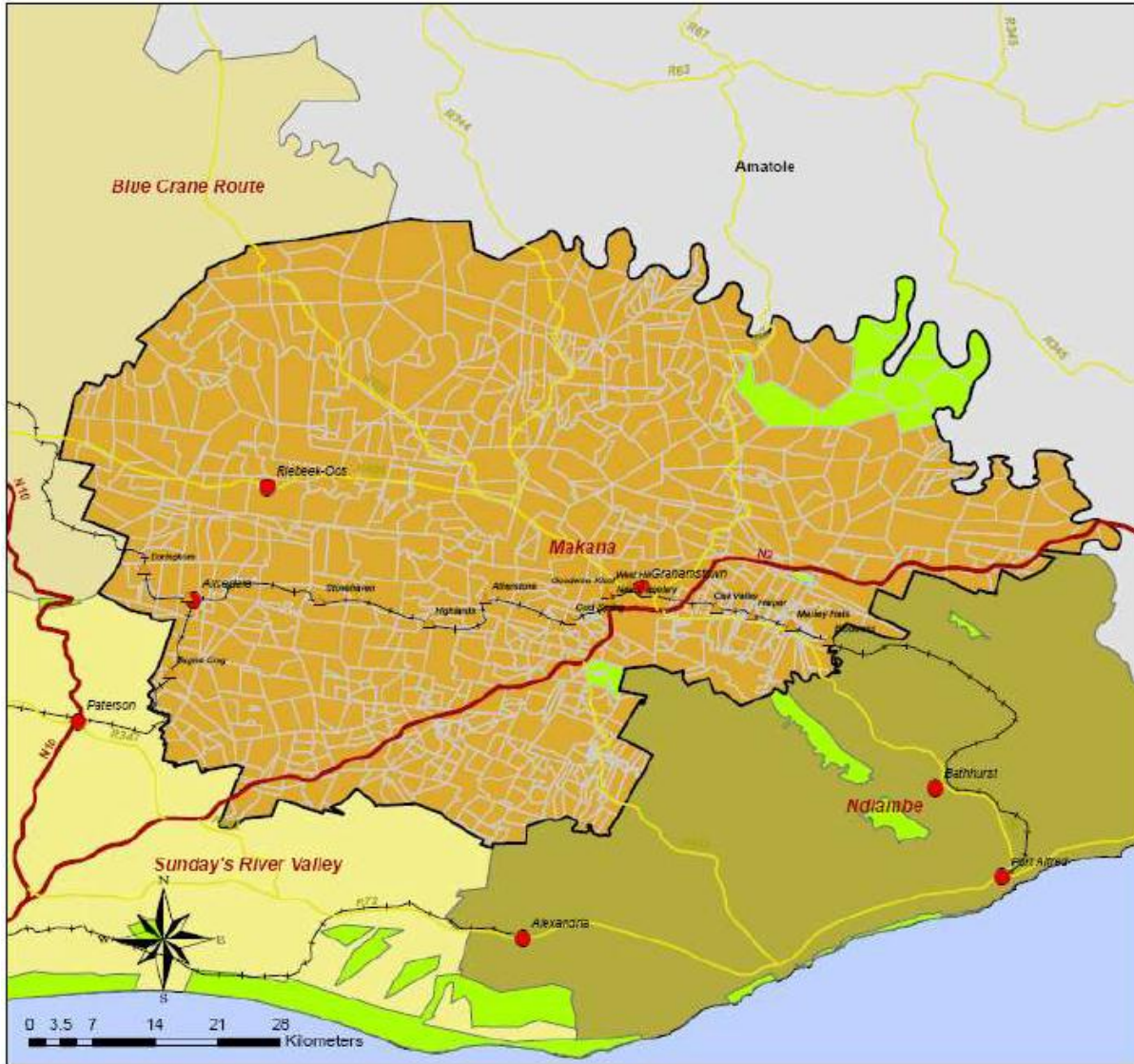


Figure 4-7: STEP conservation status of study site

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4.2. Socio-Economic Profile of Makana Local Municipality

The aim of this section is to describe the socio-economic conditions of the potentially affected areas. A brief discussion of the socio-economic setting of the Eastern Cape Province is provided in order to contextualize that of the Cacadu District, and the Makana Local Municipality.






	Makana Local Municipality
	Nature Reserves
	Towns

Figure 4-8: An indication of the locality of Makana Local Municipality.

4.2.1. The Eastern Cape Province

The Eastern Cape Province is the second largest province in South Africa, covering approximately 169 580 square kilometres, or 13.9% of South Africa’s total land area. With more than six million people, the Eastern Cape has the third largest provincial population. It is also one of the poorest provinces in the country, with a largely rural composition and a significant backlog in basic service provision.

The economy of the Eastern Cape has grown faster than the national economy over the past few years, although this has been off a low base. Economic growth has been led by the manufacturing sector, which accounts for over 16% of the total value of the province’s production of goods and services, and 20% of employment (Eastern Cape Economy – CDC, 2004). According to the Eastern Cape Development Corporation (ECDC), the manufacturing sector grew by 21% in real terms from 1998 to 2001, compared to 9% for South Africa as a whole. The province’s manufacturing sector is well integrated into the world economy. Table 4-7 indicates the sectoral production and employment in the Eastern Cape. These sectors have been identified as areas of opportunity by the ECDC. The other important areas of the Eastern Cape’s economy are agriculture, textiles, clothing and leather, wool processing, timber and transport, and tourism. It is clear from Table 4-7, that the manufacturing sector is the largest contributor and employer in the Eastern Cape Province. This sector is also highly reliant on electricity and will therefore be affected by electricity availability.

Table 4-7: Sectoral production and employment in the Eastern Cape economy

Production sector (source: StatsSA)	Value of output (Rm)	% of total EC output	No. of Employees	% of total
Agriculture, hunting, forestry, fishing	2 063	3.6	70 470	13.2
Mining & quarrying	57	0.1	7 154	1.4
Manufacturing	14 783	25.8	97 035	18.1
Electricity, gas & water supply	874	1.7	5 598	1.0
Construction	1 892	3.3	43,635	8.1
Wholesale, retail trade & accommodation	9 339	16.3	83 818	15.7
Transport, storage & communication	5,501	9.6	32 851	6.1
Financial, insurance, real estate & business services	7 048	12.3	35 181	6.6
Community, social & personal services	15 643	27.3	159 453	29.8
Total:	57 300	100.0	535 195	100.0

4.2.2. *Cacadu District Municipality*

Cacadu District is the largest of the district municipalities in the Eastern Cape and wholly surrounds Nelson Mandela Bay. The Cacadu District Municipality includes nine local municipalities, of which the Makana Local Municipality is one. The proposed wind energy facility is to be developed in Makana. It is likely that the proposed development will have direct and indirect socio-economic impacts on the municipal area and its population. Accordingly the discussion that follows provides a brief socio-economic profile of the local municipal area.

4.2.3. *Makana Local Municipality*

The proposed Grahamstown Wind Energy Project is to be developed within the Makana Local Municipality (MLM). The proposed facility will be situated approximately 22km east of Riebeeck East and 15km west of Grahamstown, and be located on seven properties, namely: Hilton Farm, Table Hill North, Kruisfontein, Brack Kloof, Table Hill, Slaaikraal Farm and Hounslow. The surrounding area is not densely populated. However, it is still highly likely that the development of the project will have direct socio-economic impacts on the municipal area and its population.

The Makana municipal area extends over 4 379 km² and is bounded by the cities of Port Elizabeth to the west, and East London to the east. According to the South African Community Survey of 2007 (StatsSA, 2007)⁵, the municipality's population declined from an estimation of 75 302 in 2001 to about 70 059 in 2007. The MLM IDP 2010⁶ cites Quantec's numeration of the population in 2007 as 70 706. The area primarily consists of three nodal points namely Grahamstown, Riebeeck East and Alicedale. Grahamstown is the largest of the nodes both economically and in terms of population size (the greater Grahamstown area accounts for approximately 81% of the municipality's population), and serves as the administrative hub. Rhodes University (RU) is a dominant feature in the economic social landscape of the city, and therefore the MLM at large. By contrast, Alicedale is a small town that used to serve as an important national railway juncture in the past, but current economic activity is restricted to tourism primarily in the form of the Bushman Sands Hotel. Lastly, Riebeeck East has traditionally been an agrarian economy, which is still reflected in the current status quo.

Makana has a population density of 16.1 people per square kilometre, which is high when compared to the district population density of 6.6 people per square kilometre. This indicates a high level of urbanization in the local municipality. Despite the overall plateau in population growth, informal settlement populations increased. This may indicate migration from farms and areas in the Grahamstown periphery to the core, in the search for economic opportunities and improved service provision (MLM IDP 2010:15).

According to the South African Census of 2001 (which provides the most accurate data to date), in terms of age distributions, 68% of the MLM's total population are estimated to be between the ages of 15 and 64. This is the segment of the population that is considered to be the working age group. This relatively large percentage indicates that the wind farm will be developed in areas in which the majority of people are within the working age population, and hence employment opportunities in the area will be needed. The 15-34 age group constitutes 38.8% of the total population; this is partly a result of the fact that Makana municipality hosts a range of education facilities, which attract people within the 15-34 age group. The implication of this relatively young population is that there is a high demand for the creation of employment opportunities. Few local employment opportunities, together with the relatively large young age population groups can also explain the population decline in the municipal area, as youth may be searching for work in different municipal areas. The wind farm will undoubtedly provide an economic boost to the area, which can potentially be expanded through the operation of the multiplier effect. Various employment opportunities will be created during the construction phase of the development, meeting the need for employment in these areas, al beit temporarily.

⁵ StatsSA. 2007. Community Survey 2007: Basic Results for the Eastern Cape. Pretoria: Statistics South Africa.

⁶ Makana Local Municipality Integrated Development Plan Review 2010/2011

Education levels have a direct impact on economic development and the quality of life enjoyed by residents of an area. This is because it influences the skills profile and thus the employability of a population. Education affects the potential that workers have, their productivity, and also income levels. Education is therefore linked to the economic development of an area. In terms of education, the 2001 census indicates that both municipal areas seem to have a significant percentage of residents who have no schooling. For example, when considering the MLM, approximately 7% have no schooling, which is below the provincial level of 9.4% and the district level of 12.3%. The 2001 census indicates that 13% of the population have some primary school education; however, the MLM IDP indicates that 36.1% of the population were educated at a primary school level in 2007. The 2001 census notes that 5.4% received some secondary school education, and 19% a Grade 12 education. A significantly low 6% of the population of this municipality have a higher education. These figures are illustrated in the table below.

Table 4-8: Educational status of the MLM

CATEGORY	MLM (%)
No schooling	7.3
Some primary	13.0
Complete primary	5.4
Some secondary	19.0
Std 10/Grade 12	10.3
Higher	6.3
Unspecified/not applicable	38.8
TOTAL	100 (%)

As per the 2001 data, employment rates are low. For example, it is estimated that about 51% of the economically active population of the MLM is employed. More detailed figures are provided in the MLM IDP (2010), according to which, of the 70 706 people recorded as living in Makana in 2007:

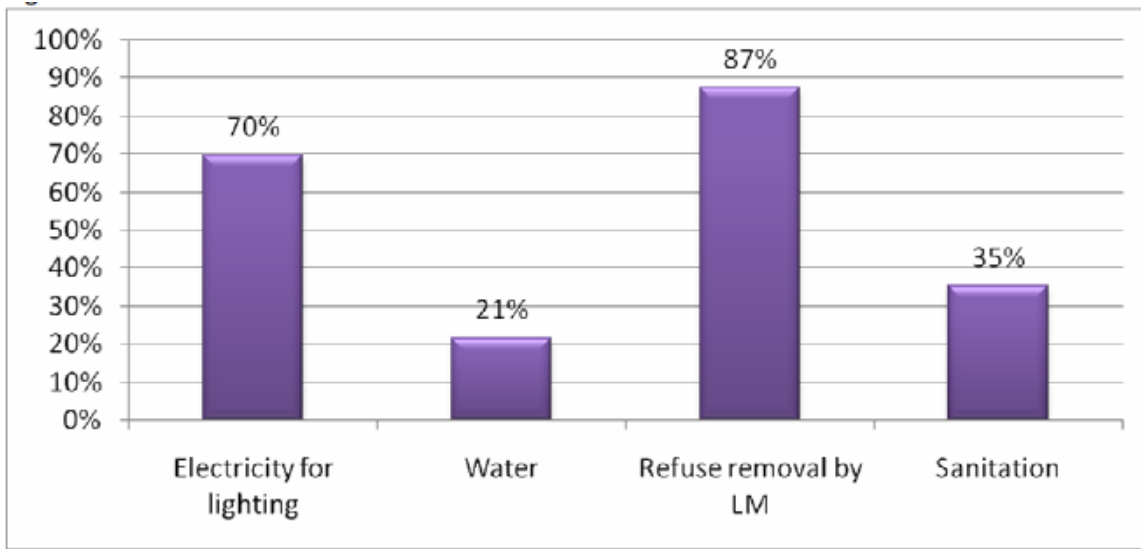
- 13801 (or 32.1%) were employed, which is similar to the provincial level but lower than the district level.
- 14 753 (or 34.3%) were unemployed, which is much higher than the provincial and district levels
- 14 496 (or 33.7%) were not economically active, which is lower than the provincial and district levels.
- 27 656 were not classified as they fall outside the bands of the working age population

This data again reinforces the need to create not only employment nodes in the area, but in so doing, to keep the educated youth in the municipal areas to stimulate the economic sectors of the larger districts. The wind farm will supply electricity and indirectly produce, or support, new economic nodes.

In order to consider the possible socio-economic impacts of the proposed wind farm, it is necessary to describe the area's general standard of living. A good indicator for 'buying power' (and hence standard of living) is household income. **23%** of households in Makana subsist on an income below the poverty line (of R800 a month or R9 600 a year), while **18%** and **29%** of district and provincial households respectively face a similar plight. The Makana municipality has a higher percentage of people in the high income brackets than the Eastern Cape which means that on average, household incomes in Makana approximate to **R8 417.63** per month. This places Makana among the higher income ranges in the Eastern Cape (MLM IDP 2010:19).

Quality of life can also be assessed in terms of access to basic services, such as water supply, refuse collection and disposal, electricity and sanitation. Provision of these services is low, in line with provincial and district standards, and indicated in the table below.

Table 4-9: Access to basic services



Source: MLM IDP 2010

Finally, the specific employment sectors predominant in the municipality should be considered in order to assess the likely impact of the wind farm project on employment sectors and in relation to the local economy. The dominant activities in Makana include tourism (events such as the national arts festival support temporary employment, rather than permanent employment), Community Services- (in the form of Rhodes University and the schools situated within Makana), and Trade and Agriculture (which can be cyclical and seasonal in nature). As is illustrated in the table below, the 2001 statistics indicate that, of all the employment sectors identified within the municipality, those related to community services, agricultural work, wholesale and retail are the most predominant.

The wind farm will definitely stimulate the construction sector of the region, which is a notable but not dominant employment provider. In addition, as the, the wind farm will add value to the significant wholesale and retail sectors in the area in terms of stimulating this sector and providing additional employment opportunities for the region, as well as providing for electricity security in the area.

Table 4-10: Employment Sectors of the MLM

CATEGORY	MLM (%)
Community services	50.9
Agricultural-related work	17.7
Wholesale, retail	12.8
Construction	5.2
Manufacturing	4.5
Business services	5.9
Transport, communication	2.3
Mining, quarrying	0.1
Elec,gas,water etc.	0.6
TOTAL	100 (%)

Synthesis

From the above discussion, it is evident that households in the Makana Municipality are on average better off than those in the rest of the Cacadu district and the Eastern Cape – however, this must be understood within the context of widespread and significant poverty. In comparison to the Eastern Cape Province, the municipality has a higher percentage of people with Matric level education, and a lower level of people without any form of education. Poverty levels are also lower in Makana than in the rest of the district and the province, but remain notable. Makana has a significant unemployment rate, which is higher than that at the provincial level. It is apparent that the local economy is currently not generating enough employment opportunities; the development of a wind farm is likely to support the stimulation of the local economy, and to provide both direct and indirect employment, and economic, opportunities to the residents of the municipality. Given the availability of relatively highly educated, but unemployed people of working age within the Makana local municipality, much of the labour requirements of the proposed wind farm should be able to be adequately met locally.

Table 4-11: Synthesis of socio-economic profile of Makana Local Municipality

Variable	Description
Population	70 706
Population Density	16.1 persons per square kilometre
Age Profile	38.9% of population are in the 15-34 age bracket
Education	6% have no schooling 22% have matric or higher
Employment	34% unemployed
Monthly household income	Average weighted household income: R8 417.63 23% of households live below poverty line of R800 per month

Source: MLM IDP 2010

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5. PUBLIC PARTICIPATION PROCESS

According to regulation 28 (1) of the EIA regulations (2010), *A scoping report must include –*

- (h) details of the public participation process conducted in terms of regulation 27(a) including –*
 - (i) the steps that were taken to notify potentially interested and affected parties of the application;*
 - (ii) proof that notice boards, advertisements and notices notifying potentially interested and affected parties of the application have been displayed, placed or given;*
 - (iii) a list of all persons or organisations that were identified and registered in terms of regulation 55 as interested and affected parties in relation to the application; and*
 - (iv) a summary of the issues raised by interested and affected parties, the date of receipt of and the response of the EAP to those issues.*

In line with the above-mentioned legislative requirement, this Chapter of the report provides the details of the Public Participation Process followed during the Scoping Phase of the EIA for the proposed wind energy project.

The Scoping phase of the EIA provides for the involvement of Interested and Affected Parties (I&APs), in forums that allow them to voice their opinions and concerns, at an early stage of the proposed project. Such engagement is critical in the EIA, as it contributes to a better understanding of the proposed project among I&APs, and raises important issues that need to be assessed in the EIA process.

There are four key steps within the overall public participation process. These include -

- Notifying I&APs of the EIA;
- Holding public meetings;
- Making provision for I&APs to review and comment on all reports before they are finalised and submitted to the competent authority; and
- Making a record of responses to comments and concerns available to I&APs.

Prior to the preparation of this Scoping Report the above steps have comprised the activities described in sections 5.1 – 5.3 below.

5.1. NOTIFYING INTERESTED AND AFFECTED PARTIES OF THE EIA

Background information document

A four-page Background Information Document (BID) that provided basic information on the proposed project, the EIA process and contact details for registration as an I&AP was prepared in both English and Afrikaans. The BID was sent to all persons responding to the inception advertising and organisations identified as potential I&APs identified in previous EIA processes conducted in the area by CES. The BID is reproduced in Appendix C-1.

Written notices

Written notices were sent to the owners and/or occupants of land immediately surrounding and within 100m of the proposed project area. Copies of these letters, together with the details of the landowners in question to whom the letters were sent, are included in Appendix C-2. Letters were also sent to:

- Department of Agriculture
- Department of Water Affairs
- Department of Energy
- Department of Environmental Affairs
- Department of Economic Development and Environmental Affairs
- Eskom Holdings

- Grahamstown Historical Society
- Head of Planning Makana Local Municipality
- The Environmental Officer Makana Local Municipality
- Municipal Manager Makana Local Municipality
- South African Civil Aviation Authority
- South African Heritage Resources Agency
- South African National Roads Agency Limited
- Wildlife and Environment Society of Southern Africa (WESSA)

Advertisements

An advertisement was placed in one Provincial Newspaper (EP Herald) on 17 May 2012 and in one local newspaper (The Grocotts Mail) on 17 May 2012 in order to:

- Advise readers of the intention to undertake an EIA for the proposed project, and;
- Invite them to register as I&APs.

A period of four weeks (17 May – 14 June 2012) was allowed for registration of I&APs after the advertisement appeared. A copy of the advertisement is included in Appendix C-3.

Site notices

The NEMA regulations require the erection of “*a notice board at a place conspicuous to the public at the boundary or on the fence of the site where the activity to which the application relates is or is to be undertaken; and any alternative site mentioned in the application*”.

Therefore in accordance with this requirement, four 800 X 600 mm single sided corex notice boards were placed on the boundary of the project site, and at other conspicuous locations. Photographs of the fixed notices are provided in Appendix C-4.

5.2. PUBLIC REVIEW PERIOD OF DRAFT ESR AND MEETINGS

During the 40 day public review period for this Draft Environmental Scoping Report (ESR) a public meeting will be held. The availability of the report for review will be advertised in the EP Herald and The Grocotts Mail, and all registered I&APs will be notified in writing of the review period and of the public meeting to be held.

A register of I&APs to date has been compiled, containing all available contact details of those who responded to the advertisement(s) and/or registered as I&APs (Appendix C-5).

A record of all comments received, together with a note of the responses given, was also maintained (Appendix C-6).

The issues and concerns raised during the Inception Phase up until the preparation of this Draft Scoping Report are discussed in Chapter 6 that follows.

6. ISSUES IDENTIFIED DURING SCOPING

According to regulation 28 (1) of the EIA regulations (2010), *A scoping report must include –*

1(g) a description of the environmental issues and potential impacts, including cumulative impacts that have been identified

6.1. POSSIBLE ENVIRONMENTAL ISSUES & IMPACTS

Tables 6-1 to 6-3 list the environmental issues and resulting impacts that have been identified in the following phases of project development: planning and design, construction, operation, and decommissioning. The identification of these impacts has resulted in the recommendation of various specialist assessments. These impacts have been identified for all the various options proposed, and hence once clarification on these options is gained, some of these impacts may become redundant. Relevant aspects will be assessed during the EIA phase.

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Table 6-1: Issues and impacts that can be identified in the planning and design phase of the proposed project

PLANNING AND DESIGN PHASE			
Issue	Impact	Nature	Description of Issue/ Impact
Environmental Legal and Policy compliance	Direct	Potentially positive/negative	<ul style="list-style-type: none"> The planning and design of the wind farm should take into account, and comply with all relevant environmental legislation and policy, e.g. Local and District Spatial Development Frameworks
Landscape & visual	Direct/ Indirect/ Cumulative	Potentially Negative	<ul style="list-style-type: none"> Design of the wind turbine layout could result in an alteration of the landscape character and sense of place.
Existing infrastructure	Direct/ Indirect	Potentially negative/ positive	<ul style="list-style-type: none"> The wind farm should be designed to make maximum use of existing infrastructure such as roads, electrical connections and substations, etc. in order to minimize environmental disturbances created by construction.
Electromagnetic Interference (EMI)	Direct/ Indirect	Potentially Negative	<ul style="list-style-type: none"> Wind farms can cause television, radio and microwave interference by blocking and / or causing part of the signal to be delayed. Accurate siting of wind turbines in the planning and design phase should reduce these effects.
Shadow flicker	Direct/ Cumulative	Potentially Negative	<ul style="list-style-type: none"> The layout of wind turbines should be designed in order to minimize the effects of shadow flicker and reflectivity on surrounding landowners.
Socio-economics	Direct/ indirect/ Cumulative	Potentially positive/negative	<p>The wind farm could have the following socio-economic impacts:</p> <ul style="list-style-type: none"> Potentially discourage people from visiting the area and therefore have an adverse effect on tourism. A localized boosting effect on particular tourism facilities nearby and within sight of the wind farm. The wind farm could have an effect on the use of the site especially if some of the land is to be taken out of productive use to provide ecological enhancement.
Traffic & transport	Direct/ Indirect/ Cumulative	Potentially positive/negative	<ul style="list-style-type: none"> Inadequate planning for the transportation of turbine parts and specialist construction equipment to the site by long and/or slow moving vehicles

PLANNING AND DESIGN PHASE			
Issue	Impact	Nature	Description of Issue/ Impact
			<p>could cause traffic congestion, especially if temporary road closures are required.</p> <ul style="list-style-type: none"> • There could also be an adverse effect on the integrity of existing highway infrastructure such as bridges. • Any road modifications which are planned to facilitate the wind farm could, on the other hand, have long lasting traffic benefits.
Air & climate	Direct/ Indirect/ Cumulative	Potentially positive/ negative	<ul style="list-style-type: none"> • The electricity generated by the wind farm will displace some of that produced by fossil fuel based forms of electricity generation. • The wind farm, over its lifetime, will therefore avoid the production of a sizeable amount of CO₂, SO₂ and NO₂ relative to fossil fuel combustion that would otherwise be emitted to the atmosphere. • The surface layer of vegetation across the remainder of the site might represent a 'carbon sink' where carbon is absorbed from the atmosphere. • The wind farm could potentially result in a loss of the carbon sink material that would not then be available over the life of the wind farm. • The wind farm could also cause a loss of carbon store material, particularly if the scheme disrupts natural drainage patterns and leads to the lowering of water levels and the drying out of natural vegetation.
Wetlands, Surface and Groundwater	Direct/ Indirect	Potentially Negative	<ul style="list-style-type: none"> • The placement of wind turbines on the banks of drainage lines may result in erosion of the banks and disturbance to the riparian vegetation. • Areas of ecological value such as wetlands, within and beyond the site, could be sensitive to any alteration of localized drainage patterns which might arise from the introduction of turbine bases, access tracks and underground cable runs. • The introduction of roads and impermeable areas of hard standing could increase rates of run-off and therefore the risk of localized flooding.

Table 6-2: Issues and impacts potentially relevant to the construction phase of the proposed project

CONSTRUCTION PHASE			
Issue	Impact	Nature	Description of Issue/ Impact
Landscape & visual	Direct/ Indirect	Potentially Negative	<ul style="list-style-type: none"> • Visual disturbance of the landscape during construction will be caused by the construction activity, and the presence and use of very large machinery. •
Ecology	Direct/ Indirect	Potentially Negative	<ul style="list-style-type: none"> • Irreversible habitat destruction associated with the construction camp, are likely to be the largest sources of risk to faunal and floral communities in the broader region. • The construction of the wind farm could cause disturbance to local wildlife, especially breeding birds. • During construction, aquatic fauna could be adversely affected if significant amounts of silt or any hydrocarbons or chemicals are allowed to enter water bodies. These impacts could also occur outside of the site boundary, downstream.
Cultural Heritage & Archaeology	Direct/ Indirect	Potentially Negative	<ul style="list-style-type: none"> • The construction of a wind farm could have a direct physical impact on any undiscovered archaeological remains or other features of cultural heritage on the site. • There could also be certain physical impacts along the wider route used to transport turbines to the site, for example heavy or wide loads could damage historic bridges and culverts, and road improvements such as corner widening could damage any features adjacent to the road.
Noise	Direct	Potentially Negative	<ul style="list-style-type: none"> • Adverse noise effects could potentially occur during the construction of the wind farm, for example from the movement of heavy goods vehicles.
Socio-economic	Direct/ Indirect	Potentially positive/negative	<ul style="list-style-type: none"> • During construction, the wind farm could have a beneficial local economic effect, supporting companies manufacturing turbine parts and providing work for construction and haulage contractors, for example. • Jobs may also be created for local communities. It could therefore have a beneficial social and economic impact in the area.

CONSTRUCTION PHASE			
Issue	Impact	Nature	Description of Issue/ Impact
Traffic & transport	Direct/ Indirect	Potentially Negative	<ul style="list-style-type: none"> • It is possible that there could be a very high number of heavy vehicle movements spread over the construction period. The average number of heavy vehicle movements per day might not be significant, but there could be peaks that might have a detrimental effect on sensitive receptors, especially if any of these are near the local access route. • Transporting turbine parts and specialist construction equipment to the site by long and/or slow moving vehicles could cause traffic congestion, especially if temporary road closures are required. • There could also be an adverse effect on the integrity of existing road infrastructure such as bridges.
Wetlands, Surface and Groundwater	Direct/ Indirect	Potentially negative	<ul style="list-style-type: none"> • The construction of the wind farm has the potential to affect water quality adversely within the streams on and near to the site and further downstream. • Sediment is especially likely to be created during the excavation of turbine foundations, the laying of access tracks, digging of cable runs and soil stripping and stockpiling to create temporary areas of hard-standing, such as the construction compound. • Pollution could arise from the spillage or leaking of diesel, lubricant and cement.

<p>Issue 1: Impacts on geology and topography</p>	<p>Cause and comment: The construction of the wind turbines will require excavations in order to lay adequate foundations. Approximately 500 m³ of substrate will have to be excavated for each turbine. Furthermore, minor excavations will be required for the construction of access roads as well as the laying of electrical cabling.</p>
<p>Issue 2: Impacts on health and safety</p>	<p>Cause and comment: Health and safety aspects will mostly pertain to activities defined under the Occupational Health and Safety Act (Act No. 85 of 1993).</p>
<p>Issue 3: Removal of top soil and soil erosion</p>	<p>Cause and comment: The construction of the individual wind turbines will require the clearing of vegetation which will result in exposed soil surfaces. This will increase the chances of soil erosion.</p>
<p>Issue 4: Impacts on air quality</p>	<p>Cause and comment: Impacts on air quality during the construction phase will primarily be as a result of increased dust levels associated with the required excavation, vegetation clearing, grading and other construction activities.</p>
<p>Issue 5: Pollution from solid waste</p>	<p>Cause and comment It is anticipated that the proposed development will produce solid waste in the form of building rubble such as excavated soil and vegetation and excess concrete, bricks, etc. and general waste such as litter during the construction phase.</p>
<p>Issue 6: Impacts on soils</p>	<p>Cause and comment Impacts on soil may primarily be due to compaction, erosion and contamination.</p>

Table 6-3: Issues and impacts potentially relevant to the operational phase of the proposed project

OPERATIONAL PHASE			
Issue	Impact	Nature	Description of Issue/ Impact
Landscape & visual		Potentially negative	<ul style="list-style-type: none"> Alteration of the landscape character and sense of place because of the wind turbine array.
Ecology	Direct/Indirect/ Cumulative	Potentially negative	<ul style="list-style-type: none"> The wind farm could result in a permanent physical loss of important habitat and species on the land required for the turbines and ancillary elements. There could additionally be habitat severance and fragmentation, particularly from linear elements such as the access tracks. The maintenance of the wind farm could cause disturbance to local wildlife, especially breeding birds.
Avifauna and Bats	Direct/Indirect/ Cumulative	Potentially negative	<ul style="list-style-type: none"> When the wind farm is operational, certain types of bird species, for example raptors, could avoid the area due to the rotating blades, and could consequently be affected by a loss of feeding habitat. Particular types of bird species, for example, raptors, divers and geese, could be susceptible to collision with the turbines and any overhead wires, particularly if the scheme straddles regular flight lines between roosting and feeding grounds or where the site is used by birds for hunting. As discussed in Chapter 4 the potential impacts on bats may be significant if the study area does in fact support significant communities of these mammals.
Cultural heritage & archaeology	Direct/Indirect	Potentially negative	<ul style="list-style-type: none"> The presence of a wind farm could indirectly affect the visual appeal of a cultural heritage features within 35km of the site (maximum visually discernible distance).
Noise	Direct/Indirect	Potentially negative	<ul style="list-style-type: none"> The wind turbines could potentially give rise to adverse noise effects, particularly at lower wind speeds or in sheltered locations where the noise of the blades is not masked by the noise of the wind.

OPERATIONAL PHASE			
Issue	Impact	Nature	Description of Issue/ Impact
Electromagnetic Interference (EMI)	Direct/Indirect	Potentially negative	<ul style="list-style-type: none"> Wind farms can cause television, radio and microwave interference by blocking and / or causing part of the signal to be delayed.
Shadow flicker & reflectivity	Direct/Indirect/ Cumulative	Potentially negative	<ul style="list-style-type: none"> Rotating blades may catch and reflect sunlight at short intervals, resulting in flickering that is potentially irritating and may result in health-related impacts.
Socio-economics	Direct/Indirect/ Cumulative	Potentially negative or positive	<ul style="list-style-type: none"> The wind farm could potentially discourage people from visiting the area and therefore have an adverse effect on tourism. The wind farm could also have a more localized effect on particular tourism facilities nearby and within sight of the wind farm. Jobs may be created for local communities. It could therefore have a beneficial social and economic impact in the area.
Traffic & transport	Direct/Indirect/	Potentially negative or positive	<ul style="list-style-type: none"> Any highway modifications which are provided to facilitate the scheme could, have long lasting traffic benefits.
Air quality & climate change	Direct/Indirect/ Cumulative	Potentially positive	<ul style="list-style-type: none"> The electricity generated by the wind farm will displace some of that produced by fossil fuel based forms of electricity generation. The scheme, over its lifetime, will therefore avoid the production of a sizeable amount of CO₂, SO₂ and NO₂ that would otherwise be emitted to the atmosphere. The surface layer of vegetation across the remainder of the site might represent a 'carbon sink' where carbon is absorbed from the atmosphere. The turbines could also cause a loss of carbon store material, particularly if the farm disrupts natural drainage patterns and leads to the lowering of water levels and the drying out of natural vegetation.
Wetlands, Surface and Groundwater	Direct/ Indirect	Potentially Negative	<ul style="list-style-type: none"> The placement of turbines on the banks of drainage lines may result in erosion of the banks and disturbance to the riparian vegetation. The use of blinding cement on roadways could affect the pH of surface water, fines could wash out of bare slopes before natural regeneration

OPERATIONAL PHASE			
Issue	Impact	Nature	Description of Issue/ Impact
			<p>has established, and there could be leaks or spillages of lubricants from any permanent maintenance compound.</p> <ul style="list-style-type: none"> • Any deterioration of water quality as a result of the wind farm could potentially affect private water supply abstractions in the vicinity of the site. • Areas of ecological value such as wetlands within and beyond the site could be sensitive to any alteration of localized drainage patterns which might arise from the introduction of turbine bases, access tracks and underground cable runs. • The introduction of roads and impermeable areas of hard standing could increase rates of run-off and therefore the risk of localized flooding.

<p>Issue 1: Loss of agricultural land</p>	<p>Cause and comment: The proposed development site is currently zoned as agriculture I. The proposed development will therefore result in a loss of agricultural potential.</p>
<p>Issue 2: Impacts on aviation</p>	<p>Cause and comment: Wind turbine blade tips, at their highest point, may reach more than 150 m in height. If located near airports or known flight paths, a wind farm may impact aircraft safety directly through potential collision or alteration of flight paths. Furthermore, wind turbines could potentially cause electromagnetic interference with aviation radar.</p>

Table 6-4: Issues and impacts potentially relevant to the decommissioning phase of the proposed project

DECOMMISSIONING PHASE			
Issue	Impact	Nature	Description of Issue/ Impact
Landscape & visual	Direct/Indirect	Potentially Negative	<ul style="list-style-type: none"> Visual disturbance of the landscape during decommissioning will be caused by the presence and use of very large machinery.
Ecology	Direct/Indirect	Potentially Negative/positive	<ul style="list-style-type: none"> The decommissioning of the wind farm could cause disturbance to local wildlife, especially breeding birds. The removal of the wind turbines could prompt the return of certain species of wildlife that had avoided the area while the turbines were present. This could include larger bird species.
Noise	Direct	Potentially Negative	<ul style="list-style-type: none"> Adverse noise effects could potentially occur during the decommissioning of the wind farm, for example from the movement of large vehicles.
Socio-economic	Direct/Indirect	Potentially Positive	<ul style="list-style-type: none"> During decommissioning, the wind farm could have a beneficial local economic effect by providing jobs for local communities. Further employment opportunities may result from any new developments that could occur on the site once the wind turbines have been decommissioned.
Traffic & transport	Direct/Indirect	Potentially Negative	<ul style="list-style-type: none"> A high number of heavy vehicle movements will occur during the decommissioning phase. The average number of heavy vehicle movements per day might not be significant, but there could be peaks that might have a detrimental effect on sensitive receptors, especially if any of these are near the local access route. Transporting turbine parts and specialist construction equipment away from the site by long and/or slow moving vehicles could cause traffic congestion, especially if temporary road closures are required. There could also be an adverse affect on the integrity of existing road infrastructure such as bridges.
Land Use	Direct/Indirect/ Cumulative	Potentially positive	<ul style="list-style-type: none"> Land previously unavailable for certain types of land use will now be

DECOMMISSIONING PHASE			
Issue	Impact	Nature	Description of Issue/ Impact
			available for those uses, e.g. agriculture.
Soils	Direct/Indirect	Potentially positive	<ul style="list-style-type: none"> After the removal of all wind farm-related structures, the disturbed soils should be revegetated to avoid unnecessary soil erosion.

In addition to the above, the comments and issues from interested and affected parties have been captured and are shown in table format in appendix C-7.

7. ALTERNATIVES

According to regulation 28 (1) and (3) of the EIA regulations (2010), A scoping report must include –

(j) a description of 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

(3) The EAP managing the application must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives, as contemplated in subregulation (1)(c), exist.

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

7.1. FUNDAMENTAL ALTERNATIVES

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

A different type of development

The current zoning for the seven property portions is agriculture. The current development proposed is the production of renewable energy. Non-renewable production of energy is unfavourable in terms of the Kyoto Protocol and therefore not an option. In terms of renewable energy production - wind is the most appropriate.

The land is currently owned and utilized for the purpose of agriculture. Since the core business of the project proponent is wind energy facilities, the fundamental alternative of a development other than the proposed facility is therefore not viable in this case, and will not be considered further in the EIA.

A different location

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

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

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

Land use alternatives

The development of a wind farm is not a mutually exclusive land use. A number of activities can be carried out in close proximity to the turbines without adverse effect. There are, however, activities that must be excluded from the immediate vicinity and possibly even the surrounding areas. Table 7-1 is a simple matrix (as determined by CES) indicating some of the land use activities that may, or cannot, be complementary to wind farm development.

Table 7-1: Matrix indicating land uses contemplated to occur in conjunction with development of a wind farm

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

No-Go development

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

7.2. INCREMENTAL ALTERNATIVES

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

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

Layout Alternatives

In the EIA phase, various layouts (siting of wind turbines) will be assessed to determine which one will be ideal from an energy generation point of view with the least impact on fauna, flora and ecological processes. An ecological specialist, avifauna specialist and bat specialists (to name but a few) have been appointed to assess the status of the fauna and flora and to determine the conservation status of the proposed development. The following criteria will be considered in determining the final layout: (1) recommendations from the various specialists (2) guidelines from relevant bioregional plans (3) comments from I&APs and other stakeholders (4) site visits and (5) scientific publications (6) the developer following wind data recorded on site.

Technology Alternatives

Various technology alternatives (i.e. size, height and type of wind turbine) will be presented and assessed in the EIR.

8. PLAN OF STUDY FOR EIA

According to regulation 28 (1) of the EIA regulations (2010), *A scoping report must include –*

(n) a plan of study for environmental impact assessment which sets out the proposed approach to the environmental impact assessment of the application, which must include –

(i) a description of the tasks that will be undertaken as part of the environmental impact assessment process, including any specialist reports or specialised processes, and the manner in which such tasks will be undertaken;

(ii) an indication of the stages at which the competent authority will be consulted;

(iii) a description of the proposed method of assessing the environmental issues and alternatives, including the option of not proceeding with the activity; and

(iv) particulars of the public participation process that will be conducted during the environmental impact assessment process;

(o) any specific information required by the competent authority; and

(p) any other matters required in terms of sections 24(4)(a) and (b) of the Act.

In line with the above-mentioned legislative requirement, this Chapter therefore sets out the Plan of Study (PoS) for the EIA phase of the assessment. Consultation with DEA will be on-going throughout this EIA. However, it is anticipated that DEA will provide relevant comment with respect to the adequacy of this Plan of Study for the EIA, as it informs the content of the EIR and sufficiency thereof.

8.1. EIA PHASE

The EIA phase has four key elements, namely:-

- **Specialist Studies:** Specialist studies identified as being necessary during the Scoping Phase, plus any additional studies that may be required by the authorities, will be undertaken during the initial phase of the EIA. Appropriately qualified and experienced specialists will be appointed to undertake the various assessments. Specialists will gather baseline information relevant to the study being undertaken and will assess impacts associated with the development. Specialists will also make recommendations to mitigate negative impacts and enhance benefits. The resulting information will be synthesised into the Environmental Impact Report (EIR), whilst the full specialist reports will be attached to the EIR as a Specialist Volume.
- **Environmental Impact Report (EIR):** The main purpose of this report is to gather and synthesise environmental information and evaluate the overall environmental impacts associated with the development, to consider mitigation measures and alternative options, and make recommendations in choosing the best development alternative. The EIR also identifies mitigation measures and management recommendations to minimise negative impacts and enhance benefits. The EIR and associated specialist reports are made available for public and authority review and comment. The availability of the report will be advertised in one Provincial and one local newspaper and the report will also be made available for public scrutiny in easily accessible locations.
- **Comments Report:** The comments report provides a detailed record of comments, issues and concerns that have been raised by I&APs and the authorities during the review period, and also provides relevant responses to these comments.
- **Environmental Management Programme (EMPr):** The EMPr provides guidelines to the project proponent and the technical team on how best to implement the mitigation measures and management recommendations outlined in the EIR during the construction and operational phase.

In addition to the above, the **Public Participation Process** commenced during the Scoping Phase is continued, during which I&APs are afforded further opportunities to raise their issues, concerns and comments regarding the proposed project. It is possible that some of the project details may have changed in response to the preliminary findings of the ESR, and as a result of design changes made by the project proponent. I&APs and key stakeholders are given the opportunity to

review the Draft EIR before it is submitted to the authorities for consideration. Comments on the Draft EIR received from I&APs will be included and addressed in the submitted EIR.

8.2. SPECIALIST STUDIES

The following Specialist Studies are proposed for the EIA Phase of the assessment:

- Visual Impact Assessment
- Noise Impact Assessment
- Ecological Impact Assessment (incorporating flora and fauna)
- Avifauna Impact Assessment
- Heritage, Archaeological Impact Assessment
- Palaeontological Impact Assessment
- Bat Impact Assessment
- Agricultural Impact Assessment

The Terms of Reference for the above-mentioned studies, which outline the information required from the specialists, are provided below and the methodology for assessing the significance of impacts and alternatives is described in the section that follows. Specialists will also be required to address issues raised by I&APs in their reports.

8.2.1. *Visual and Landscape Impact Assessment*

The size of the structures is dictated by the design, and there is little that can be done to reduce their dimensions. Therefore, the Visual and Landscape Impact Assessment (the details of which are provided below) will focus on mitigation measures. The specific Terms of Reference for the Visual and Landscape Impact Assessment will therefore include:-

1. Conduct a site reconnaissance visit and photographic survey of the proposed project site.
2. Conduct a desk top mapping exercise to establish visual sensitivity:-
 - Describe and rate the scenic character and sense of place of the area and site;
 - Establish extent of visibility by mapping the view-sheds and zones of visual influence;
 - Establish visual exposure to viewpoints; and
 - Establish the inherent visual sensitivity of the site by mapping slope grades, landforms, vegetation, special features and land use and overlaying all relevant above map layers to assimilate a visual sensitivity map.
3. Review relevant legislation, policies, guidelines and standards.
4. Preparation of a draft Visual Baseline/Sensitivity report:
 - Assessing visual sensitivity criteria such as extent of visibility, the sites inherent sensitivity, visual sensitivity of the receptor's, visual absorption capacity of the area and visual intrusion on the character of the area;
 - Prepare photomontages of the proposed development;
 - Conduct shadow flickering modelling;
 - Assess the proposed project against the visual impact criteria (visibility, visual exposure, sensitivity of site and receptor, visual absorption capacity and visual intrusion) for the site;
 - Assess impacts based on a synthesis of criteria for each site (criteria = nature of impact, extent, duration, intensity, probability and significance); and
 - Establish mitigation measures/recommendations with regards to minimizing visual risk areas.

8.2.2. Ecological Impact Assessment

The assessment will follow on from the initial desktop study, (see Chapter 4 above) conducted during the scoping phase, and will address any key issues raised by interested and affected parties. The study will comprise a desktop study of all available and relevant literature.

However, a detailed survey of the site will be undertaken to determine the possibility of there being listed threatened or protected ecosystems and species on the proposed project site. If any of these are found, the Environmental Management Plan will include recommended measures to remove or otherwise protect plant species found on the site that are afforded protection under the National Environmental Management: Biodiversity Act during construction.

This specialist study will therefore include but will not be limited to –

1. A detailed description of the ecological (fauna and flora) environment within and immediately surrounding the footprint of the proposed development and will consider terrestrial fauna and flora. Fauna include mammals, reptiles, amphibians, and insects but not avifauna as these will be the subject of a separate specialist. This aspect of the report will specifically include the identification of -
 - Areas of high biodiversity;
 - The presence of species of special concern, including sensitive, endemic and protected species;
 - Habitat associations and conservation status of the identified fauna and flora;
 - The presence of areas sensitive to invasion by alien species; and
 - The presence of conservation areas and sensitive habitats where disturbance should be avoided or minimised.
2. Review relevant legislation, policies, guidelines and standards.
3. An assessment of the potential direct and indirect impacts resulting from the proposed development (including the wind turbines, associated infrastructure e.g. access road), both on the footprint and the immediate surrounding area during construction and operation;
4. A detailed description of appropriate mitigation measures that can be adopted to reduce negative impacts for each phase of the project, where required; and
5. Checklists of faunal groups identified in the region to date, highlighting sensitive species and their possible areas of distribution.

8.2.3. Noise Impact Assessment

The objective of the noise impact assessment will be to:

1. Identify all potential noise sensitive sites that could be impacted upon by activities relating to the construction and operation of the proposed wind energy facility.
2. Identify all noise sources relating to the activities of the facility during the construction and operation phases that could potentially result in a noise impact at the identified noise sensitive sites.
3. Determine the sound emission, operating cycle and nature of the sound emission from each of the identified noise sources.
4. Calculate the combined sound power level due to the sound emissions of the individual noise sources.
5. Calculate the expected rating level of sound at the identified noise sensitive sites from the combined sound power level emanating from identified noise sources.
6. Display the rating level of sound emitted by the noise sources in the form of noise contours superimposed on the map of the study area.
7. Determine the existing ambient levels of noise at identified noise sensitive sites by conducting representative sound measurements.
8. Determine the acceptable rating level for noise at the identified noise sensitive sites.
9. Calculate the noise impact at identified noise sensitive sites.

10. Assess the noise impact at identified noise sensitive sites in terms of:-
 - SANS 101 SANS 10103 for “The measurement and rating of environmental noise with respect to land use, health, annoyance and to speech communication”.
 - Noise Control Regulations.
 - World Health Organisation - Guidelines for Community Noise.
 - World Bank - Environmental Guidelines.
11. Investigate alternative noise mitigation procedures, if required, in collaboration with the design engineers of the facility and estimate the impact of noise upon implementation of such procedures.
12. Prepare and submit a full environmental noise impact report containing detailed procedures and findings of the investigation including recommended noise mitigation procedures, if relevant.

8.2.4. Heritage, Archaeological and Paleontological Impact Assessment

As part of the Environmental Impact Assessment (EIA) for the proposed facility, it is necessary to undertake a phase one archaeological and historical survey to fulfil SAHRA requirements in accordance with the requirements of the National Heritage Resources Act (Act No 25 of 1999) which requires that “...any development or other activity which will change the character of a site exceeding 5 000m², or the rezoning or change of land use of a site exceeding 10 000 m², requires an archaeological impact assessment”.

A heritage and archaeological impact assessment will therefore be conducted, the primary objective of which is to determine whether there are any indications that the proposed site is of archaeological significance. This will be a phase 1 assessment and will be largely desk-top although a site visit will be required to enable the specialist the opportunity to look for significant artefacts on the surface of the site. It is not expected that a more detailed Phase 2 assessment will be required but this remains to be confirmed.

The terms of reference for the Phase 1 heritage and archaeological study will be to:

1. Determine the likelihood of heritage or archaeological remains of significance on the proposed site within the study area;
2. Identify and map (where applicable) the location of any significant heritage or archaeological remains;
3. Assess the sensitivity and significance of heritage and archaeological remains in the site; and
4. Identify mitigatory measures to protect and maintain any valuable heritage and/or archaeological sites and remains that may exist within the proposed site.

A paleontological impact assessment will therefore be conducted, the primary objective of which is to determine whether there are any indications that the proposed site is of paleontological significance.

This will be a phase 1 assessment and will be largely desk-top although a site visit will be required to enable the specialist the opportunity to look for significant artefacts/fossils on the surface of the site. It is not expected that a more detailed Phase 2 assessment will be required but this remains to be confirmed. The terms of reference for the Phase 1 paleontological study will be to:

- Provide a summary of the relevant legislation;
- Conduct a site inspection as required by national legislation;
- Determine the likelihood of paleontological remains of significance in the proposed site;
- Identify and map (where applicable) the location of any significant paleontological remains;
- Assess the sensitivity and significance of paleontological remains in the site;

- Assess the significance of direct and cumulative impacts of the proposed development and viable alternatives on paleontological resources;
- Identify mitigatory measures to protect and maintain any valuable paleontological sites and remains that may exist within the proposed site; and
- Prepare and submit any permit applications to the relevant authorities.

8.2.5. Avifauna Assessment

An avifauna specialist study will be conducted. The assessment will include:

1. A desk-top review of existing literature to seek:
 - Previous means of predicting bird mortality (and other impacts) of wind turbines affecting birds in groups similar to those in the study area;
 - Accounts of mortality at wind turbines; and
 - Information on the status of bird groups most likely to be affected.
2. A site visit to identify species of special concern and assess the likely impacts of the construction and operational phases on the avifauna of the site.
 - Surveys will be conducted on the study area in line with recommended guidelines in this regard. These will be refined for the study area.
3. Conduct a review of international literature and experience relating to operational wind farms; including state of the art plants around the world;
4. Contextualize the literature and experience and relate it to the regional scenario and local avifauna;
5. Map sensitive areas in and around the proposed project site(s);
6. Describe the affected environment and determine the status quo in terms of avifauna;
7. Indicate how an avifaunal resource or community will be affected by the proposed project;
8. Discuss gaps in the baseline data with respect to avifauna and relevant habitats;
9. List and describe the expected impacts;
10. Assess and evaluate the anticipated impacts; and
11. Make recommendations for relevant mitigation measures which will allow the reduction of negative impacts and the maximization of the benefits associated with any identified positive impacts.

Although the avifauna specialist will assess avian collision risk and provide detailed explanations and ratings of the likelihood of collisions of various species, detailed avian collision modelling i.e. quantitatively assessing the collision risk potential (i.e. birds directly colliding with rotor blades and turbine towers) of the proposed wind farm cannot be undertaken. This is because the extent to which this can formally be modelled and quantified to arrive at predicted numbers of collisions, would depend largely on the primary data collection related to flight frequencies and species, but it is unlikely that even the best possible data collection would provide much confidence in such a model, as it would require more representative data collection across a range of conditions/seasons and years etc. In addition, very often the worst bird collision 'events' at wind farms around the world have been found to have occurred in extreme weather conditions, when flight behaviour is abnormal.

A site specific, 12 month baseline monitoring regime is intended to be initiated at the start of the EIA phase (along with the bat monitoring).

8.2.6. Bat Impact Assessment

A bat impact assessment specialist study will be conducted. This study will investigate the following issues:

1. The likelihood and significance of impacts with regards to bat (Chiroptera) fauna, in relation to the proposed wind energy facility;
2. Identification and mapping (where applicable) of any significant bat habitats;

3. Assessment of the sensitivity and significance of the site with regards to bat (Chiroptera) fauna;
4. Assessment of the significance of direct and cumulative impacts (including foraging impacts, roost impacts and migration impacts to a certain extent) of the proposed development and viable alternatives;
5. Identification of mitigatory measures to protect and maintain any bat habitats.

As for the avifauna assessment a specialist determined baseline monitoring programme needs to be conducted during the EIA process and beyond. The applicability of locally developed monitoring regimes to the study will be assessed and refined for implementation.

8.2.7. Agriculture Impact Assessment

An agricultural specialist study will be conducted, the key issues that will be investigated are the following:

- The extent and quality of arable land (less than 12% slope);
- The extent and quality of existing crops;
- The extent and quality of commercially unused land;
- The availability of irrigation water;
- The condition of the veld and other natural vegetation;
- The percentage of usable land that will be utilised during construction; and
- The percentage of usable land that will be utilised after construction.

Specifically, the following will be investigated:

1. Status Quo of Soils
 - Erosion Hazards - The study will identify any visible erosion hazards and record the apparent reasons therefore. It will also identify and describe any environmental hazards other than erosion.
 - Slope - Identify any areas with a slope greater than 12%.
 - Current and previous land usage - Evaluate the ratio between virgin arable land, currently cultivated crops, fallow and abandoned fields.
 - Infrastructure and Access - Note and record where improved infrastructure and access could impact negatively on the natural environment.
 - Extension Services - Note and report on incidence of industry, provincial and municipal extension and support services.
2. Water Resources
 - Surface Water - Note and record any visible water resources.
 - Groundwater - Identify and note any evidence of the presence of groundwater – springs, eyes, seepage, green patches etc.
3. Vegetation
 - Grasses, Decorative and Medicinal Veld Plants - The presence of any important or interesting medicinal or other indigenous plants will be noted. A general assessment of veld condition and condition of livestock will be made.

8.3. METHODOLOGY FOR ASSESSING THE SIGNIFICANCE OF IMPACTS

Although specialists will be given relatively free rein on how they conduct their research and obtain information, they will be required to provide their reports to the EAP in a specific layout and structure, so that a uniform specialist report volume can be produced. To ensure a direct comparison between various specialist studies, a standard rating scale has been defined and will be used to assess and quantify the identified impacts. This is necessary since impacts have a number of parameters that need to be assessed. Four factors need to be considered when assessing the significance of impacts, namely:

1. Relationship of the impact to **temporal** scales - the temporal scale defines the significance of the impact at various time scales, as an indication of the duration of the impact.
2. Relationship of the impact to **spatial** scales - the spatial scale defines the physical extent of the impact.
3. The severity of the impact - the **severity/beneficial** scale is used in order to scientifically evaluate how severe negative impacts would be, or how beneficial positive impacts would be on a particular affected system (for ecological impacts) or a particular affected party. The severity of impacts can be evaluated with and without mitigation in order to demonstrate how serious the impact is when nothing is done about it. The word 'mitigation' means not just 'compensation', but also the ideas of containment and remedy. For beneficial impacts, optimization means anything that can enhance the benefits. However, mitigation or optimization must be practical, technically feasible and economically viable.
4. The **likelihood** of the impact occurring - the likelihood of impacts taking place as a result of project actions differs between potential impacts. There is no doubt that some impacts would occur (e.g. loss of vegetation), but other impacts are not as likely to occur (e.g. vehicle accident), and may or may not result from the proposed development. Although some impacts may have a severe effect, the likelihood of them occurring may affect their overall significance.

Each criterion is ranked with scores assigned as presented in Table 8-1 to determine the overall **significance** of an activity. The criterion is then considered in two categories, viz. effect of the activity and the likelihood of the impact. The total scores recorded for the effect and likelihood are then read off the matrix presented in Table 8-2, to determine the overall significance of the impact (Table 8-3). The overall significance is either negative or positive.

The **environmental significance** scale is an attempt to evaluate the importance of a particular impact. This evaluation needs to be undertaken in the relevant context, as an impact can either be ecological or social, or both. The evaluation of the significance of an impact relies heavily on the values of the person making the judgment. For this reason, impacts of especially a social nature need to reflect the values of the affected society.

Negative impacts that are ranked as being of **"VERY HIGH"** and **"HIGH"** significance will be investigated further to determine how the impact can be minimised or what alternative activities or mitigation measures can be implemented. These impacts may also assist decision makers i.e. lots of **HIGH** negative impacts may bring about a negative decision.

For impacts identified as having a negative impact of **"MODERATE"** significance, it is standard practice to investigate alternate activities and/or mitigation measures. The most effective and practical mitigations measures will then be proposed.

For impacts ranked as **"LOW"** significance, no investigations or alternatives will be considered. Possible management measures will be investigated to ensure that the impacts remain of low significance.

Table 8-1: Criterion used to rate the significance of an impact

EFFECT	Temporal scale		Score
	Short term	Less than 5 years	1
	Medium term	Between 5 and 20 years	2
	Long term	Between 20 and 40 years (a generation) and from a human perspective almost permanent.	3
	Permanent	Over 40 years and resulting in a permanent and lasting change that will always be there	4
	Spatial Scale		
	Localised	At localised scale and a few hectares in extent	1
	Study area	The proposed site and its immediate environs	2
	Regional	District and Provincial level	3
	National	Country	3

	International	Internationally	4
	Severity		Benefit
	Slight / Slightly Beneficial	Slight impacts on the affected system(s) or party(ies)	Slightly beneficial to the affected system(s) or party(ies) 1
	Moderate / Moderately Beneficial	Moderate impacts on the affected system(s) or party(ies)	An impact of real benefit to the affected system(s) or party(ies) 2
	Severe / Beneficial	Severe impacts on the affected system(s) or party(ies)	A substantial benefit to the affected system(s) or party(ies) 4
	Very Severe / Very Beneficial	Very severe change to the affected system(s) or party(ies)	A very substantial benefit to the affected system(s) or party(ies) 8
LIKELIHOOD	Likelihood		
	Unlikely	The likelihood of these impacts occurring is slight	1
	May Occur	The likelihood of these impacts occurring is possible	2
	Probable	The likelihood of these impacts occurring is probable	3
	Definite	The likelihood is that this impact will definitely occur	4

Table 8-2: The matrix that will be used for the impacts and their likelihood of occurrence

Likelihood		Effect													
		3	4	5	6	7	8	9	10	11	12	13	14	15	16
1		4	5	6	7	8	9	10	11	12	13	14	15	16	17
2		5	6	7	8	9	10	11	12	13	14	15	16	17	18
3		6	7	8	9	10	11	12	13	14	15	16	17	18	19
4		7	8	9	10	11	12	13	14	15	16	17	18	19	20

Table 8-3: The significance rating scale

Significance	Description	Score
Low	Acceptable impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in either positive or negative medium to short term effects on the social and/or natural environment.	4-7
Moderate	An important impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in either a positive or negative medium to long-term effect on the social and/or natural environment.	8-11
High	A serious impact, if not mitigated, may prevent the implementation of the project (if it is a negative impact). These impacts would be considered by society as constituting a major and usually a long-term change to the (natural &/or social) environment and result in severe effects or beneficial effects.	12-15
Very High	A very serious impact which, if negative, may be sufficient by itself to prevent implementation of the project. The impact may result in permanent change. Very often these impacts are unmitigable and usually result in very severe effects, or very beneficial effects.	16-20

8.4. ENVIRONMENTAL IMPACT REPORT

The results of the Specialist Studies given above will inform the preparation of the EIR.

In addition, the EIR will gather any comments received from I&APs and determine whether it is necessary to increase the scope of work or amend the ToR.

The EIR will also examine the option of not proceeding with the proposed development – the so-called “No Go” option.

8.4.1. Proposed structure of EIR

To avoid the EIR being excessively long and cumbersome, whilst meeting the content requirements specified in the NEMA EIA regulations, the final report will be divided into a number of volumes indicated in Table 8-4.

Table 8-4: Volumes that will be generated in the EIA phase for the proposed project

Volume Number	Report	Contents
1	Scoping Report	As per the Draft ESR (this report)
2	Specialist Studies	This volume will be a compilation of all the specialist studies undertaken in the EIA, and will include assessments of - <ul style="list-style-type: none"> • Visual impacts • Heritage resources on site • Noise impacts • Ecological impacts • Palaeontology impacts • Avifauna and Bat impacts • Agricultural impacts
3	Environmental Impact Report (EIR)	This volume will include - <ol style="list-style-type: none"> 1. Introduction <ul style="list-style-type: none"> • Detail of the environmental assessment practitioner who compiled the report • Expertise of the EAP to carry out an environmental impact assessment 2. Description of the Project <ul style="list-style-type: none"> • A description of the property on which the activity is to be undertaken • The location of the activity on the property • A description of the types of activities that are proposed for the development. 3. Description of the Affected Environment <ul style="list-style-type: none"> • The natural environment • The socio-economic environment • The legal, policy and planning setting 4. The Public Participation Process <ul style="list-style-type: none"> • Steps undertaken in order to notify and involve I&APs • Advertisements and media • Meetings held in the PPP • Issues and Comment Trail management 5. Summary of Comments and Response Trail <ul style="list-style-type: none"> • Summary of comments and issues raised by I&APs and responses to the issues

		<p>6. Summary of Specialist Reports</p> <ul style="list-style-type: none"> • Summary of the findings and recommendations of all specialist studies <p>7. Alternatives Considered</p> <ul style="list-style-type: none"> • Description of all alternatives considered in the EIA • Initial screening of alternatives • Description and comparative assessment of all alternatives identified during the EIA <p>8. The Significance of Potential Environmental Impacts</p> <ul style="list-style-type: none"> • The methodology used to determine the significance of environmental impacts • Impacts on the natural environment • Impacts on the socio-economic environment • Impacts on the legal, policy and planning setting <p>9. Environmental Impact Statement</p> <ul style="list-style-type: none"> • A summary of the key findings of the EIA • Comparative assessment of the positive and negative implications of the proposed activity and identified alternatives <p>10. Conclusions</p> <ul style="list-style-type: none"> • Opinion as to whether the activity should or should not be authorised. • Any conditions that should be made in respect to any form of authorisation. <p><i>It should be noted that the above is not the exact Table of Contents for the EIA, but is intended to indicate the major topics that will be covered in the report.</i></p>
<p>4</p>	<p>Environmental Management Programme (EMPr)</p>	<p>Environmental management programmes for key activities of the proposed project, which will contain the following -</p> <p>1. Introduction</p> <ul style="list-style-type: none"> • The details of the EAP who prepared the EMPr • The expertise of the EAP to prepare an EMPr <p>2. Detailed description of the aspects of the activity covered by the EMPr's</p> <p>3. Mitigation Measures and Actions</p> <ul style="list-style-type: none"> • Planning and Design • Pre-construction and construction activities • Operation and undertaking of the activity • Rehabilitation of the environment <p>4. Responsibilities</p> <ul style="list-style-type: none"> • Persons responsible • Time periods for implementation <p>5. Monitoring Programme</p>

8.5. PPP FOR THE EIA PHASE

The primary aims for the public participation process include the following:

- meaningful and timeous participation of I&APs;
- promoting transparency and an understanding of the proposed project and its potential environmental (social and biophysical) impacts;
- accountability for information used for decision-making;

- serving as a structure for liaison and communication with I&APs;
- assisting in identifying potential environmental (socio-economic and biophysical) impacts associated with the proposed development; and
- inclusivity (the needs, interests and values of I&APs must be considered in the decision-making process).

Advertising

In terms of the EIA Regulations, the availability of the Draft EIR will be advertised within newspapers in the predominant languages (English and Afrikaans) of the area. The primary aim of these advertisements will be to ensure that the widest group of I&APs possible are informed of the project. Other advertisements to be placed during the course of the EIA phase of the project will relate to the availability of reports for public review, the dates of public meetings, as well as the advertising of the environmental authorisation/decision.

Identification of and Consultation with Key Stakeholders

I&APs and Key Stakeholders have been identified during the Scoping phase of the project. The identification and engagement if necessary, of I&APs and Key Stakeholders will continue through into the EIA phase of the project as the public participation process is a continuous process that runs throughout the duration of an environmental investigation.

I&AP Database

All I&AP information (including contact details), together with dates and details of consultations and a record of all issues raised is recorded within a comprehensive database of I&APs. This database will be updated on an on-going basis throughout the project, and will act as a record of the communication/ involvement process.

Public Review of the Draft Environmental Impact Assessment Report

Consultation with I&APs is considered to be critical to the success of any EIA process. Therefore, public meetings with I&APs will be undertaken. The aim of this process will be to provide I&APs with details regarding the process and to obtain further comments regarding the proposed project. I&APs will be notified of the Draft EIR availability and dates and venues for the required public meetings. Minutes of all meetings held will be compiled and forwarded to all attendees. These minutes will also be included in the EIA Report. This consultation process will be on-going throughout the process. Consultation with I&APs will take place at two levels: public meetings for general I&APs who require an overview of the project; and focus group meetings for those who require more in-depth information and intensive interaction.

Public Meetings

The purpose of Public Meetings is to provide an appropriate format to enable I&APs to raise concerns related to the proposed project. The intention is that I&APs are afforded the opportunity of interacting on a one-on-one basis with technical and planning representatives of Terra Wind as well as the environmental team. I&APs will be encouraged to complete an attendance register and a comment and registration form to assist I&APs in raising concerns and general views on the project.

Issues & Response Trail

All issues, comments and concerns raised during the public participation process of the EIA process will be compiled into an Issues Trail and incorporated and submitted as part of the Final EIR.

8.6. CONSIDERATION BY THE COMPETENT AUTHORITY FOR ENVIRONMENTAL AUTHORISATION AND APPEALS PROCESS

Once the EIR has been finalised it will be submitted to the competent authority for review and consideration for authorisation. The authority will grant authorisation, refuse authorisation or request further detail or information to clarify areas of concern. Should authorisation be granted, the decision will carry Conditions of Approval, to which the proponent is obliged to adhere.

The competent authority's decision will be advertised in the newspapers mentioned above and registered I&APs will be informed within seven days of receipt of the Decision. Once the public have been notified of the Environmental Authorisation - formerly termed Record of Decision (RoD) - anyone wishing to appeal the decision must lodge a notice of intention to appeal with the MEC within 20 days of the notification, and the appeal must be submitted, in a form prescribed by the competent authority, within 30 days of lodging the notice of appeal.

DRAFT

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APPENDIX A: THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The Environmental Impact Assessment process comprises two key phases – the Scoping Phase and the Environmental Impact Assessment Phase. These phases are described in detail below.

A1. THE SCOPING PHASE

Scoping is the first step in the EIA process. It allows for all role players – stakeholders and Interested and Affected Parties (I&APs) - to gain a greater understanding of the project by means of a public participation process. Scoping is also critical in as much as it facilitates the early identification of important natural and social issues that will need to be considered later in the process.

The principal objectives of the Scoping Phase are:-

- Describe the nature of the proposed project;
- Preliminary identification and assessment of potential environmental issues or impacts to be addressed in the subsequent EIA phase;
- Define the legal, policy and planning context for the proposed project;
- Describe important biophysical and socio-economic characteristics of the affected environment;
- Undertake a public participation process that provides opportunities for all I&APs to be involved;
- Identify feasible alternatives that must be assessed in the EIA phase; and
- Define the Plan of Study (PoS) for the EIA phase.

Each of the steps involved in the scoping phase is discussed in detail below.

A1.1. Project description

A description of the components of the proposed project is provided.

A1.2. Preliminary assessment of the project

Baseline data and information on the proposed development is collected, primarily from the project proponent, but also from preliminary site surveys and published literature, and from legislation, guidelines and other regulatory instruments, in order to determine the activities for which approval must be sought from the competent environmental authority.

Information sourced from the project proponent includes the proposed location and layout of the development, and the technology to be adopted. A preliminary assessment of this data and information, in the context of legal requirements and an understanding of the receiving environment, is by way of a preliminary risk assessment or fatal flaw analysis. It enables major risks to the project or to the receiving environment to be identified at an early stage in the EIA process, and informs subsequent decisions about aspects of the development identified as being potentially problematic.

A1.3. Legal context

The legislation relevant to the proposed Project is identified and reviewed.

A1.4. Identification of key bio-physical and socio-economic issues

The key biophysical and socio-economic issues related to the project are identified during the Scoping Phase. Relevant information is drawn from as wide a range of sources as possible, including local authorities, local communities, and specialists.

A1.5. Public Participation Process

A public participation process is an explicit requirement of the NEMA EIA regulations, and must take place throughout the EIA process. The approach to public consultation depends largely on the location of the proposed development, the nature of the project, the sensitivity of the receiving environment, the previous level of exposure of the public to the EIA process, and the level of education of those who will be affected by the proposed development. Among other things, involvement of the public in the EIA process is an opportunity to gather local knowledge from individuals, communities and organisations.

Key stakeholders are identified and notified of the proposed development and the ways in which they can be involved. These stakeholders include:-

- Local and regional authorities;
- Ratepayers associations;
- Ward councillors and representatives;
- Non-governmental Organisations (NGOs) and Community Based Organisations (CBOs); and
- Landowners adjacent and close to the site of the proposed development.

Stakeholders and I&APs are informed of the proposed development by means of:-

- Advertisements in newspapers;
- A background information document (BID);
- Letters to key stakeholders and neighbouring landowners/occupiers; and
- Notice boards placed at the site.

All of the above must include name(s) and contact details - telephone and fax numbers, and e-mail address/es to which stakeholders and I&APs can direct written or verbal comments.

Advertisements are placed in a minimum of one local and one regional newspaper, depending on the nature and extent of the proposed development. Stakeholders and I&APs are encouraged to register by sending their names and contact details to the EAP, whereupon they are sent a copy of the BID, and are thereafter kept informed of and involved in all subsequent stages of the EIA process. The BID is a brief document that provides information on the nature and location of the proposed development, and details of how the EIA process will be undertaken. However, it is unlikely that the final design specifications of some proposed developments are known at this stage, and there may be changes to the information presented in the BID as the project progresses.

In addition, public meetings, open house meetings and/or focus group meetings may be held. In the early stages of the Scoping Phase these meetings provide an opportunity for the Environmental Assessment Practitioner (EAP) to present and discuss the information in the BID, to elicit information from local sources, and to register I&APs. Comment forms provide a further way by which comments may be submitted. In the latter stages meetings provide opportunities to discuss the draft version of the Scoping Report before it is submitted to the competent environmental authority.

A1.6. Identification of alternatives

Possible alternatives to the proposed development must be identified during the Scoping Phase. These may include fundamental alternatives, such as maintaining the current land use, or proposing a development of a different nature to the one proposed by the project proponent. Design alternatives are intended to modify certain design aspects of the proposed project, such as alternative technologies, timing of activities, or the location of infrastructure, so as to minimise negative impacts on the environment. The identification of alternatives must be reasonable and practical.

A1.7. Plan of Study for the EIA Phase

The information and comments received and recorded during the Scoping Phase inform the larger and more comprehensive EIA Phase. This is usually achieved by the development of the Plan of Study (PoS) for the EIA. The PoS defines the actions, steps, and studies that must be undertaken in the EIA Phase.

A1.8. Scoping Reports

The data collected during the baseline data collection and public participation processes must be synthesised in a Scoping Report. In line with NEMA regulations, registered I&APs are entitled to comment, in writing, on all written submissions made to the competent authority by the applicant or the EAP managing an application. Accordingly a Draft Scoping Report is made available for public comment for a minimum period of 40 days. All comments on the draft report must be considered, and necessary changes made to the Draft before it is submitted for review to the competent authority as the final Scoping Report. This report includes the PoS discussed in A1.7 above.

A2. ENVIRONMENTAL IMPACT ASSESSMENT PHASE

The Environmental Impact Assessment (EIA) is a comprehensive evaluation and study phase that addresses all the issues raised in the Scoping Phase. It is a substantial phase that has seven key objectives:-

- Describe the biophysical and socio-economic environment that is likely to be affected by the proposed development.
- Undertake specialist studies to address the key biophysical and socio-economic issues.
- Assess the significance of impacts that may occur from the proposed development.
- Assess the alternatives proposed during the Scoping Phase.
- Provide details of mitigation measures and management recommendations to reduce the significance of impacts.
- Provide a framework for the development of Environmental Management Plans.
- Continue with the public participation process.

A2.1. Specialist Studies

Specialist studies are undertaken to provide a detailed and thorough examination of key issues and environmental impacts. Specialists gather relevant data to identify and assess environmental impacts that might occur on the specific component of the environment that they are studying (for instance waste management, air quality, noise, vegetation, water quality, pollution, waste management). Once completed, these studies are synthesised in, and presented in full as appendices to the Environmental Impact Report (EIR).

A2.2. Public Participation Process

The public participation process (PPP) initiated at the beginning of the Scoping Phase continues into the EIA Phase. Once again the PPP provides a platform from which all I&APs are able to voice their concerns and raise issues regarding the project.

A2.3. Assessment of the Significance of Impacts

It is necessary to determine the significance, or seriousness, of any impacts on the natural or social environment. It is common practice in the EIA Phase to use a significance rating scale that determines the spatial and temporal extent, and the severity and certainty of any impact occurring, including impacts relating to any project alternatives. This allows the overall significance of an impact or benefit to be determined.

The overall intent of undertaking a significance assessment is to provide the competent authority

with information on the potential environmental impacts and benefits, thus allowing them to make an informed, balanced and fair decision.

A2.4. Mitigation Measures and Recommendations

Critical to any EIA is the recommendation of practical and reasonable mitigation measures and recommendations. These recommendations relate to the actions that are needed in order to avoid, minimise or offset any negative impacts from the development.

A3.5. Planning Input

An effective EIA process should actively engage and contribute to the project planning process so as to mitigate environmental impacts through improved design and layout.

A3.6. Environmental Impact Report

The above-mentioned tasks are synthesised in an Environmental Impact Report (EIR). This will allow the assessment of the relationship of environmental impacts to project actions, as well as to assess the overall significance of these impacts. The EIR will also provide sufficient information to allow the competent authority to make an informed decision.

A summary report covering key findings is prepared in a manner that is easy to read and understand. Text will be kept short and technical detail to a minimum, while information will be presented in the form of photographs and figures wherever possible.

A4. ENVIRONMENTAL MANAGEMENT PROGRAMMES

Environmental management and action plans based on the findings and recommendations set out in the EIR are prepared. An Environmental Management Programme (EMPr) consists of a set of practical and actionable mitigation, monitoring and institutional measures to be taken into account during construction and operation of the proposed development. The aim is to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels. These plans include: -

- The standards and guidelines that must be achieved in terms of environmental legislation.
- Mitigation measures and environmental specifications that must be implemented at 'ground level', that is, during construction and operation.
- Provide guidance through method statements to achieve the environmental specifications.
- Define corrective action that must be taken in the event of non-compliance with the specifications of the EMPs and SMPs.
- Prevent long-term or permanent environmental degradation.

A5. ENVIRONMENTAL AUTHORISATION AND APPEALS PROCESS

On thorough examination of the EIR, the competent authority will issue an Environmental Authorisation or reject the application. Should authorisation be granted, it will carry Conditions of Approval. The proponent is obliged to adhere to these conditions.

I&APs are notified of the decision and have 20 days in which to lodge a notice of intention to appeal the decision, and a further 30 days in which to submit the appeal.

APPENDIX B: DEA ACKNOWLEDGEMENT OF RECEIPT



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

Private Bag X 447· PRETORIA · 0001· Fedsure Building · 315 Pretorius Street · PRETORIA
Tel (+ 27 12) 310 3911 · Fax (+ 2712) 322 2682

NEAS Reference: DEA/EIA/0001282/2012

DEA Reference: 14/12/16/3/3/2/369

Enquiries: Mmatlala Rabothata

Tel: 012 395 1768/1694 **Fax:** 012 320 7539 **E-mail:** mrabothata@environment.gov.za

Mr Marc Hardy
Coastal & Environmental Services
PO Box 934
GRAHAMSTOWN
6139

Fax: 046 622 6564

Tel: 046 622 2364

PER FACSIMILE / MAIL

Dear Mr Hardy

ACKNOWLEDGEMENT OF RECEIPT AND ACCEPTANCE OF NEW APPLICATION FOR ENVIRONMENTAL AUTHORISATION (SCOPING/EIA PROCESS) FOR THE PROPOSED TERRA POWER SOLUTIONS RIEBEECK EAST WIND FARM, MAKANA LOCAL MUNICIPALITY, EASTERN CAPE PROVINCE

The Department confirms having received the application form for environmental authorisation for the abovementioned project on 6 June 2012 and the original signed details of EAP and declaration of interest; project schedule indicating the different phases and landowner's consent forms on 28 June 2012. You have submitted these documents to comply with the Environmental Impact Assessment Regulations, 2010. The Application is accepted

Please include both reference numbers (NEAS Reference and DEA Reference), as listed above, on all documents and correspondence submitted to the Department.

Please note that one hard copy and one electronic copy (saved on CD/DVD) of draft reports, and five hard copies and one electronic copy of final reports must be submitted to the Department.

In addition, please consider the following during compilation of reports for this application for environmental authorisation:

- All applicable Departmental Guidelines must be considered throughout the application process. These can be downloaded from the Department's website: www.environment.gov.za, Environmental Impact Management button, listed under "EIA Administration": Integrated Environmental Management Information Series link. These include, but are not limited to, the following topics: Scoping, Environmental Impact

Reporting, Stakeholder Engagement, Specialist Studies, Impact Significance, Cumulative Effects Assessments, Alternatives in EIA and Environmental Management Plans.

- Please be advised that in terms of the EIA Regulations and NEMA the investigation of alternatives is mandatory. Alternatives must therefore be identified, investigated to determine if they are feasible and reasonable. It is also mandatory to investigate and assess the option of not proceeding with the proposed activity (the "no-go" option).
- Refer to the attached annexure for specific requirements for the submission of applications for environmental authorisation for solar/wind power generation facilities.
- Should water, solid waste removal, effluent discharge, stormwater management and electricity services be provided by the municipality, you are requested to provide this office with written proof that the municipality has sufficient capacity to provide the necessary services to the proposed development. Confirmation of the availability of services from the service providers must be provided together with the reports to be submitted.
- In the reports to be submitted it must clearly be demonstrated in which way the proposed development will meet the requirements of sustainable development. You must also consider energy efficient technologies and water saving devices and technologies for the proposed development. This could include measures such as the recycling of waste, the use of low voltage or compact fluorescent lights instead of incandescent globes, maximising the use of solar heating, the use of dual flush toilets and low-flow shower heads and taps, the management of storm water, the capture and use of rainwater from gutters and roofs, the use of locally indigenous vegetation during landscaping and the training of staff to implement good housekeeping techniques.
- A detailed and complete EMPr must be submitted with the EIR. This EMPr must not provide recommendations but must indicate actual remediation activities which will be binding on the applicant. Without this EMPr the documents will be regarded as not meeting the requirements and will be returned to the applicant for correction.
- The applicant/EAP is required to inform this Department in writing upon submission of any draft report, of the contact details of the relevant State Departments (that administer laws relating to a matter affecting the environment) to whom copies of the draft report were submitted for comment. Upon receipt of this confirmation, this Department will in accordance with Section 24O (2) & (3) of the National Environmental Management Act, 1998 (Act 107 of 1998) inform the relevant State Departments of the commencement date of the 40 day commenting period, or 60 days in the case of the Department of Water Affairs for waste management activities which also require a licence in terms of the National Water Act, 1998 (Act 36 of 1998).
- Should it be necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999), please submit the necessary application to SAHRA or the relevant provincial heritage agency and submit proof thereof with the Environmental Impact assessment Report. The relevant heritage agency should also be involved during the public participation process and have the opportunity to comment on all the reports to be submitted to this Department.

You are required to submit the final site layout plan together with the Final EIR to the Department. All available biodiversity information must be used in the finalisation of the layout plan. The site layout plan must indicate the following:

- Positions of solar/wind facilities;
- Foundation footprint;
- Permanent laydown area footprint;
- Construction period laydown footprint;

- Internal roads indicating width (construction period width and operation period width) and with numbered sections between the other site elements which they serve (to make commenting on sections possible);
- Wetlands, drainage lines, rivers, stream and water crossing of roads and cables indicating the type of bridging structures that will be used;
- The location of Heritage sites;
- Sub-station(s) and/or transformer(s) sites including their entire footprint;
- Cable routes and trench dimensions (where they are not along internal roads);
- Connection routes (including pylon positions) to the distribution/transmission network;
- Cut and fill areas at solar panels/ wind turbines sites along roads and at sub-station/transformer sites indicating the expected volume of each cut and fill;
- Borrow pits;
- Spoil heaps (temporary for topsoil and subsoil and permanently for excess material);
- All existing infrastructure on the site, especially roads;
- Buildings including accommodation;
- All "no-go" areas; and
- A map combining the final layout plan must be superimposed (overlain) on the environmental sensitivity map.

The Environmental Management Programme (EMPr) submitted as part of the application for environmental authorisation must include the following:

- All recommendations and mitigation measures to be recorded in the Final EIR.
- A plant rescue and protection plan which allows for the maximum transplant of conservation important species from areas to be transformed. This plan must be compiled by a vegetation specialist familiar with the site in consultation with the ECO and be implemented prior to commencement of the construction phase.
- An open space management plan to be implemented during the construction and operation of the facility.
- A re-vegetation and habitat rehabilitation plan to be implemented during the construction and operation of the facility including timeframes for restoration which must indicate rehabilitation within the shortest possible time after completion of construction activities to reduce the amount of habitat converted at any one time and to speed up the recovery to natural habitats.
- An alien invasive management plan to be implemented during construction and operation of the facility. The plan must include mitigation measures to reduce the invasion of alien species and ensure that the continuous monitoring and removal of alien species is undertaken.
- A storm water management plan to be implemented during the construction and operation of the facility. The plan must ensure compliance with applicable regulations and prevent off-site migration of contaminated storm water or increased soil erosion. The plan must include the construction of appropriate design measures that allow surface and subsurface movement of water along drainage lines so as not to impede natural surface and subsurface flows. Drainage measures must promote the dissipation of storm water runoff.
- An effective monitoring system to detect any leakage or spillage of all hazardous substances during their transportation, handling, use and storage. This must include precautionary measures to limit the possibility of oil and other toxic liquids from entering the soil or storm water systems.

- An erosion management plan for monitoring and rehabilitating erosion events associated with the facility. Appropriate erosion mitigation must form part of this plan to prevent and reduce the risk of any potential erosion.
- A traffic management plan for the site access roads to ensure that no hazards would result from the increased truck traffic and that traffic flow would not be adversely impacted. This plan must include measures to minimize impacts on local commuters e.g. limiting construction vehicles travelling on public roadways during the morning and late afternoon commute time and avoid using roads through densely populated built-up areas so as not to disturb existing retail and commercial operations.
- An environmental sensitivity map indicating environmental sensitive areas and features identified during the EIA process.
- Measures to protect hydrological features such as streams, rivers, pans, wetlands, dams and their catchments, and other environmental sensitive areas from construction impacts including the direct or indirect spillage of pollutants.

The EAP must, in order to give effect to regulation 56 (2), before submitting the final Environmental Impact Assessment report to the Department give registered interested and affected parties access to, and an opportunity to comment on the report in writing within 21 days.

In terms of regulation 67 of the EIA Regulations, 2010 this application will lapse if the applicant (or the EAP on behalf of the applicant) fails to comply with a requirement in terms of the Regulations for a period of six months after having submitted the application, unless the reasons for failure have been communicated to and accepted by this Department.

You are hereby reminded of Section 24F of the National Environmental Management Act, Act No 107 of 1998, as amended, that no activity may commence prior to an environmental authorisation being granted by the Department.

Yours sincerely

M. Mmatlala
Mr Mark Gordon

**Chief Director: Integrated Environmental authorisations
 Department of Environmental Affairs**

Letter signed by: Ms Mmatlala Rabothata


Designation: Environmental Officer: Integrated Environmental Authorisations

Date: 19/07/2012

CC:	Mr Howard Ramsden	Terra Power Solutions (Pty) Ltd	Tel: 087 808 1501	Fax: N/A
	Mr Leon Els	Eastern Cape DEDEA	Tel: 041 508 5808	Fax: 041 508 5867
	Ms Ntombi Baart	Makana Local Municipality	Tel: 046 603 6131	Fax: N/A

APPENDIX C: PUBLIC PARTICIPATION

APPENDIX C-1: BACKGROUND INFORMATION DOCUMENT

BACKGROUND INFORMATION DOCUMENT & INVITATION TO COMMENT	
Terra Power Riebeeck East Wind Project	
<p>Background to the project: Terra Power Solutions (Pty) Ltd, a renewable energy company, plans to develop a wind powered electricity generation facility (known as a 'wind farm') km outside of Riebeeck East, in the Eastern Cape Province of South Africa (refer to Figure 1). The proposed site is on the farms: Hilton Farm, Table Hill North, Kruisfontein, Brack Kloof, Table Hill, Slaaikraal Farm and Hounslow situated approximately 22km east of Riebeeck East and 15km west of Grahamstown. Coastal & Environmental Services (CES) has been appointed by Terra Power (Pty) Ltd to undertake the necessary environmental investigations for the wind and solar energy project, and to apply for approval from the Department of Environmental Affairs (DEA), for its construction and operation, as required by South Africa's environmental legislation. Details of the environmental impact assessment process are provided on the next page.</p> <p>Project description: The wind farm (refer to Figure 1 for relevant farm portions) is planned to host up to a maximum of 77 turbines, each with a nominal power output ranging between 2-3MW (Mega Watts). The total potential output of the wind and solar farm would be 140MW, and will feed into the national grid.</p> <p>Dimensions: The ultimate size of the wind turbines will depend on further technical assessments but will typically consist of rotor turbines with rotor diameters up to a maximum of 120 meters. The towers will have a nacelle or transformer hub between 100 and 140 meters above ground with a blade tip height of between 160 and 200 meters above ground.</p>	<p style="text-align: center;">REGISTRATION</p> <div style="text-align: center;">  </div> <p style="text-align: center;">CES requests that all potential stakeholders and interested and affected parties register as participants in the EIA process</p> <p style="text-align: center;">Return address for comments: Mr Justin Green</p> <p style="text-align: center;">P.O. Box 934 Grahamstown, 6140</p> <p style="text-align: center;">Tel: (048) 622 2364 Fax: (048) 622 8564 Email: j.green@cesnet.co.za</p> <p style="text-align: center;">Or</p> <p style="text-align: center;">Mr Jadon Schmidt Email: j.schmidt@cesnet.co.za</p>

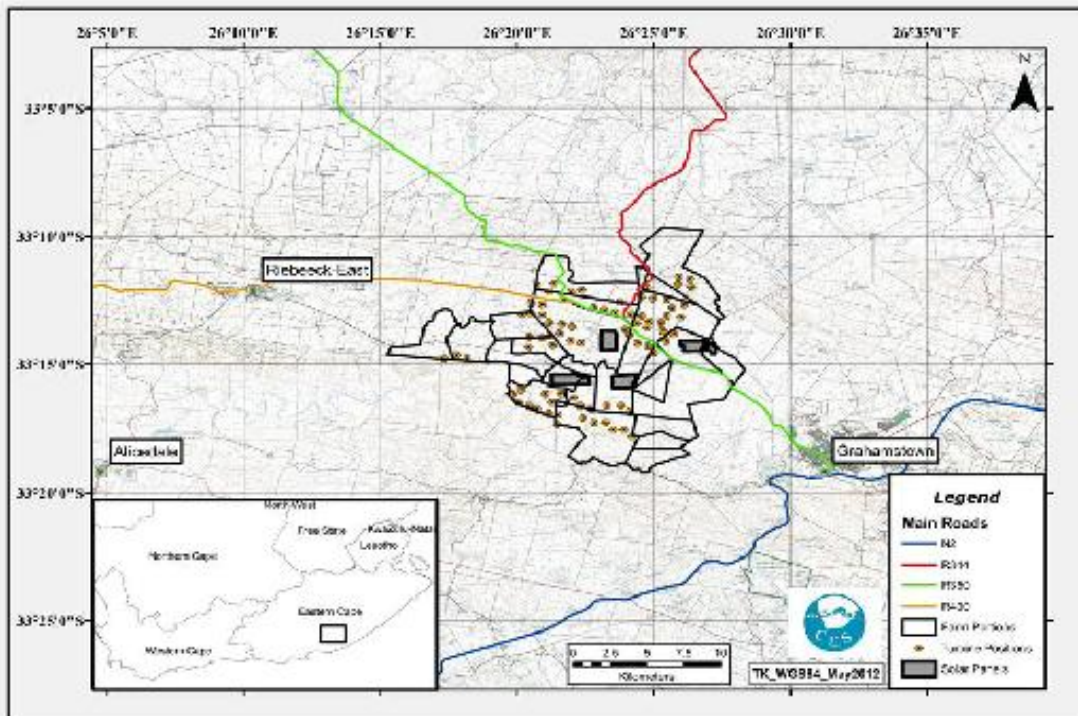


Figure 1: Location of the Terra Power Riebeeck East wind farm project.

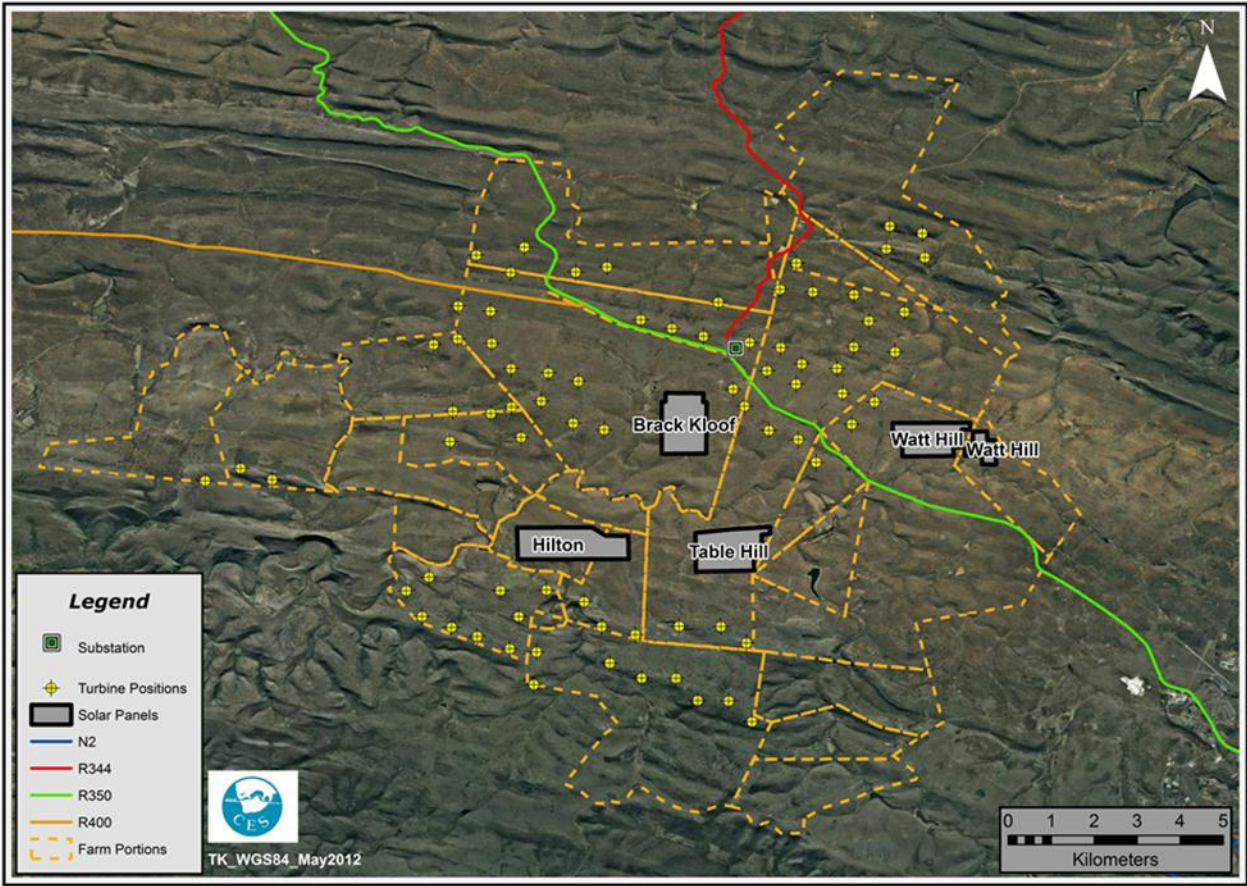


Figure 2: Infrastructure of the Terra Power Riebeeck East wind farm project

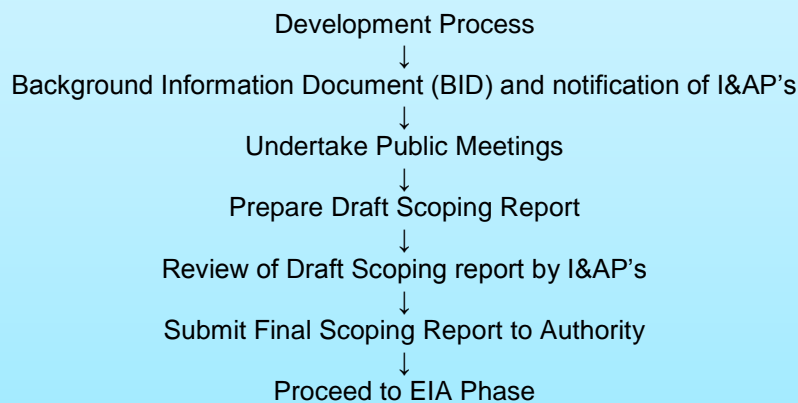


Figure 3: A wind farm similar to that proposed for Riebeeck East

APPROACH TO THE SCOPING PHASE

The Scoping Phase is important for informing the public and relevant authorities about the nature and size of the proposed project. A critical component of the Scoping Phase is the Public Participation Process, in which Interested and Affected Parties (I&APs) are given an opportunity to raise any issues or concerns they may have about the project. The process is outlined in the figure below. The Draft Scoping Report will be made available for review by the public and all registered I&APs will be notified to the availability thereof. This report will set the scope and specialist terms of reference for the EIA Phase.

The Scoping Process



The Environmental Impact Assessment phase

This phase is more complex and more detailed than the Scoping phase, because it focuses on undertaking a number of specialist studies that have been identified as being necessary during the Scoping phase. These studies provide expert input into the EIA process based on scientific information. I&APs will be consulted again during this phase, and will be given an opportunity to comment on the Draft Environmental Impact Report (EIR) that will contain the specialist reports. During this phase an Environmental Management Plan must also be prepared for the project.

Environmental Authorisation phase

The final EIR is submitted to the national Department of Environment Affairs (DEA) who, after considering the report, will make a decision either authorising the project to continue under certain conditions, or requiring additional work to be undertaken.

Potential issues for investigation

The following specialist studies will be conducted within the proposed wind farm site, to ascertain any potential impacts, positive and negative, that may occur as a result of pre-construction, construction and operational phases.

- **Visual and aesthetic impacts**
A wind farm will normally have a high visibility due mainly to the height of the turbines.
- **Noise impacts**
The Noise Impact Investigation will be conducted in accordance with the South African National Standard (SANS) 10328 "Methods for environmental noise impact assessments"
- **Ecological impacts**
The location of any species of special concern will be identified, and the location noted in order to inform the mitigation and management measures.
- **Avifaunal and Bat impacts**
Potential impacts to birds and bats
- **Heritage, archaeological and/or palaeontological impacts**
Potential impacts on heritage, cultural resources and/or fossils etc.

I hereby wish to register as an Interested and Affected Party (IAP) for the Terra Power Riebeeck East Wind project EIA process

Name:

Organization:

Postal address:

Email:

Phone #: _____ Fax #: _____

My initial comments, issues or concerns are:

Other individuals, stakeholders, organisations or entities that should be registered are:

Name:

Organization:

Postal address:

Email:

Phone #: _____ Fax #: _____

Please return details to: **Mr Justin Green**: P.O. Box 934, Grahamstown, 6140

Telephone: (046) 622 2364 Fax: (046) 622 6564 Email: j.green@cesnet.co.za or ppp@cesnet.co.za

APPENDIX C-2: EXAMPLE OF THE LETTER SENT TO THE LAND OWNER AND NEIGHBOURS OF THE PROJECT SITE, AND A REGISTERED MAIL SLIP INDICATING ALL INDIVIDUALS NOTIFIED.

COASTAL & ENVIRONMENTAL SERVICES
Environmental Management and Impact Assessment



67 African Street
P O Box 934
Grahamstown 6139
SOUTH AFRICA
Tel: 046 622 2364
Fax: 046 622 6564
Email: info@cesnet.co.za
Website: www.cesnet.co.za

05 June 2012

ATTENTION: OWNERS AND/OR OCCUPIERS OF LAND IMMEDIATELY SURROUNDING OR WITHIN 100m OF TERRA POWER WIND AND SOLAR FARM NEAR GRAHAMSTOWN IN THE EASTERN CAPE

NOTIFICATION OF ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED DEVELOPMENT OF A WIND AND SOLAR ENERGY PROJECT AT RIEBEECK EAST IN THE EASTERN CAPE PROVINCE OF SOUTH AFRICA

In accordance with the requirements of section 54 (2) (b) (vi) of the Environmental Impact Assessment Regulations (2010) made in terms of section 24(5) of the National Environmental Management Act (Act No 107 of 1998) as amended, we are required to, "give written notice to any organ of state having jurisdiction in respect of any aspect of the activity". In accordance with this requirement, please find here-with a letter of notification for an environmental impact assessment being carried out by Coastal and Environmental Services in respect of the above-mentioned project.

Terra Power Solutions (Pty) Ltd - a renewable energy company, plans to develop a wind power generation facility (known as a 'wind farm') 22km East of Riebeeck East, along the R350 located in the Makana Municipality in the Eastern Cape Province of South Africa. The proposed project is planned to host up to 77 turbines, each with a nominal power output ranging between 2-3 Mega Watts (MW). The total potential output of the wind farm would be 140MW. The wind farm will cover an area of approximately 15 900 hectares.

Terra Power Solutions (Pty) Ltd, a renewable energy company, also proposes to develop a photovoltaic (PV - or solar panel) electricity generating facility for the production of ±75 MW of energy on four portions of land in the Riebeeck East Region. The site will include Brack Kloof (120 hectares), Table Hill (120 hectares), Watt Hill (132 hectares) and Hilton (150 hectares).

- Coastal & Environmental Services (CES) of Grahamstown have been appointed by Terra Power Solutions (Pty) Limited, to conduct an environmental impact assessment for the proposed development. The activities that we believe will be triggered by the proposed development are listed in the application and the Background Information Document (BID) that is attached to this letter.
- A public meeting will be held to present the project and to give the public an opportunity to comment on the proposed development. You will be notified of the date, time and venue for the public meeting accordingly.
- CES would highly appreciate it if you could please send us a letter confirming your receipt of this notification. For more information, please feel free to contact Mr. Justin Green at the CES Grahamstown office numbers shown above.

Yours sincerely,

Justin Green
Environmental Consultant

East London: Tel: 043 742 3302 Fax: 043 742 3306 Email: cesel@cesnet.co.za

Henque 1018 t/a Coastal and Environmental Services • Reg no. CK 1997/061914/23 • Vat No. 4380172835
Members: Dr AM Avis (PhD Rhodes) • Prof RA Lubke (PhD Western Ontario)
Mrs CE Avis (MA Rhodes, CAIB) • Dr AR Carter (PhD Rhodes, CPA USA) • Mr WSJ Rowston (Bsc Hons CivEng)
Mrs J Gopal (B.Optom, Hons) • Dr KJ Whittington-Jones (PhD Rhodes) • Mr M Gopal • Mrs BK Emslie (B.Comm Accounting Rhodes)

List of REGISTERED LETTERS
Lys van GEREgistreerde BRIEWE
 (with an insurance option/met 'n versekeringsopsie)

170



Full tracking and tracing/Volledige volg en spoor

Name and address of sender: CES
 Naam en adres van afsender: CES
67 African Street, Grahamstown, 6139

Enquiries/Navrae
 Toll-free number
 Tolvry nommer
0800 111 502

No	Name and address of addressee Naam en adres van geadresseerde	Insured amount Versekerde bedrag	Insurance fee Versekeringsgeld	Postage Posgeld	Service fee Diensgeld	Affix Track and Trace customer copy Plak Volg-en-Spoor-kliëntafbeeld
1	Renzo Millelani, Vodacom SA Eastern Region P.O. Box 27504, Greenacres, P.E., 6004					REGISTERED LETTER REGISTERED LETTER RD 753 484 963 ZA CUSTOMER COPY 301628
2	Provincial Manager, South African Heritage Resources Agency, P.O. Box 759, East London, 5200					REGISTERED LETTER REGISTERED LETTER RD 753 484 945 ZA CUSTOMER COPY 301628
3	Mr Tom Smith, Eastern Holdings Ltd. Private Bag XI Beacon Bay 5205					REGISTERED LETTER REGISTERED LETTER RD 753 484 931 ZA CUSTOMER COPY 301628
4	Mrs M. Mabelegana, Department of Energy, Private Bag X59, Pretoria, 0001					REGISTERED LETTER REGISTERED LETTER RD 753 484 928 ZA CUSTOMER COPY 301628
5	Mrs Lizette Fourie, Department of Water Affairs P.O. Box 7019, East London, 5200					REGISTERED LETTER REGISTERED LETTER RD 753 484 914 ZA CUSTOMER COPY 301628
6	Lizelle Stroh, South African Civil Aviation Authority, Private Bag X 72, Mulhargy House 1685					REGISTERED LETTER REGISTERED LETTER RD 753 484 891 ZA CUSTOMER COPY 301628
7	Mrs ANNEKA CONYER, Wildlife Land Use & Soil Management, Department of Agriculture Forestry & Fisheries, Private Bag X250 Pretoria, 0001					REGISTERED LETTER REGISTERED LETTER RD 753 484 905 ZA CUSTOMER COPY 301628
8	Mrs Mamebekhaya Bant, Makana Local Municipality/City/Hall, High Street, Grahamstown, 6140					REGISTERED LETTER REGISTERED LETTER RD 753 484 874 ZA CUSTOMER COPY 301628
9	Director: Environmental Impact Evaluation, Department of Environmental Affairs, Private Bag X1467, Pretoria, 0001					REGISTERED LETTER REGISTERED LETTER RD 753 484 888 ZA CUSTOMER COPY 301628
10	Mrs A. Lourenco, Department of Economic Development & Environmental Affairs, Private Bag X5001, Greenacres, Port Elizabeth 6057					REGISTERED LETTER REGISTERED LETTER RD 753 484 857 ZA CUSTOMER COPY 301628

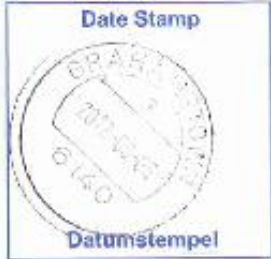
Number of letters posted 10 Total
 Getal briewe gepos 10 Totaal

Signature of client [Signature]
 Handtekening van klient

Signature of accepting officer [Signature]
 Handtekening van aanneembeampte

The value of the contents of these letters is as indicated and compensation is not payable for a letter received unconditionally. Compensation is limited to R100,00. No compensation is payable without documentary proof. Optional insurance of up to R2 000,00 is available and applies to domestic registered letters only.

Die waarde van die inhoud van hierdie briewe is soos aangedui en vergoeding sal nie betaal word vir 'n brief wat sonder voorbehoud ontvang word nie. Vergoeding is beperk tot R100,00. Geen vergoeding is sonder dokumentêre bewys betaalbaar nie. Opsionele versekering van tot R2 000,00 is beskikbaar en is slegs op binnelandse geregistreerde briewe van toepassing.



List of REGISTERED LETTERS
Lys van GEREGISTREERDE BRIEWE
(with an insurance option/met 'n versekeringsopsie)

170



Full tracking and tracing/Volledige volg en spoor

Name and address of sender: CES
 Naam en adres van afsender: 67 African Street, Grahamstown, 6139

Enquiries/Navrae
 Toll-free number
 Tovry nommer
0800 111 502

No	Name and address of addressee Naam en adres van geadresseerde	Insured amount Versekerde bedrag	Insurance fee Versekeringsgeld	Postage Posgeld	Service fee Diensgeld	Affix Track and Trace customer copy Plak Volg-en-Spoor-kliëntafskrif
1	Jennifer Gon, Wildlife & Environment Society of Southern Africa, P.O. Box 73 Grahamstown 6140					REGISTERED LETTER (with a domestic insurance option) ShareCall 0800 111 502 www.saps.co.za RD 753 484 865 ZA CUSTOMER COPY 301028R
3						
4						
5						
6						
7						
8						
9						
10						
Number of letters posted Getal briewe gepos		Total Totaal	R	R	R	R

Number of letters posted
Getal briewe gepos

Signature of client
Handtekening van kliënt

Signature of accepting officer
Handtekening van aanneembeampte

The value of the contents of these letters is as indicated and compensation is not payable for a letter received unconditionally. Compensation is limited to R100,00. No compensation is payable without documentary proof. Optional insurance of up to R2 000,00 is available and applies to domestic registered letters only.

Die waarde van die inhoud van hierdie briewe is soos aangedui en vergoeding sal nie betaal word vir 'n brief wat sonder voorbehoud ontvang word nie. Vergoeding is beperk tot R100,00. Geen vergoeding is sonder dokumentêre bewys betaalbaar nie. Opsionele versekering van tot R2 000,00 is beskikbaar en is slegs op binnelandse geregistreerde briewe van toepassing.



THE GROCOTTS (LOCAL) – 18 MAY 2012

Grocott's Mail Friday, 18 May 2012

News

3

Nyaluza to host historic torch

LOYISO DYONGMAN

Minister for Higher Education and Training Blade Nzimande will be among the VIPs attending celebrations as Makana receives the ANC's Century Torch on Sunday.

The torch, visiting ANC regions around the country to mark the organisation's 100th birthday, arrived in Kouga Municipality yesterday, after blazing a trail from the OR Tambo District Municipality.

VIPs attending the ceremony will include Cacadu's ANC regional chairperson Gugile Nkwinti, deputy chairperson Lungile Mxube and secretary Nosisa Siwundu.

Sub-regional chairperson Mncedisi Boma said the torch would come to Nathaniel Nyaluza Secondary School in Fingo village at 9am.

Boma said: "Nyaluza was

our first high school within Makana and this is a way of acknowledging their contribution to the community."

From Nyaluza the proceedings will go on to the main venue, BB Zondani Hall in Tantiyi. The torch will then go to the Thabha graves.

"Going to the graves, the ANC will be visiting their fallen heroes and heroines that were killed in the 80s during apartheid," Boma said.

"Those include Siphiwo Mazwayi, Rogers Faltein, Vuyo Moleli – who were Umkhonto we Sizwe soldiers – and Mam' uTshali and Mam' uMpande – both ANC activists and many others."

Later in the day Boma said Nzimande would give a memorial lecture, in the name of former ANC president, the late Govan Mbeki. Boma said that a venue for the lecture is yet to be decided.



MARCHING OVER MONEY... Eastcape Midlands College students protest outside the Department of Education district offices this week over their alleged failure to channel loans to pay for tuition and accommodation. The ANCYL has stepped in to mediate between students and the college. Photo: Desiree Schiringer

ANCYL steps in over loans crisis

LOYISO DYONGMAN AND ZAMATHYANE NDABA

THE ANC Youth League has stepped in to help resolve a dispute between the Eastcape Midlands College and hundreds of students threatened with expulsion for not paying their fees, following a week of protest action.

Around 200 students first protested outside the Department of Education district offices, in Milner Street, on Tuesday, demanding answers

about delays in the payment of their National Students Financial Aid Scheme (NSFAS) loans.

They proceeded to the city hall, where they called on ANC Youth League regional chairperson, Mabhubi Matyuzza, to intervene. Matyuzza works at the city hall in Makana Municipality's social development portfolio committee.

Students at the college said they had been told they must leave unless they

paid their fees and said they should have received the first instalments of loans from the scheme in March.

The source of the anger and confusion was apparently the reply to an email students sent to the NSFAS on Monday urgently requesting their funding. A reply the next day reportedly said the scheme had no knowledge of the alleged unpaid loans.

Matyuzza, who is mediating between the students and the college, said negotiations

were in progress. "The school is failing them in addressing financing," Matyuzza said.

"This is not going to be something which will be solved in a day. We are moving as swiftly as possible to solve the problem."

Yesterday protests continued at the education department offices, while inside a meeting between college staff, Matyuzza and the Makana Youth Forum member, Andile Hoyi, took place.

Teamwork boosts tourism

PHILIPPA BRADBURY

THE Eastern Cape had a strong presence at the annual Tourism Indaba at Durban's Inkosi Albert Luthuli ICC complex last week.

Under the theme "Shaping our future together", the expo offered tourism enterprises, the opportunity to market their products.

The Eastern Cape products were exhibited under the banner of the Adventure Province, surrounding the Eastern Cape Parks and Tourism Agency (ECPPTA) stand.

According to the agency's communications and public relations manager, Veliswa Mthlope, this year they intended to package the province's tourism offerings collectively, offering consumers more and strengthening ties between the ECPPTA and tourism businesses in the province.

Makana Tourism director Susan Waugh said, "We had a lot of interest shown not only in Grahamstown but within the Eastern Cape.

"It was an extremely positive experience."

Bursary fund honours murdered student

MIKAILA THURGOOD

RHODES University has established a fund in memory of murdered BSc Honours student Letona FuFu. FuFu was killed while hitch-hiking to her Rhodes graduation ceremony last month. To honour her memory,

Rhodes has invited staff and students to contribute towards a memorial prize, awarded annually to a student graduating in science with a BSc or BSc (Hons) who has overcome educational hardships.

Dean of Science, Professor Ric Bernard, said preference

would be given to a student who had come through the Foundation Programme and who had majored in the mathematical or statistical sciences.

Donations to the fund are through student fees, in Eden Grove or at the main administration building.

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS



PROPOSED DEVELOPMENT OF THE RIEBEEK EAST WIND AND SOLAR PROJECT

Notice is given in terms of regulation 54(2) as published in the Government Gazette No 543 Environmental Impact Assessment (EIA) regulations of the National Environmental Management Act (Act No 107 of 1998) for intent to undertake an EIA.

Terra Power Solutions (Pty) Ltd is proposing to construct a Wind and Solar Energy Project to be developed outside of Riebeeck East, in the Eastern Cape Province of South Africa. The proposed project will entail the construction and operation of up to 77 turbines, each generating 2-3 MW of power with a total capacity of 140MW.

The project also includes the construction and operation of solar panels covering an area of approximately 487 hectares. The proposed study area is 5,900 hectares.

You are invited to register as an Interested and Affected Party (I&AP). Please contact: Mr Justin Green, P.O. Box 934, Grahamstown. Tel: 046-622 2364; Fax: 046-6226564 Email: j.green@cesnet.co.za.



21 Kwa Street
PO Box 2391
Grahamstown
6101
Tel: 046 636 1660
Fax: 046 636 9962

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**APPENDIX C-4: COPY OF SITE NOTICE TEXT AND PHOTOGRAPHS
PLACED AT VARIOUS POINTS NOTIFYING I&APS OF THE PROPOSED
ENERGY IPP WIND ENERGY PROJECT**

**PROPOSED DEVELOPMENT OF THE RIEBEECK EAST WIND AND
SOLAR ENERGY PROJECT IN THE EASTERN CAPE PROVINCE
NOTICE OF ENVIRONMENTAL IMPACT ASSESSMENT PROCESS**

Notice is given in terms of Regulation 54 of the Environmental Impact Assessment (EIA) Regulations published in Government Notice R543 in Government Gazette No 33306 of 02 August 2010, under Section 24(5) of the National Environmental Management Act 1998 (Act No 107 of 1998), as amended, that a wind and solar energy project is proposed for construction in Riebeeck East in the Makana Municipality in the Eastern Cape Province.

The proposed project will entail the construction and operation of up to 77 turbines each generating a maximum of 2-3MW of power with a total generation capacity of ~ 140MW.

The proposed project will also entail the construction and operation of four solar farms covering 522 hectares, each producing ~ 75 MW each.

In terms of the EIA regulations, the proposed development will require a full scoping and Environmental Impact Assessment (EIA). Terra Power Solutions (Pty) Ltd has appointed Coastal and Environmental Services (CES) to undertake the EIA. The application has been submitted to the Department of Environmental Affairs (DEA).

Coordinates of site centre: 33°14'44.72" S; 26°23'19.38" E

If you have any comments or queries, or if you require further information, please contact Mr. Justin Green at:-
Tel: 046 622 2364; or Fax: 046 622 6564; or
Email: J.green@cesnet.co.za





Plate C4 (1) – Site notice erected on the corner of the R344 and R400 between Grahamstown and Riebeeck East.

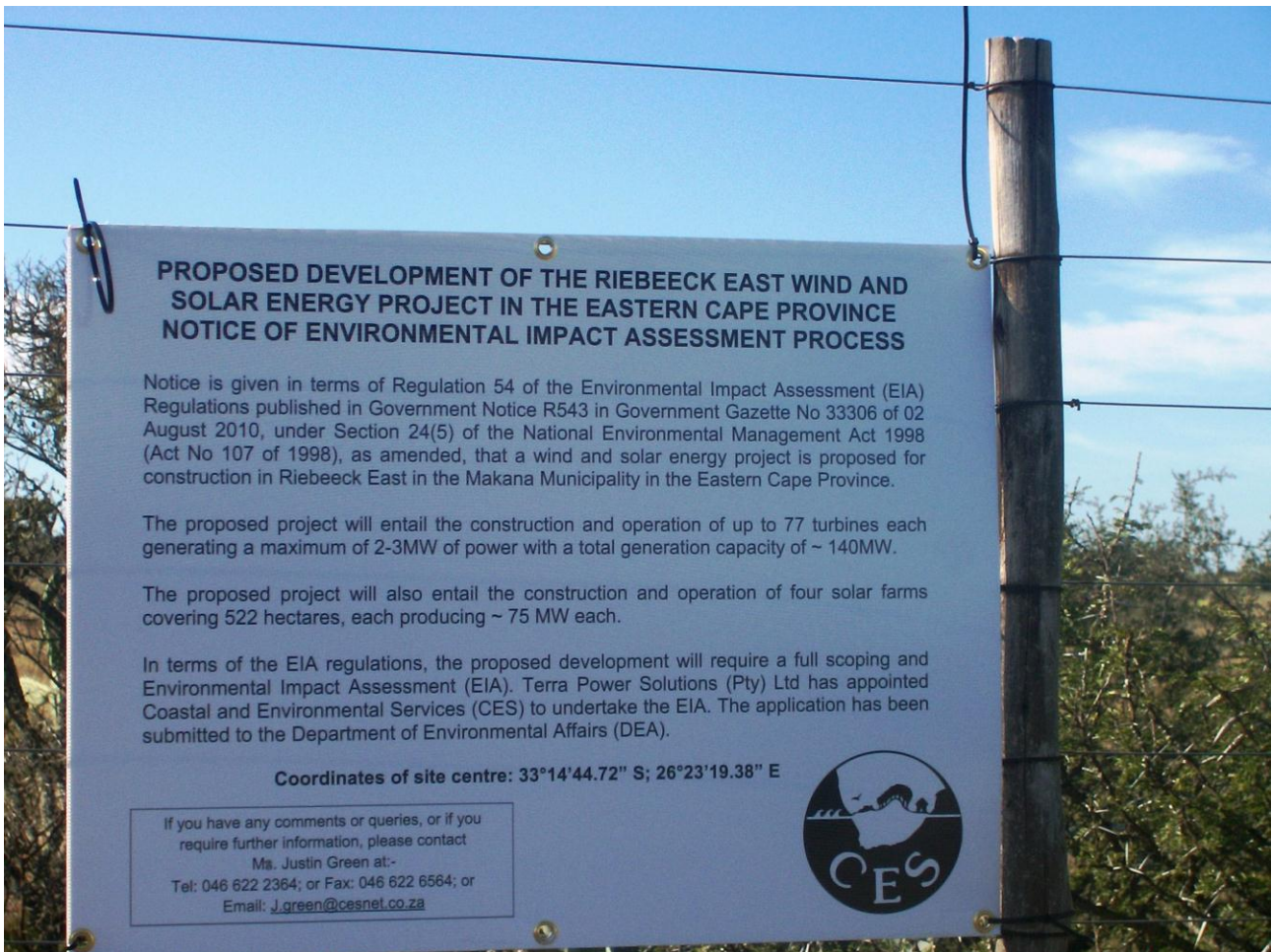


Plate C4 (2) – Site notice erected on the corner of the R350 and R400 between Riebeeck East and Bedford.



Plate C4 (3) – Site notice erected on the dirt road linking the R400 and Alicedale.



Plate C4 (4) – Site notice erected on the dirt road linking the Grahamstown and Alicedale.

APPENDIX C-5: REGISTER OF INTERESTED AND AFFECTED PARTIES

Landowner

Name	Association	Email
John White	Hilton Farm	hiltonfarm@telkomsa.net
Adrian White	Table Hill Farm (North)	tablefarm@eastcape.net
Robert White	Table Hill (South)	watty1@telkomsa.net
Tony Phillips	Kruisfontein	buck@imagnet.co.za
Geoff Brown	Brack Kloof	glenambrose@imagnet.co.za
Trevor Hoole	Slaaikraal Farm	tthoole@gmail.com
John Dell	Hounslow	dell@johndelldorpers.co.za

Surrounding Neighbours

Name	Association	Email
Angus Sholto	Kwandwe Game Reserve	angus@kwandwe.co.za
Barry Podesta	Aylesby Trust	barryp@isat.co.za
Brian Victor Stewart		brianncathy@mweb.co.za
Christopher Thomas		No Email
David Pohl		pohlads@imagnet.co.za
Gerhard von Hasseln		mvonhasseln@gmail.com
Grant Soul	Aptrac Aviation	grant@aptrac.com
Lee Nortier	P J Thompson Pty Ltd	lee@rockdale.co.za
Lft col Jakes	SANDF	rfim.dbn@vodamail.co.za
Makana Municipality	Mun Grahamstown	anele.kwayimani@webmail.co.za
Mandisa Mondl	Transnet Ltd	mandisa.mondl@transnet.net
Mark Bristow	Nuritex Inv Pty Ltd	MBristow@randgoldresources.com
Michael Palmer		palmer@itsnet.co.za
Peter Rose		p.rose@ru.ac.za
Pieter Grobler	Van Der Merwes Kraal	gro@cybertrade.co.za
Pumba Game Reserve	Firglen Farms C C	rpearse@pehotels.co.za
Thinus Hergesus	J R 11 Inv Pty Ltd	thinus@hellspoort.co.za

AUTHORITIES**National**

Name	Association	Email
Mr Briant Noncembu	DEDEA (Amathole)	Briant.Noncembu@deaet.ecape.gov.za
Mr D. Govender	DEDEAT Regional Director	
Andries Struwig	DEDEAT Assistant Director	Andries.struwig@deaet.ecape.gov.za
Jeff Govender	DEDEAT Regional Manager for the Cacadu District	Dayalan.govender@deaet.ecape.gov.za
Carin Swart	DEDEA	Carin.Swart@deaet.ecape.gov.za
Dan Malgas	DAFF Forestry	MalgasM@daff.gov.za
S. Gwen	DAFF Forestry	gwendolines@daff.gov.za
Ms Mashudu Marubini	Delegate of the Minister (DAFF)	MashuduMa@daff.gov.za
Ms Thoko Buthelezi	AgriLand Liaison office (DAFF)	ThokoB@daff.gov.za
Ms Mashudu Marubini	DAFF Agri - Delegate of the Minister	MashuduMa@daff.gov.za
Ms Thoko Buthelezi	DAFF Agri - AgriLand Liaison	ThokoB@daff.gov.za
M Mathekgana	Dept of Energy	mokgadi.mathekgana@energy.gov.za
Ms Nyiko Nkosi	DEA	nnkosi@environment.gov.za

Makana LM

Name	Association	Email
Ntonek Nocweka	Makana Municipality	ntontela@makana.gov.za
Anele Kwayimani	Makana Municipality	anele.kwayimani@webmail.co.za
Xhanli Bokue	Makana Municipality	bokwe@makana.gov.za
Casa Yonela	Makana Municipality	casayo@webmail.co.za
Ndumiso Nongwe	Environment Manager	

Cacadu DM

Name	Association	Email
Howard Sikweza	Cacadu Environment	hsikweza@cacadu.co.za

Key Stakeholders

Name	Association	Email
Mariagrazia Galamberti	SAHRA	mgalimberti@sahra.org.za

Xolani Wana	ESKOM	Xolani.Wana@eskom.co.za
Chris Isherwood	SACAA (Aviation Survey Inspector)	isherwoodC@caa.co.za
Lizelle Stroh	SACAA	strohl@caa.co.za
Nana Gouws	SANRAL	GouwsJ@nra.co.za

Registered IAP's

Name	Association	Email
Bert Maris		bwmaris@gmail.com
Cary Clarke	P.G. Properties	cary@imagnet.co.za
Chris Pike	Conservation Officer - Hunters and Guides Africa	conservation@huntersandguides.co.za
Christopher Clarke	Windwatts Turbines	christopher@windwattsturbines.com
Debi Brody	P.G. Properties	debi.brody@pamgolding.co.za
Florian Kroeber	EAB Astrum Energy	florian.kroeber@astrumenergy.com
Graeme Marin	Kwandwe	graeme@kwandwe.co.za
Hendrik Odendaal	Kwandwe	hendrik@kwandwe.co.za
Hendrik Reyneke	Mainstream Renewable Power South Africa	hein.reyneke@mainstreamrp.com
Hugh Retief		hughretief@gmail.com
John Parker	Lukhanyo Game Farm - Mark Bristow	j.parker@geenet.co.za
Michael Mangnall		mike.mangnall@mainstreamrp.com
Owen Poultney		opoultney@yahoo.com
Rob Dell	Hounslow Farm	robert@johndelldorpers.co.za
T. Duda	South-Lik	Southlinkinternational@gmail.com
Will Fowlds	Indallo	William@amakhala.co.za
Chris Pike		Sales@huntersandguides.co.za
P.J.Thompson		ria@rockdale.co.za
MF Way-Jones	Grahamstown Historical Society	f.way-jones@ru.ac.za
Margaret Campton		cramptonmargeret@gmail.com
Nick Fox	Sibuya Game Reserve; Indalo	nickfox@sibuya.co.za

APPENDIX C-6: COMMENTS REPORT (ISSUES AND RESPONSE TRAIL) INCORPORATING COMMENTS RECEIVED SINCE THE START OF THE SCOPING PHASE

NAME	ISSUE	DATE	RESPONSE
1. GENERAL			
Chris Pike and John Parker	The carbon footprint during construction phase	18/06/2012 Email	The total area of the properties is 15 900 ha, but the footprint will be much small. This will be dependent on the end number of accepted turbines, as well as the underground cables that will be laid. A more accurate description will be available in the Final report
Nick Fox	<p>Your anticipated reports (below) are substantially insufficient. Other essential reports should at least include (but not necessarily be limited to):</p> <ol style="list-style-type: none"> 1. Socio- economic- to assess the damage and loss of jobs caused by such a project on the tourism industry which is a major economic activity in the area. 2. Land value impacts – the effect such a project will have on values of adjacent land 	12/07/2012 Email	<p>Noted.</p> <ol style="list-style-type: none"> 1. The socio-economic impacts of windfarms are very difficult to determine, because some people think they are attractive and indicate a commitment to renewable energy, while others think they are unattractive. Nevertheless, all comments on the proposed Riebeeck East wind farm will be communicated to the regulatory authority as completely and as accurately as possible. 2. Unfortunately there have been no studies done in South Africa to determine the effect that these structures will have on land value.
Nanna Gouws SANRAL	<ol style="list-style-type: none"> 1. Wind turbines: the placement of wind turbines more than 500m from the national road reserve would not require any approval from SANRAL. 2. The absolute minimum placement is offset of tip height plus 10% but a desirable offset of tip height plus 50% is preferred. 3. All other structures the building restriction is 60 metres from the national road reserve fence and 500 metres from an intersection. 4. Access to these wind farms must be obtained from other roads and not the national road. 	05/07/2012 Email	Noted.
2. TOURISM AND BUSINESS OPERATIONS			

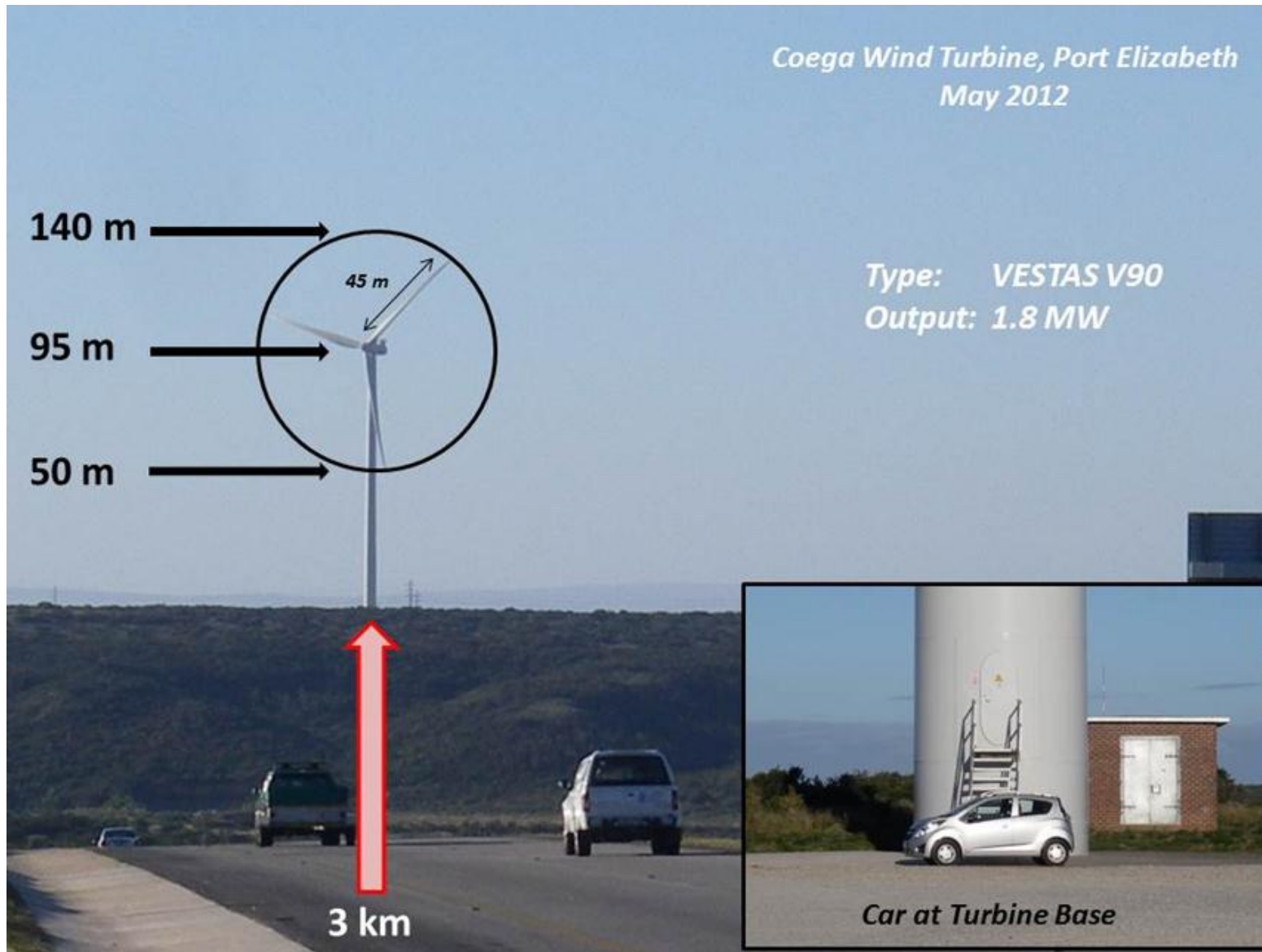
NAME	ISSUE	DATE	RESPONSE
Chris Pike and John Parker	Revenue loss and compensation due to unnatural state of the area.	18/06/2012 Email	It is likely that some of your clients will find these structures unpleasant, but we have no knowledge of how many may not be bothered by them. It is a matter of people's opinions and perceptions. Without a detailed, nationwide study, this concern cannot be adequately addressed. We regret that this is the case. There is currently no evidence to suggest this due to the fact that there are currently very few wind farms in South Africa. A viewshed analysis will be conducted during the visual specialist study and will show all the areas from which turbines will be visible.
Alexandra Whitehead E.	The loss of eco-tourism and hunting?	01/07/2012 Email	
Patrick Billson	NOT in favour of this project. My farming and eco business is in the Highlands area	27/07/2012 Email	
3. VISUAL			
Chris Pike and John Parker	Visual pollution to game lodges	18/06/2012 Email	Noted. A visual specialist study will be undertaken during the EIR phase of the project. We can then submit visual montages and we can then arrange to get those to you.
Alexandra Whitehead E.	Strobe Effect	01/07/2012 Email	
Grant Soule	Strobe Effect	01/07/2012 Email	
Nick Fox	A wind farm will normally have a high visibility due mainly to the height of the turbines.	12/07/2012 Email	Noted. A specialist visual impact assessment study will be completed to determine the degree of visual impact the wind turbines will have on the area.
4. NOISE			
Alexandra Whitehead E.	Noise pollution	01/07/2012 Email	Noted. A noise impact assessment will be undertaken during the EIA phase of the project. The specialist will be notified of all these concerns and asked to address them where possible. The study will model the suggested turbine type, and use topographical and climatic data to indicate the noise impact on the surrounding areas.
Grant Soule	Noise Pollution	01/07/2012 Email	

NAME	ISSUE	DATE	RESPONSE
Nick Fox	The Noise Impact Investigation will be conducted in accordance with the South African National Standard (SANS) 10328 "Methods for environmental noise impact assessments"	12/07/2012 Email	Noted.
5. AVIFAUNAL			
Chris Pike and John Parker	Avifaunal impact to area – specifically populations of blue crane, Kori bustard, Black Eagle, Marshall Eagle, black Harrier	18/06/2012 Email	An avifaunal study will demarcate bird sensitive areas that need to be excluded from development. This will be looked at during the EIR phase. In addition to this, a twelve month long monitoring program will under way that will make more recommendations that will reduce the impact on these species
Alexandra Whitehead E.	The Effect on bird life.	01/07/2012 Email	
Grant Soule	Bird Life	01/07/2012 Email	
6. BAT			
Chris Pike and John Parker	Bat impact over such a wide area. 15 900 ha	18/06/2012 Email	The avifaunal and bat studies will demarcate bird and bat sensitive areas that need to be excluded from development. This will be looked at during the EIR phase.
Nick Fox	Potential impacts to birds and bats	12/07/2012	In addition to this, a twelve month long monitoring program will under way that will make more recommendations that will reduce the impact on these species.
7. ECOLOGICAL			

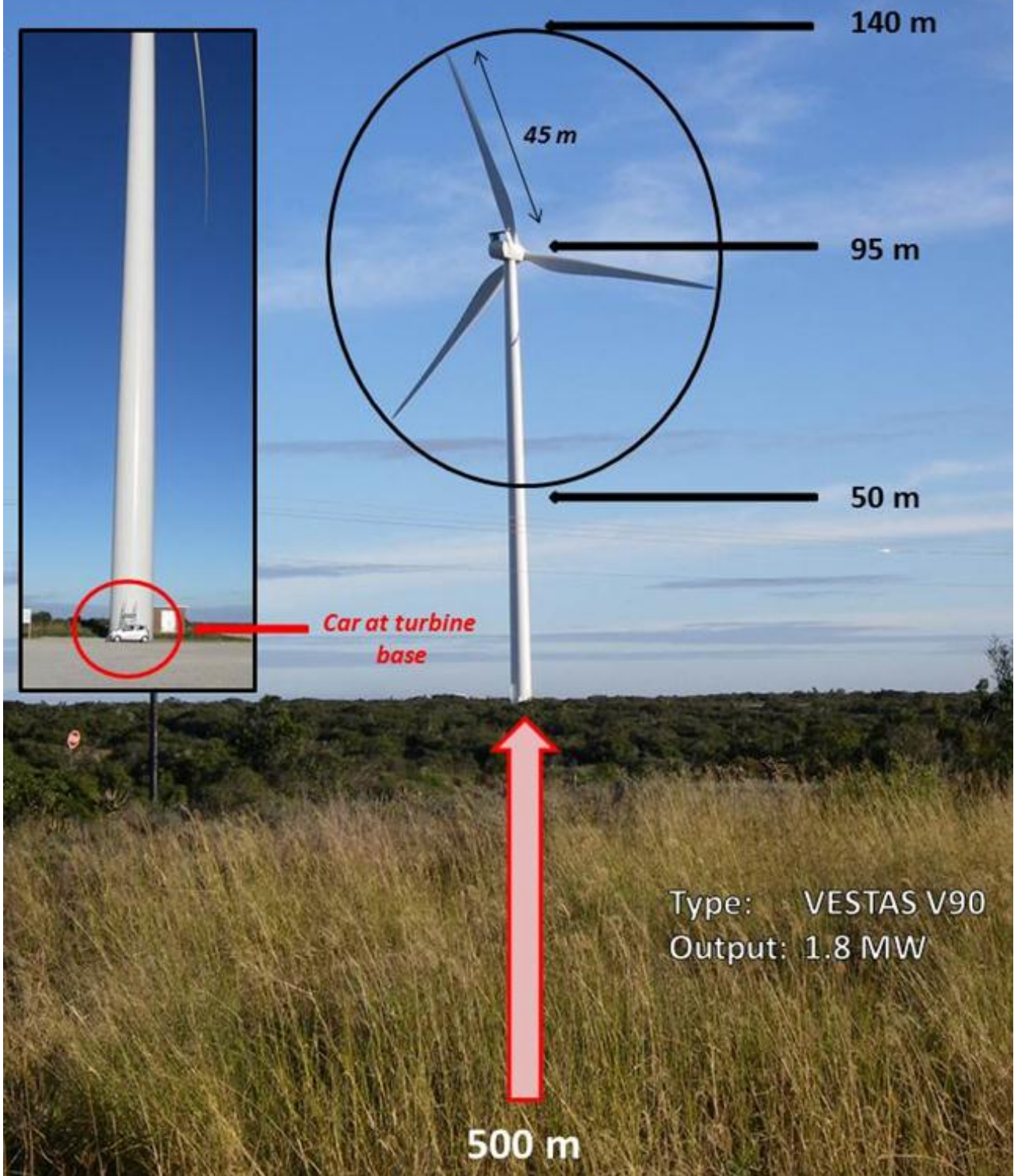
NAME	ISSUE	DATE	RESPONSE
	The location of any species of special concern will be identified, and the location noted in order to inform the mitigation and management measures.		Noted. A terrestrial ecological specialist study will be undertaken during the EIR phase of the project.
Chris Pike and John Parker	The clearing of thicket in classified areas	18/06/2012 Email	Noted. A terrestrial ecological specialist study will be undertaken during the EIR phase of the project.
8. TEMPERATURE			
Grant Soule	Temperature variations	01/07/2012 Email	CES does not deem this to be of concern.
9. CIVIL AVIATION AUTHORITY			
Grant Soule	Proposed development is in breach of Civil Aviation Regulations part 139.01.33 (35 kms from Airfield)	01/07/2012 Email	The project respects the 2,5km buffer required by CAA Furthermore; the permitting process requires that the Civil Aviation Authority will be consulted by the applicant and the necessary approval was secured for the proposed project.
Alexandra Whitehead E.	A hazard to aviation	01/07/2012 Email	
10. HERITAGE			
Fleur Way-Jones	<ol style="list-style-type: none"> The integrity of the heritage in the area be preserved and if not possible, recorded (description, location and photographic record) The impact of the development of the area on the heritage of the area be determined and measured against the legal framework as set out in the Heritage Resources Act of 1999 	12/07/2012 Email	<ol style="list-style-type: none"> Noted This will be taken into account and passed on to the specialist.

NAME	ISSUE	DATE	RESPONSE
Nick Fox	Potential impacts on heritage, cultural resources and/or fossils etc	12/07/2012	Noted. A heritage and archaeological specialist study will be undertaken during the EIR phase of the project.

APPENDIX D: THE COEGA WIND TURBINE (FOR ILLUSTRATION PURPOSES)



Coega Wind Turbine, Port Elizabeth
May 2012



APPENDIX E: SPECIES LIST OF POTENTIAL SPECIES OF SPECIAL CONCERN THAT COULD POSSIBLY OCCUR AT THE STUDY SITE (SIBIS, 2012)

Genus and Species	IUCN	CITES	Red Data List	PNCO	NA
<i>Acacia baileyana</i>	NA	NA	NE	NA	NA
<i>Acacia cyclops</i>	NA	NA	NE	NA	NA
<i>Acacia fimbriata</i>	NA	NA	NE	NA	NA
<i>Acacia karroo</i>	NA	NA	NE	NA	NA
<i>Acacia longifolia</i>	NA	NA	NE	NA	NA
<i>Acacia mearnsii</i>	NA	NA	NE	NA	NA
<i>Acacia saligna</i>	NA	NA	NE	NA	NA
<i>Acanthospermum glabratum</i>	NA	NA	NE	NA	NA
<i>Achyranthes aspera</i> var. <i>aspera</i>	NA	NA	NE	NA	NA
<i>Achyranthes aspera</i> var. <i>sicula</i>	NA	NA	NE	NA	NA
<i>Acokanthera oppositifolia</i>	NA	NA	LC	Schedule 4	NA
<i>Acrolophia capensis</i>	NA	II	LC	NA	NA
<i>Acrolophia cochlearis</i>	NA	II	LC	NA	NA
<i>Adenium multiflorum</i>	NA	NA	LC	Schedule 4	NA
<i>Agathosma bicornuta</i>	NA	NA	EN	NA	NA
<i>Agathosma</i> sp.	NA	NA	Critically rare	NA	NA
<i>Aloe micracantha</i>	NA	NA	NT	NA	NA
<i>Aloe striata</i> subsp. <i>karasbergensis</i>	NA	NA	VU	NA	NA
<i>Alsophila capensis</i>	NA	NA	Declining	NA	NA
<i>Alternanthera pungens</i>	NA	NA	NE	NA	NA
<i>Amaranthus hybridus</i> subsp. <i>hybridus</i> var. <i>hybridus</i>	NA	NA	NE	NA	NA
<i>Ammocharis coranica</i>	NA	NA	LC	Schedule 4	NA
<i>Anacampseros filamentosa</i> subsp. <i>filamentosa</i>	NA	II	LC	Schedule 4	NA
<i>Anagallis arvensis</i> subsp. <i>arvensis</i>	NA	NA	NE	NA	NA
<i>Anisotoma cordifolia</i>	NA	NA	LC	Schedule 4	NA
<i>Apium graveolens</i>	NA	NA	NE	NA	NA
<i>Apodolirion macowanii</i>	NA	NA	VU	Schedule 4	NA
<i>Aptenia cordifolia</i>	NA	NA	LC	Schedule 4	NA
<i>Aptenia cordifolia</i>	NA	NA	LC	NA	NA
<i>Aptenia haeckeliana</i>	NA	NA	LC	Schedule 4	NA
<i>Aptenia haeckeliana</i>	NA	NA	LC	NA	NA
<i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	NA	NA	NE	NA	NA
<i>Argyrolobium trifoliatum</i>	NA	NA	Threatened	NA	NA
<i>Aristea abyssinica</i>	NA	NA	LC	Schedule 4	NA
<i>Aristea abyssinica</i>	NA	NA	LC	NA	NA
<i>Aristea anceps</i>	NA	NA	LC	Schedule 4	NA

Volume 1: Environmental Scoping Report

<i>Aristea anceps</i>	NA	NA	LC	NA	NA
<i>Aristea dichotoma</i>	NA	NA	LC	Schedule 4	NA
<i>Aristea dichotoma</i>	NA	NA	LC	NA	NA
<i>Aristea pusilla</i>	NA	NA	LC	Schedule 4	NA
<i>Aristea pusilla</i>	NA	NA	LC	NA	NA
<i>Arundo donax</i>	NA	NA	NE	NA	NA
<i>Asclepias albens</i>	NA	NA	LC	Schedule 4	NA
<i>Asclepias crispa</i> var. <i>crispa</i>	NA	NA	LC	Schedule 4	NA
<i>Asclepias dregeana</i> var. <i>dregeana</i>	NA	NA	NA	Schedule 4	NA
<i>Asclepias expansa</i>	NA	NA	LC	Schedule 4	NA
<i>Aspalathus argyrophanes</i>	NA	NA	Rare	NA	NA
<i>Aspalathus gerrardii</i>	NA	NA	VU	NA	NA
<i>Asparagus stipulaceus</i>	NA	NA	NT	NA	NA
<i>Aspidoglossum carinatum</i>	NA	NA	LC	Schedule 4	NA
<i>Aspidonepsis diploglossa</i>	NA	NA	NA	Schedule 4	NA
<i>Aster squamatus</i>	NA	NA	NE	NA	NA
<i>Atriplex lindleyi</i> subsp. <i>inflata</i>	NA	NA	NE	NA	NA
<i>Atriplex littoralis</i>	NA	NA	NE	NA	NA
<i>Bidens pilosa</i>	NA	NA	NE	NA	NA
<i>Bobartia gracilis</i>	NA	NA	LC	Schedule 4	NA
<i>Bobartia gracilis</i>	NA	NA	LC	NA	NA
<i>Bobartia orientalis</i> subsp. <i>orientalis</i>	NA	NA	Rare	Schedule 4	NA
<i>Bobartia orientalis</i> subsp. <i>orientalis</i>	NA	NA	Rare	NA	NA
<i>Bonatea speciosa</i> var. <i>antennifera</i>	NA	II	LC	NA	NA
<i>Bonatea speciosa</i> var. <i>antennifera</i>	NA	II	LC	NA	NA
<i>Boophone disticha</i>	NA	NA	Declining	Schedule 4	NA
<i>Brachycorythis macowaniana</i>	NA	II	LC	NA	NA
<i>Brachycorythis macowaniana</i>	NA	II	LC	NA	NA
<i>Brachystelma comptum</i>	NA	NA	VU	Schedule 4	NA
<i>Brachystelma macropetalum</i>	NA	NA	LC	Schedule 4	NA
<i>Brachystelma minimum</i>	NA	NA	Rare	Schedule 4	NA
<i>Brachystelma rubellum</i>	NA	NA	LC	Schedule 4	NA
<i>Brachystelma schizoglossoides</i>	NA	NA	LC	Schedule 4	NA
<i>Briza maxima</i>	NA	NA	NE	NA	NA
<i>Briza minor</i>	NA	NA	NE	NA	NA
<i>Bromus catharticus</i>	NA	NA	NE	NA	NA
<i>Brownleea coerulea</i>	NA	II	LC	NA	NA
<i>Brownleea coerulea</i>	NA	II	LC	NA	NA
<i>Brownleea parviflora</i>	NA	II	LC	NA	NA
<i>Brownleea parviflora</i>	NA	II	LC	NA	NA
<i>Brunsvigia grandiflora</i>	NA	NA	LC	Schedule	NA

Volume 1: Environmental Scoping Report

				4	
<i>Brunsvigia gregaria</i>	NA	NA	LC	Schedule 4	NA
<i>Callistemon rigidus</i>	NA	NA	NE	NA	NA
<i>Calopsis paniculata</i>	NA	NA	NE	NA	NA
<i>Capsella bursa-pastoris</i>	NA	NA	NE	NA	NA
<i>Carissa bispinosa</i>	NA	NA	LC	Schedule 4	NA
<i>Carpobrotus edulis</i> subsp. <i>edulis</i>	NA	NA	LC	Schedule 4	NA
<i>Carpobrotus edulis</i> subsp. <i>edulis</i>	NA	NA	LC	NA	NA
<i>Cassytha filiformis</i>	NA	NA	NE	NA	NA
<i>Centaurea cyanus</i>	NA	NA	NE	NA	NA
<i>Centaurea melitensis</i>	NA	NA	NE	NA	NA
<i>Ceratandra grandiflora</i>	NA	II	LC	NA	NA
<i>Ceratandra grandiflora</i>	NA	II	LC	NA	NA
<i>Ceropegia ampliata</i> var. <i>ampliata</i>	NA	NA	LC	Schedule 4	NA
<i>Ceropegia bowkeri</i> subsp. <i>sororia</i>	NA	NA	LC	Schedule 4	NA
<i>Ceropegia carnosia</i>	NA	NA	LC	Schedule 4	NA
<i>Ceropegia stapeliiformis</i> subsp. <i>stapeliiformis</i>	NA	NA	LC	Schedule 4	NA
<i>Chasmanthe aethiopica</i>	NA	NA	LC	Schedule 4	NA
<i>Chasmanthe aethiopica</i>	NA	NA	LC	NA	NA
<i>Chenopodium carinatum</i>	NA	NA	NE	NA	NA
<i>Chenopodium glaucum</i>	NA	NA	NE	NA	NA
<i>Chenopodium murale</i> var. <i>murale</i>	NA	NA	NE	NA	NA
<i>Chenopodium pumilio</i>	NA	NA	NE	NA	NA
<i>Chenopodium schraderianum</i>	NA	NA	NE	NA	NA
<i>Cirsium vulgare</i>	NA	NA	NE	NA	NA
<i>Clivia nobilis</i>	NA	NA	VU	Schedule 4	NA
<i>Conyza bonariensis</i>	NA	NA	NE	NA	NA
<i>Coronopus didymus</i>	NA	NA	NE	NA	NA
<i>Corpuscularia taylori</i>	NA	NA	LC	Schedule 4	NA
<i>Corpuscularia taylori</i>	NA	NA	LC	NA	NA
<i>Cotyledon adscendens</i>	NA	NA	EN	NA	NA
<i>Crassula perfoliata</i> var. <i>coccinea</i>	NA	NA	LC	Schedule 4	NA
<i>Crassula perfoliata</i> var. <i>minor</i>	NA	NA	LC	Schedule 4	NA
<i>Crassula rupestris</i> subsp. <i>commutata</i>	NA	NA	Rare	NA	NA
<i>Crassula vaillantii</i>	NA	NA	NE	NA	NA
<i>Crinum campanulatum</i>	VU	NA	NT	Schedule 4	NA
<i>Crinum macowanii</i>	NA	NA	Declining	Schedule 4	NA
<i>Crinum macowanii</i> subsp. <i>confusum</i>	NA	NA	Declining	Schedule 4	NA
<i>Curtisia dentata</i>	NA	NA	NT	NA	NA
<i>Cuscuta campestris</i>	NA	NA	NE	NA	NA
<i>Cyathea capensis</i> var. <i>capensis</i>	NA	II	NA	NA	Protected Tree List

Volume 1: Environmental Scoping Report

<i>Cymbopogon pospischilii</i>	NA	NA	NE	NA	NA
<i>Cynanchum ellipticum</i>	NA	NA	LC	Schedule 4	NA
<i>Cyrtanthus clavatus</i>	NA	NA	DDT	Schedule 4	NA
<i>Cyrtanthus obliquus</i>	NA	NA	Declining	Schedule 4	NA
<i>Cyrtanthus parviflorus</i>	NA	NA	NA	Schedule 4	NA
<i>Cyrtanthus smithiae</i>	NA	NA	LC	Schedule 4	NA
<i>Cyrtanthus sp.</i>	NA	NA	NA	Schedule 4	NA
<i>Cyrtorchis arcuata</i> subsp. <i>arcuata</i>	NA	II	LC	NA	NA
<i>Cyrtorchis arcuata</i> subsp. <i>arcuata</i>	NA	II	LC	NA	NA
<i>Datura stramonium</i>	NA	NA	NE	NA	NA
<i>Delosperma affine</i>	NA	NA	LC	Schedule 4	NA
<i>Delosperma affine</i>	NA	NA	LC	NA	NA
<i>Delosperma cooperi</i>	NA	NA	LC	Schedule 4	NA
<i>Delosperma cooperi</i>	NA	NA	LC	NA	NA
<i>Delosperma ecklonis</i>	NA	NA	LC	Schedule 4	NA
<i>Delosperma ecklonis</i>	NA	NA	LC	NA	NA
<i>Delosperma frutescens</i>	NA	NA	LC	Schedule 4	NA
<i>Delosperma frutescens</i>	NA	NA	LC	NA	NA
<i>Delosperma hollandii</i>	NA	NA	LC	Schedule 4	NA
<i>Delosperma hollandii</i>	NA	NA	LC	NA	NA
<i>Delosperma multiflorum</i>	NA	NA	LC	Schedule 4	NA
<i>Delosperma multiflorum</i>	NA	NA	LC	NA	NA
<i>Delosperma sp.</i>	NA	NA	NA	Schedule 4	NA
<i>Diascia cuneata</i>	NA	NA	LC	Schedule 4	NA
<i>Diascia sp.</i>	NA	NA	NA	Schedule 4	NA
<i>Dicrothamnus rhinocerotis</i>	NA	NA	NE	NA	NA
<i>Dietes iridioides</i>	NA	NA	LC	Schedule 4	NA
<i>Dietes iridioides</i>	NA	NA	LC	NA	NA
<i>Digitaria sanguinalis</i>	NA	NA	NE	NA	NA
<i>Dioscorea elephantipes</i>	NA	NA	Declining	NA	NA
<i>Dioscorea sylvatica</i> var. <i>sylvatica</i>	NA	NA	NE	NA	NA
<i>Disa bracteata</i>	NA	II	LC	NA	NA
<i>Disa bracteata</i>	NA	II	LC	NA	NA
<i>Disa brevicornis</i>	NA	II	LC	NA	NA
<i>Disa brevicornis</i>	NA	II	LC	NA	NA
<i>Disa caulescens</i>	NA	II	LC	NA	NA
<i>Disa caulescens</i>	NA	II	LC	NA	NA
<i>Disa lugens</i> var. <i>lugens</i>	NA	II	EN	NA	NA
<i>Disa lugens</i> var. <i>lugens</i>	NA	II	EN	NA	NA
<i>Disa patula</i> var. <i>patula</i>	NA	II	LC	NA	NA
<i>Disa patula</i> var. <i>patula</i>	NA	II	LC	NA	NA

Volume 1: Environmental Scoping Report

<i>Disa polygonoides</i>	NA	II	LC	NA	NA
<i>Disa polygonoides</i>	NA	II	LC	NA	NA
<i>Disa porrecta</i>	NA	II	LC	NA	NA
<i>Disa porrecta</i>	NA	II	LC	NA	NA
<i>Disa racemosa</i>	NA	II	LC	NA	NA
<i>Disa racemosa</i>	NA	II	LC	NA	NA
<i>Disa sagittalis</i>	NA	II	LC	NA	NA
<i>Disa sagittalis</i>	NA	II	LC	NA	NA
<i>Disperis capensis</i> var. <i>capensis</i>	NA	II	LC	NA	NA
<i>Disperis capensis</i> var. <i>capensis</i>	NA	II	LC	NA	NA
<i>Disperis lindleyana</i>	NA	II	LC	NA	NA
<i>Disperis lindleyana</i>	NA	II	LC	NA	NA
<i>Drimia altissima</i>	NA	NA	Declining	NA	NA
<i>Drosanthemum fourcadei</i>	NA	NA	LC	Schedule 4	NA
<i>Drosanthemum fourcadei</i>	NA	NA	LC	NA	NA
<i>Drosanthemum hispidum</i>	NA	NA	LC	Schedule 4	NA
<i>Drosanthemum hispidum</i>	NA	NA	LC	NA	NA
<i>Drosanthemum lique</i>	NA	NA	LC	Schedule 4	NA
<i>Drosanthemum lique</i>	NA	NA	LC	NA	NA
<i>Drosanthemum</i> sp.	NA	NA	NA	Schedule 4	NA
<i>Einadia nutans</i> subsp. <i>nutans</i>	NA	NA	NE	NA	NA
<i>Elaeodendron croceum</i>	NA	NA	Declining	NA	NA
<i>Encephalartos caffer</i>	NT	II	NT	Schedule 3	NA
<i>Encephalartos latifrons</i>	CR	II	CR	Schedule 3	NA
<i>Encephalartos longifolius</i>	NT	II	NT	Schedule 3	NA
<i>Encephalartos trispinosus</i>	VU	II	VU	Schedule 3	NA
<i>Erica caffra</i> var. <i>auricularis</i>	NA	NA	NA	Schedule 4	NA
<i>Erica caffra</i> var. <i>caffra</i>	NA	NA	LC	Schedule 4	NA
<i>Erica cerinthoides</i> var. <i>barbertona</i>	NA	NA	LC	Schedule 4	NA
<i>Erica cerinthoides</i> var. <i>cerinthoides</i>	NA	NA	LC	Schedule 4	NA
<i>Erica chamissonis</i> var. <i>chamissonis</i>	NA	NA	LC	Schedule 4	NA
<i>Erica chamissonis</i> var. <i>polyantha</i>	NA	NA	LC	Schedule 4	NA
<i>Erica curviflora</i> var. <i>curviflora</i>	NA	NA	NE	Schedule 4	NA
<i>Erica cyathiformis</i> var. <i>cyathiformis</i>	NA	NA	LC	Schedule 4	NA
<i>Erica demissa</i> var. <i>demissa</i>	NA	NA	LC	Schedule 4	NA
<i>Erica glumiflora</i>	NA	NA	LC	Schedule 4	NA
<i>Erica harveyana</i>	NA	NA	LC	Schedule 4	NA
<i>Erica hispidula</i> var. <i>hispidula</i>	NA	NA	LC	Schedule 4	NA
<i>Erica nemorosa</i>	NA	NA	LC	Schedule 4	NA

Volume 1: Environmental Scoping Report

<i>Erica pectinifolia</i> var. <i>pectinifolia</i>	NA	NA	LC	Schedule 4	NA
<i>Erica scabriuscula</i>	NA	NA	LC	Schedule 4	NA
<i>Erica sparsa</i> var. <i>sparsa</i>	NA	NA	LC	Schedule 4	NA
<i>Erica subdivaricata</i>	NA	NA	LC	Schedule 4	NA
<i>Erica varderi</i>	NA	NA	DDT	Schedule 4	NA
<i>Erodium cicutarium</i>	NA	NA	NE	NA	NA
<i>Erodium moschatum</i>	NA	NA	NE	NA	NA
<i>Eucomis comosa</i> var. <i>comosa</i>	NA	NA	NE	NA	NA
<i>Eugenia zeyheri</i>	DD	NA	LC	NA	NA
<i>Eulophia aculeata</i> subsp. <i>aculeata</i>	NA	II	LC	NA	NA
<i>Eulophia aculeata</i> subsp. <i>aculeata</i>	NA	II	LC	NA	NA
<i>Eulophia ensata</i>	NA	II	LC	NA	NA
<i>Eulophia ensata</i>	NA	II	LC	NA	NA
<i>Eulophia foliosa</i>	NA	II	LC	NA	NA
<i>Eulophia foliosa</i>	NA	II	LC	NA	NA
<i>Eulophia hians</i> var. <i>hians</i>	NA	II	LC	NA	NA
<i>Eulophia hians</i> var. <i>hians</i>	NA	II	LC	NA	NA
<i>Eulophia macowanii</i>	NA	II	LC	NA	NA
<i>Eulophia macowanii</i>	NA	II	LC	NA	NA
<i>Eulophia parviflora</i>	NA	II	LC	NA	NA
<i>Eulophia parviflora</i>	NA	II	LC	NA	NA
<i>Eulophia streptopetala</i>	NA	II	LC	NA	NA
<i>Eulophia streptopetala</i>	NA	II	LC	NA	NA
<i>Eulophia tuberculata</i>	NA	II	LC	NA	NA
<i>Eulophia tuberculata</i>	NA	II	LC	NA	NA
<i>Eulophia zeyheri</i>	NA	II	LC	NA	NA
<i>Eulophia zeyheri</i>	NA	II	LC	NA	NA
<i>Euphorbia bubalina</i>	NA	II	LC	NA	NA
<i>Euphorbia bupleurifolia</i>	NA	II	Declining	Schedule 4	NA
<i>Euphorbia caerulescens</i>	NA	II	LC	NA	NA
<i>Euphorbia esculenta</i>	NA	II	LC	NA	NA
<i>Euphorbia fimbriata</i>	NA	II	LC	NA	NA
<i>Euphorbia flanagani</i>	NA	II	LC	NA	NA
<i>Euphorbia grandialata</i>	NA	II	Rare	NA	NA
<i>Euphorbia inconstantia</i>	NA	II	LC	NA	NA
<i>Euphorbia inermis</i> var. <i>inermis</i>	NA	II	LC	NA	NA
<i>Euphorbia mauritanica</i> var. <i>corallothamnus</i>	NA	II	NA	NA	NA
<i>Euphorbia mauritanica</i> var. <i>mauritanica</i>	NA	II	LC	NA	NA
<i>Euphorbia meloformis</i> subsp. <i>meloformis</i> forma <i>falsa</i>	NA	II	NE	Schedule 4	NA
<i>Euphorbia micracantha</i>	NA	II	LC	NA	NA
<i>Euphorbia obesa</i> subsp. <i>Obesa</i>	NA	II	EN	Schedule 4	NA
<i>Euphorbia ornithopus</i>	NA	II	LC	NA	NA
<i>Euphorbia pentagona</i>	NA	II	LC	NA	NA

Volume 1: Environmental Scoping Report

Euphorbia polygona	NA	II	LC	NA	NA
Euphorbia pugniformis	NA	II	LC	NA	NA
Euphorbia rectirama	NA	II	LC	NA	NA
Euphorbia rhombifolia	NA	II	LC	NA	NA
Euphorbia serrata	NA	NA	NE	NA	NA
Euphorbia silenifolia	NA	II	LC	NA	NA
Euphorbia stellata	NA	II	LC	NA	NA
Euphorbia tetragona	NA	II	LC	NA	NA
Euphorbia triangularis	NA	II	LC	NA	NA
Fallopia convolvulus	NA	NA	NE	NA	NA
Faucaria felina	NA	NA	LC	Schedule 4	NA
Faucaria felina	NA	NA	LC	NA	NA
Ficinia sp.	NA	NA	Rare	NA	NA
Fockea capensis	NA	NA	LC	Schedule 4	NA
Freesia corymbosa	NA	NA	LC	Schedule 4	NA
Freesia corymbosa	NA	NA	LC	NA	NA
Galinsoga parviflora	NA	NA	NE	NA	NA
Gladiolus huttonii	NA	NA	VU	Schedule 4	NA
Gladiolus huttonii	NA	NA	VU	NA	NA
Gladiolus mortonius	NA	NA	LC	Schedule 4	NA
Gladiolus mortonius	NA	NA	LC	NA	NA
Gladiolus ochroleucus	NA	NA	LC	Schedule 4	NA
Gladiolus ochroleucus	NA	NA	LC	NA	NA
Gladiolus permeabilis subsp. edulis	NA	NA	LC	Schedule 4	NA
Gladiolus permeabilis subsp. edulis	NA	NA	LC	NA	NA
Gladiolus permeabilis subsp. permeabilis	NA	NA	LC	Schedule 4	NA
Gladiolus permeabilis subsp. permeabilis	NA	NA	LC	NA	NA
Gladiolus sp.	NA	NA	NA	Schedule 4	NA
Gladiolus wilsonii	NA	NA	LC	Schedule 4	NA
Gladiolus wilsonii	NA	NA	LC	NA	NA
Glottiphyllum longum	NA	NA	LC	Schedule 4	NA
Glottiphyllum longum	NA	NA	LC	NA	NA
Glottiphyllum sp.	NA	NA	NA	Schedule 4	NA
Gnaphalium declinatum	NA	NA	NT	NA	NA
Gomphocarpus cancellatus	NA	NA	LC	Schedule 4	NA
Gomphocarpus physocarpus	NA	NA	LC	Schedule 4	NA
Gunnera perpensa	NA	NA	Declining	NA	NA
Habenaria arenaria	NA	II	LC	NA	NA
Habenaria arenaria	NA	II	LC	NA	NA
Habenaria dregeana	NA	II	LC	NA	NA
Habenaria dregeana	NA	II	LC	NA	NA

Volume 1: Environmental Scoping Report

<i>Habenaria falcicornis</i> subsp. <i>falcicornis</i>	NA	II	LC	NA	NA
<i>Habenaria falcicornis</i> subsp. <i>falcicornis</i>	NA	II	LC	NA	NA
<i>Haemanthus albiflos</i>	NA	NA	LC	Schedule 4	NA
<i>Haemanthus coccineus</i>	NA	NA	LC	Schedule 4	NA
<i>Hakea drupacea</i>	NA	NA	NE	NA	NA
<i>Hakea drupacea</i>	NA	NA	NE	NA	NA
<i>Hakea sericea</i>	NA	NA	NE	NA	NA
<i>Hakea sericea</i>	NA	NA	NE	NA	NA
<i>Halleria lucida</i>	NA	NA	LC	Schedule 4	NA
<i>Haworthia altilinea</i>	NA	NA	NE	NA	NA
<i>Haworthia angustifolia</i> var. <i>angustifolia</i>	NA	NA	DDT	NA	NA
<i>Haworthia coarctata</i> var. <i>adelaidensis</i>	NA	NA	DDT	NA	NA
<i>Haworthia cymbiformis</i> var. <i>incurvula</i>	NA	NA	DDT	NA	NA
<i>Helichrysum foetidum</i> var. <i>foetidum</i>	NA	NA	NE	NA	NA
<i>Helichrysum odoratissimum</i> var. <i>odoratissimum</i>	NA	NA	NE	NA	NA
<i>Heliotropium curassavicum</i>	NA	NA	NE	NA	NA
<i>Hesperantha candida</i>	NA	NA	LC	Schedule 4	NA
<i>Hesperantha candida</i>	NA	NA	LC	NA	NA
<i>Hesperantha radiata</i>	NA	NA	LC	Schedule 4	NA
<i>Hesperantha radiata</i>	NA	NA	LC	NA	NA
<i>Holothrix brevipetala</i>	NA	II	LC	NA	NA
<i>Holothrix brevipetala</i>	NA	II	LC	NA	NA
<i>Holothrix burchellii</i>	NA	II	LC	NA	NA
<i>Holothrix burchellii</i>	NA	II	LC	NA	NA
<i>Holothrix cernua</i>	NA	II	LC	NA	NA
<i>Holothrix cernua</i>	NA	II	LC	NA	NA
<i>Holothrix exilis</i>	NA	II	LC	NA	NA
<i>Holothrix exilis</i>	NA	II	LC	NA	NA
<i>Holothrix macowaniana</i>	NA	II	DDD	NA	NA
<i>Holothrix macowaniana</i>	NA	II	DDD	NA	NA
<i>Holothrix parviflora</i>	NA	II	LC	NA	NA
<i>Holothrix parviflora</i>	NA	II	LC	NA	NA
<i>Huernia thuretii</i> var. <i>thuretii</i>	NA	NA	NE	Schedule 4	NA
<i>Hypochoeris glabra</i>	NA	NA	NE	NA	NA
<i>Hypochoeris microcephala</i> var. <i>albiflora</i>	NA	NA	NE	NA	NA
<i>Hypochoeris radicata</i>	NA	NA	NE	NA	NA
<i>Hypoxis hemerocallidea</i>	NA	NA	Declining	NA	NA
<i>Hypoxis villosa</i> var. <i>obliqua</i>	NA	NA	NE	NA	NA
<i>Ilex mitis</i> var. <i>mitis</i>	NA	NA	Declining	NA	NA
<i>Indigofera porrecta</i> var. <i>porrecta</i>	NA	NA	NE	NA	NA
<i>Isoetes wormaldii</i>	CR	NA	CR	NA	NA
<i>Lagurus ovatus</i>	NA	NA	NE	NA	NA
<i>Lampranthus scaber</i>	NA	NA	EN	Schedule 4	NA

Volume 1: Environmental Scoping Report

Lampranthus scaber	NA	NA	EN	NA	NA
Lampranthus sp.	NA	NA	NA	Schedule 4	NA
Lampranthus spectabilis	NA	NA	LC	Schedule 4	NA
Lampranthus spectabilis	NA	NA	LC	NA	NA
Lavatera trimestris	NA	NA	NE	NA	NA
Leucadendron salignum	NA	NA	LC	NA	NA
Leucadendron spissifolium subsp. phillipsii	NA	NA	LC	NA	NA
Leucospermum cordifolium	NA	NA	NT	NA	NA
Leucospermum cordifolium	NA	NA	NT	NA	NA
Leucospermum cuneiforme	NA	NA	LC	NA	NA
Liparis remota	NA	II	LC	NA	NA
Liparis remota	NA	II	LC	NA	NA
Lolium perenne	NA	NA	NE	NA	NA
Lotononis alpina subsp. multiflora	NA	NA	DDT	NA	NA
Loxostylis alata	NA	NA	Declining	NA	NA
Malva parviflora var. parviflora	NA	NA	NE	NA	NA
Mantisalca salmantica	NA	NA	NE	NA	NA
Medicago laciniata var. laciniata	NA	NA	NE	NA	NA
Melia azedarach	NA	NA	NE	NA	NA
Melilotus indicus	NA	NA	NE	NA	NA
Mesembryanthemum aitonis	NA	NA	LC	Schedule 4	NA
Mesembryanthemum aitonis	NA	NA	LC	NA	NA
Mesembryanthemum splendens subsp. splendens	NA	NA	NA	Schedule 4	NA
Mestoklema albanicum	NA	NA	NT	Schedule 4	NA
Mestoklema albanicum	NA	NA	NT	Schedule 4	NA
Mestoklema albanicum	NA	NA	NT	NA	NA
Mestoklema tuberosum	NA	NA	LC	Schedule 4	NA
Mestoklema tuberosum	NA	NA	LC	NA	NA
Metalasia pulcherrima forma pulcherrima	NA	NA	NT	NA	NA
Moraea britteniae	NA	NA	LC	Schedule 4	NA
Moraea britteniae	NA	NA	LC	NA	NA
Moraea elliotii	NA	NA	LC	Schedule 4	NA
Moraea elliotii	NA	NA	LC	NA	NA
Moraea pallida	NA	NA	LC	Schedule 4	NA
Moraea pallida	NA	NA	LC	NA	NA
Moraea polystachya	NA	NA	LC	Schedule 4	NA
Moraea polystachya	NA	NA	LC	NA	NA
Moraea spathulata	NA	NA	LC	Schedule 4	NA
Moraea spathulata	NA	NA	LC	NA	NA
Moraea tricuspida	NA	NA	LC	Schedule 4	NA
Moraea tricuspida	NA	NA	LC	NA	NA

Volume 1: Environmental Scoping Report

<i>Myriophyllum aquaticum</i>	NA	NA	NE	NA	NA
<i>Mystacidium capense</i>	NA	II	LC	NA	NA
<i>Mystacidium capense</i>	NA	II	LC	NA	NA
<i>Nerine filifolia</i>	NA	NA	NA	Schedule 4	NA
<i>Ocotea bullata</i>	NA	NA	EN	NA	Protected Tree Species List
<i>Oenothera biennis</i>	NA	NA	NE	NA	NA
<i>Oenothera grandiflora</i>	NA	NA	NE	NA	NA
<i>Oenothera indecora</i>	NA	NA	NE	NA	NA
<i>Oenothera parodiana</i> subsp. <i>parodiana</i>	NA	NA	NE	NA	NA
<i>Oenothera stricta</i> subsp. <i>stricta</i>	NA	NA	NE	NA	NA
<i>Oldenburgia grandis</i>	LR/nt	NA	LC	NA	NA
<i>Oldenburgia grandis</i>	NA	NA	LC	NA	NA
<i>Opuntia aurantiaca</i>	NA	NA	NE	NA	NA
<i>Opuntia ficus-indica</i>	NA	NA	NE	NA	NA
<i>Opuntia stricta</i>	NA	NA	NE	NA	NA
<i>Orbea verrucosa</i>	NA	NA	LC	Schedule 4	NA
<i>Ornithogalum fimbrimarginatum</i>	NA	NA	NE	NA	NA
<i>Ornithogalum tenuifolium</i> subsp. <i>tenuifolium</i>	NA	NA	NE	NA	NA
<i>Otholobium prodiens</i>	NA	NA	NE	NA	NA
<i>Oxalis corniculata</i>	NA	NA	NE	NA	NA
<i>Pachycarpus grandiflorus</i> subsp. <i>grandiflorus</i>	NA	NA	LC	Schedule 4	NA
<i>Pachypodium bispinosum</i>	NA	II	LC	Schedule 4	NA
<i>Pachypodium succulentum</i>	NA	II	LC	Schedule 4	NA
<i>Paraserianthes lophantha</i> subsp. <i>lophantha</i>	NA	NA	NE	NA	NA
<i>Paspalum dilatatum</i>	NA	NA	NE	NA	NA
<i>Passiflora coerulea</i>	NA	NA	NE	NA	NA
<i>Pelargonium reniforme</i> subsp. <i>reniforme</i>	NA	NA	NE	NA	NA
<i>Pelargonium reniforme</i> subsp. <i>velutinum</i>	NA	NA	NE	NA	NA
<i>Pennisetum clandestinum</i>	NA	NA	NE	NA	NA
<i>Pennisetum setaceum</i>	NA	NA	NE	NA	NA
<i>Phyllobolus splendens</i> subsp. <i>splendens</i>	NA	NA	LC	Schedule 4	NA
<i>Phyllobolus splendens</i> subsp. <i>splendens</i>	NA	NA	LC	NA	NA
<i>Phytolacca dioica</i>	NA	NA	NE	NA	NA
<i>Piранthus geminatus</i> var. <i>foetidus</i>	NA	NA	LC	Schedule 4	NA
<i>Picris echioides</i>	NA	NA	NE	NA	NA
<i>Poa annua</i>	NA	NA	NE	NA	NA
<i>Podalyria velutina</i>	NA	NA	NT	NA	NA
<i>Podocarpus falcatus</i>	NA	NA	LC	NA	Protected Tree Species List
<i>Podocarpus latifolius</i>	LR/lc	NA	LC	NA	Protected Tree Species List
<i>Polygonum aviculare</i>	NA	NA	NE	NA	NA
<i>Polypogon monspeliensis</i>	NA	NA	NE	NA	NA
<i>Polystachya ottoniana</i>	NA	II	LC	NA	NA
<i>Polystachya ottoniana</i>	NA	II	LC	NA	NA

Volume 1: Environmental Scoping Report

<i>Prionium serratum</i>	NA	NA	Declining	NA	NA
<i>Protea aurea</i> subsp. <i>aurea</i>	NA	NA	LC	NA	NA
<i>Protea cynaroides</i>	NA	NA	LC	NA	NA
<i>Protea eximia</i>	NA	NA	LC	NA	NA
<i>Protea foliosa</i>	NA	NA	LC	NA	NA
<i>Protea laurifolia</i>	NA	NA	LC	NA	NA
<i>Protea neriifolia</i>	NA	NA	LC	NA	NA
<i>Protea repens</i>	NA	NA	LC	NA	NA
<i>Psilocaulon articulatum</i>	NA	NA	LC	Schedule 4	NA
<i>Psilocaulon articulatum</i>	NA	NA	LC	NA	NA
<i>Psoralea oreophila</i>	NA	NA	Rare	NA	NA
<i>Psoralea repens</i>	NA	NA	NT	NA	NA
<i>Rapanea melanophloeos</i>	NA	NA	Declining	NA	NA
<i>Raphionacme hirsuta</i>	NA	NA	LC	Schedule 4	NA
<i>Raphionacme zeyheri</i>	NA	NA	LC	Schedule 4	NA
<i>Rhoicissus tridentata</i> subsp. <i>cuneifolia</i>	NA	NA	NE	NA	NA
<i>Rhoicissus tridentata</i> subsp. <i>tridentata</i>	NA	NA	NE	NA	NA
<i>Richardia brasiliensis</i>	NA	NA	NE	NA	NA
<i>Richardia humistrata</i>	NA	NA	NE	NA	NA
<i>Ricinus communis</i> var. <i>communis</i>	NA	NA	NE	NA	NA
<i>Romulea autumnalis</i>	NA	NA	LC	Schedule 4	NA
<i>Romulea autumnalis</i>	NA	NA	LC	NA	NA
<i>Romulea longipes</i>	NA	NA	LC	Schedule 4	NA
<i>Romulea longipes</i>	NA	NA	LC	NA	NA
<i>Rumex brownii</i>	NA	NA	NE	NA	NA
<i>Rumex crispus</i>	NA	NA	NE	NA	NA
<i>Ruschia hamata</i>	NA	NA	LC	Schedule 4	NA
<i>Ruschia hamata</i>	NA	NA	LC	NA	NA
<i>Ruschia lineolata</i>	NA	NA	LC	Schedule 4	NA
<i>Ruschia lineolata</i>	NA	NA	LC	NA	NA
<i>Ruschia parviflora</i>	NA	NA	DDT	Schedule 4	NA
<i>Ruschia parviflora</i>	NA	NA	DDT	NA	NA
<i>Ruschia parvifolia</i>	NA	NA	DDT	Schedule 4	NA
<i>Ruschia</i> sp.	NA	NA	NA	Schedule 4	NA
<i>Ruschia staminodiosa</i>	NA	NA	LC	Schedule 4	NA
<i>Ruschia staminodiosa</i>	NA	NA	LC	NA	NA
<i>Ruschia vulvaria</i>	NA	NA	NA	Schedule 4	NA
<i>Salsola kali</i>	NA	NA	NE	NA	NA
<i>Sarcostemma viminale</i> subsp. <i>viminale</i>	NA	NA	NA	Schedule 4	NA
<i>Satyrium acuminatum</i>	NA	II	LC	NA	NA
<i>Satyrium acuminatum</i>	NA	II	LC	NA	NA
<i>Satyrium ligulatum</i>	NA	II	LC	NA	NA

Volume 1: Environmental Scoping Report

Satyrium ligulatum	NA	II	LC	NA	NA
Satyrium longicauda var. longicauda	NA	II	LC	NA	NA
Satyrium longicauda var. longicauda	NA	II	LC	NA	NA
Satyrium membranaceum	NA	II	LC	NA	NA
Satyrium membranaceum	NA	II	LC	NA	NA
Satyrium parviflorum	NA	II	LC	NA	NA
Satyrium parviflorum	NA	II	LC	NA	NA
Satyrium sphaerocarpum	NA	II	LC	NA	NA
Satyrium sphaerocarpum	NA	II	LC	NA	NA
Schkuhria pinnata	NA	NA	NE	NA	NA
Schoenoplectus tabernaemontani	NA	NA	NE	NA	NA
Schotia latifolia Jacq. x S. afra (L.) Thunb. form A	NA	NA	NE	NA	NA
Searsia albomarginata	NA	NA	CR	NA	NA
Searsia lucida forma lucida	NA	NA	NE	NA	NA
Secamone alpini	NA	NA	LC	Schedule 4	NA
Selago burchellii	NA	NA	VU	NA	NA
Senecio glutinarius	NA	NA	DDT	NA	NA
Senna septemtrionalis	NA	NA	NE	NA	NA
Sesbania punicea	NA	NA	NE	NA	NA
Sideroxylon inerme subsp. inerme	NA	NA	LC	NA	Protected Tree Species List
Silene burchellii var. angustifolia	NA	NA	NE	NA	NA
Silene gallica	NA	NA	NE	NA	NA
Silybum marianum	NA	NA	NE	NA	NA
Sisyranthus imberbis	NA	NA	LC	Schedule 4	NA
Solanum mauritianum	NA	NA	NE	NA	NA
Solanum nigrum	NA	NA	NE	NA	NA
Solanum rigescens	NA	NA	NE	NA	NA
Solanum sisymbriifolium	NA	NA	NE	NA	NA
Sonchus asper subsp. asper	NA	NA	NE	NA	NA
Sonchus oleraceus	NA	NA	NE	NA	NA
Sphalmanthus sp.	NA	NA	NA	Schedule 4	NA
Stapelia grandiflora var. conformis	NA	NA	LC	Schedule 4	NA
Stapelia grandiflora var. grandiflora	NA	NA	LC	Schedule 4	NA
Stapelia hirsuta var. baylissii	NA	NA	LC	Schedule 4	NA
Stellaria media	NA	NA	NE	NA	NA
Streptocarpus meyeri	NA	NA	LC	Schedule 4	NA
Streptocarpus rexii	NA	NA	LC	Schedule 4	NA
Tagetes minuta	NA	NA	NE	NA	NA
Taraxacum officinale	NA	NA	NE	NA	NA
Trichodiadema orientale	NA	NA	DDT	Schedule 4	NA
Tritonia gladiolaris	NA	NA	LC	Schedule 4	NA
Tritonia gladiolaris	NA	NA	LC	NA	NA

Volume 1: Environmental Scoping Report

<i>Tritonia laxifolia</i>	NA	NA	LC	Schedule 4	NA
<i>Tritonia laxifolia</i>	NA	NA	LC	NA	NA
<i>Tritonia lineata</i> var. <i>lineata</i>	NA	NA	NA	Schedule 4	NA
<i>Tritonia strictifolia</i>	NA	NA	LC	Schedule 4	NA
<i>Tritonia strictifolia</i>	NA	NA	LC	NA	NA
<i>Tritoniopsis caffra</i>	NA	NA	LC	Schedule 4	NA
<i>Tritoniopsis caffra</i>	NA	NA	LC	NA	NA
<i>Urtica urens</i>	NA	NA	NE	NA	NA
<i>Verbena aristigera</i>	NA	NA	NE	NA	NA
<i>Verbena bonariensis</i>	NA	NA	NE	NA	NA
<i>Verbesina encelioides</i> var. <i>encelioides</i>	NA	NA	NE	NA	NA
<i>Vicia hirsuta</i>	NA	NA	NE	NA	NA
<i>Vulpia bromoides</i>	NA	NA	NE	NA	NA
<i>Vulpia myuros</i>	NA	NA	NE	NA	NA
<i>Watsonia knysnana</i>	NA	NA	LC	Schedule 4	NA
<i>Watsonia knysnana</i>	NA	NA	LC	NA	NA
<i>Widdringtonia nodiflora</i>	NA	NA	LC	NA	Protected Tree Species List
<i>Xanthium spinosum</i>	NA	NA	NE	NA	NA
<i>Xysmalobium involucreatum</i>	NA	NA	LC	Schedule 4	NA