BOULDERS WIND FARM

Western Cape Province

Final Scoping Report

DEA Ref.: 14/12/16/3/3/2/1057

April 2018

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PROJECT DETAILS

Title	:	Environmental Impact Assessment Process: Final Scoping Report for the Boulders Wind Farm and Associated Infrastructure, Western Cape Province
DEA Ref.	:	14/12/16/3/3/2/1057
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Report Revision	:	Revision 0
Date	:	April 2018

When used as a reference this report should be cited as: Savannah Environmental (2018) Final Scoping Report for the Boulders Wind Farm and Associated Infrastructure, Western Cape Province.

PURPOSE OF THE SCOPING REPORT AND 30-DAY REVIEW PERIOD

Vredenburg Windfarm (Pty) Ltd has appointed Savannah Environmental as the independent environmental consultant to undertake the Environmental Impact Assessment (EIA) for the Boulders Wind Farm, Western Cape. The EIA process is being undertaken in accordance with the requirements of the 2014 EIA Regulations promulgated in terms of the National Environmental Management Act (NEMA; Act No. 107 of 1998).

This final Scoping Report represents the findings of the Scoping Phase of the EIA process and contains the following chapters:

» **Chapter 1** provides background to the proposed project and the environmental impact assessment.
» **Chapter 2** describes the activities associated with the project (project scope) and provides insight of the available technologies.
» **Chapter 3** provides the Regulatory and Planning Context.
» **Chapter 4** outlines the process which was followed during the Scoping Phase of the EIA process, including the consultation programme that was undertaken and input received from interested and affected parties.
» **Chapter 5** describes the existing biophysical and social environment.
» **Chapter 6** provides an identification and evaluation of the potential issues associated with the proposed wind farm and associated infrastructure.
» **Chapter 7** presents the conclusions of the scoping evaluation for the wind farm.
» **Chapter 8** describes the Plan of Study for EIA.
» **Chapter 9** provides references used to compile the Scoping report.

The Scoping Report was made available for review from **01 March 2018 – 03 April 2018** at the following locations:

» Vredenburg Public Library (2 Akademie Street, Vredenburg).
» Paternoster Public Library (Civic Centre Building, St Augustine's Way, Paternoster).
» St Helena Bay Public Library (2 Albertros Street, St Helena Bay).
» www.savannahSA.com

All comments received during the review period of the Scoping report have been recorded, included and addressed as part of this final Scoping report for the consideration of the DEA.

EXECUTIVE SUMMARY

Vredenburg Windfarm (Pty) Ltd is proposing the development a commercial wind farm and associated infrastructure on a site located approximately 14km north of Vredenburg in the Saldanha Bay Local Municipality, under the jurisdiction of the greater West Coast District Municipality in the Western Cape. The proposed project is to be known as the Boulders Wind Farm.

A preferred project site, with an extent of approximately 5084ha has been identified by Vredenburg Windfarm (Pty) Ltd as a technically suitable area for the development of the Boulders Wind Farm with a contracted capacity of up to 140MW that can accommodate up to 45 wind turbines. It is within the identified project site that a development footprint will be designed by the developer through consideration of the sensitive environmental features and buffers identified within this final Scoping report. The project site is the area under assessment in the Environmental Impact Assessment (EIA) process and is located directly adjacent to the existing operational West Coast One Wind Energy Facility, and comprises the following ten farm portions:

- Boebezaks Kraal 2/40
- Boebezaks Kraal 3/40
- Boebezaks Kraal 5/40
- Frans Vlei 2/46
- Schuitjes Klip 3/22
- Schuitjes Klip 1/22
- Davids Fontyn 9/18
- Davids Fontyn 7/18
- Het Schuytje 1/21
- Uitkomst RE/6/23

It is the developer's intention to bid the Boulders Wind Farm under the Department of Energy's (DoE) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme. The power generated from the project will be sold to Eskom and will feed into the national electricity grid. Ultimately, the project is intended to be a part of the renewable energy projects portfolio for South Africa, as contemplated in the Integrated Resource Plan.

The Boulders Wind Farm project site will accommodate the following infrastructure:

- Up to 45 wind turbines with a maximum hub height of up to 120m. The tip height of the turbines will be up to 165m;
- Concrete foundations to support the turbines;
- Cabling between the turbines, to be laid underground where practical;

» An on-site substation of up to 200m x 200m in extent to facilitate the connection between the wind farm and the electricity grid;
» An overhead 132kV power line, with a 32m servitude, to connect the facility to the electricity grid[1] ;
» A transformer station for each wind turbine;
» Access roads to the site and between project components with a width of approximately 6m;
» Laydown areas, crane hardstand pads, administrative buildings and offices.

Potential impacts associated with the development of the Boulders Wind Farm are expected to occur during both the construction and operation phases. The conclusion of the findings of the Scoping Study is that the potential impacts identified to be associated with the construction and operation of the Boulders Wind Farm are anticipated to be at a site or localised level, with few impacts extending from a local to national extent which includes both positive and negative impacts. The following provides a summary of the findings of the specialist studies undertaken:

» *Ecology: T*he extent of the ecological impacts identified during the Scoping Phase is local and the significance of the impacts (at the scoping stage) is considered to be low, subject to the avoidance of the sensitive features located within the project site. The impacts identified include impacts on vegetation due to construction activities, faunal impacts, degradation of the ecosystem and impacts on CBAs and broad-scale ecological processes.

» *Freshwater Features:* The extent of the impacts on the freshwater features located within the project site is local and the significance of the impacts (at the scoping stage) is considered to be low, subject to the avoidance of the sensitive features. The impacts identified include direct disturbance of freshwater habitats, decrease of freshwater habitat integrity, alteration of runoff patterns, altered hydrology of freshwater features and altered stream and base flow patterns.

» *Avifauna:* The extent of the avifaunal impacts identified during the Scoping Phase is local to regional and the significance of the impacts (at the scoping stage) is considered to be low to medium, subject to the avoidance of the identified no-go areas. The impacts include, habitat destruction and disturbance and/or displacement, collision with wind turbine blades and disturbance due to maintenance activities.

» *Bats:* The extent of the bats impacts identified during the Scoping Phase is local to national and the significance of the impacts (at the scoping stage) will be from low to high, subject to the avoidance of the identified no-go areas. The impacts include loss of habitat, construction of new buildings, disturbance during roosting, destruction of roosts and collision with wind turbines and barotrauma.

» *Soils and Agricultural Potential:* The extent of the soils and agricultural potential impacts identified during the Scoping Phase is local and the significance of the impacts (at the scoping stage) will be very low (i.e. negligible), subject to the avoidance of the identified no-go areas. The impacts include

[1] The construction of the 132kV overhead power line will be assessed as part of a separate Basic Assessment process which will consider feasible alternatives for the power line route.

an imact on the current farming activities, increase in wind and soil erosion and impact on the financial situation of the affected properties.

» *Heritage:* Heritage sensitivity relates to archaeological resources, palaeontological resources, heritage resources, and the cultural landscape. From an archaeological perspective the extent of the impacts identified at the Scoping Phase will be local and the significance of the impacts will be low, subject o the avoidance of the sensitive archaeological sites and associated buffer areas. The impacts include disturbance and destruction of the archaeoloigcal sites. From a palaeontological perpsective the extent of the impacts idetnifed at the Scoping Phase will be regional to national and the significance of the impacts will be low in the Grantic Hills Terrains; and the impacts within the Coastal Formations Terrain will be high (the area is not considered a no-go to development and excavations are still acceptable with the implementation of appropriate mitigation measures). The impacts include excavation into fossiliferous deposits.

» *Social:* The extent of the impacts identified at the Scoping Phase is local to national and the significance of the impacts varies from low to high. Both positive and negative impacts were also identified to be associated with the construction and operation phases of the project. The positive impacts include creation of employment and business opportunities, skills development and training, establishment of renewable energy infrastructure, the generation of clean energy, increase in revenue, benefits associated with the Community Trustand improved energy security. The negative impacts include impacts associated with the presence of construction workers, influx of jobseekers, security risks, impact of heavy vehicles, impact on farming activities, visual impacts, impact on property values due to perception and impacts on tourism due to perception.

» *Noise:* The extent of the impacts identified at the Scoping Phase is local (i.e. up to 2km from the development footprint) and the significance of the impacts will be medium to low should the 500m buffer areas be avoided and considered. The impacts include an increase in the noise levels at the closest receptors and noise levels exceeding the SANS 10103 rating level due to construction activities.

» *Visual:* Visual impacts will mainly occur once the wind farm is operational. Due to the nature of a wind farm, the extent of the impact (at the scoping stage) is expected to be local (with the highest probability within 0km to 5km from the development footprint). The significance of the impact can only be identified and confirmed once the layout of the facility development footprint is available. The identified potential impacts include visual impacts due to construction activities, impact on observers travelling along the arterial and secondary roads, visibility of the facility from populated areas (inlcuding homesteads and farmsteads, impact on the visual charater and sense of place, impact due to the ancillary infrastructure, impact due to the lighting of th facility and shadow flicker.

No environmental fatal flaws were identified to be associated with the development of the Boulders Wind Farm on the identified project site at this stage in the process. **Figure 1** provides an environmental sensitivity map of the scoping phase no-go areas. This conclusion must be confirmed through a detailed investigation of the development footprint within the EIA Phase of the process.

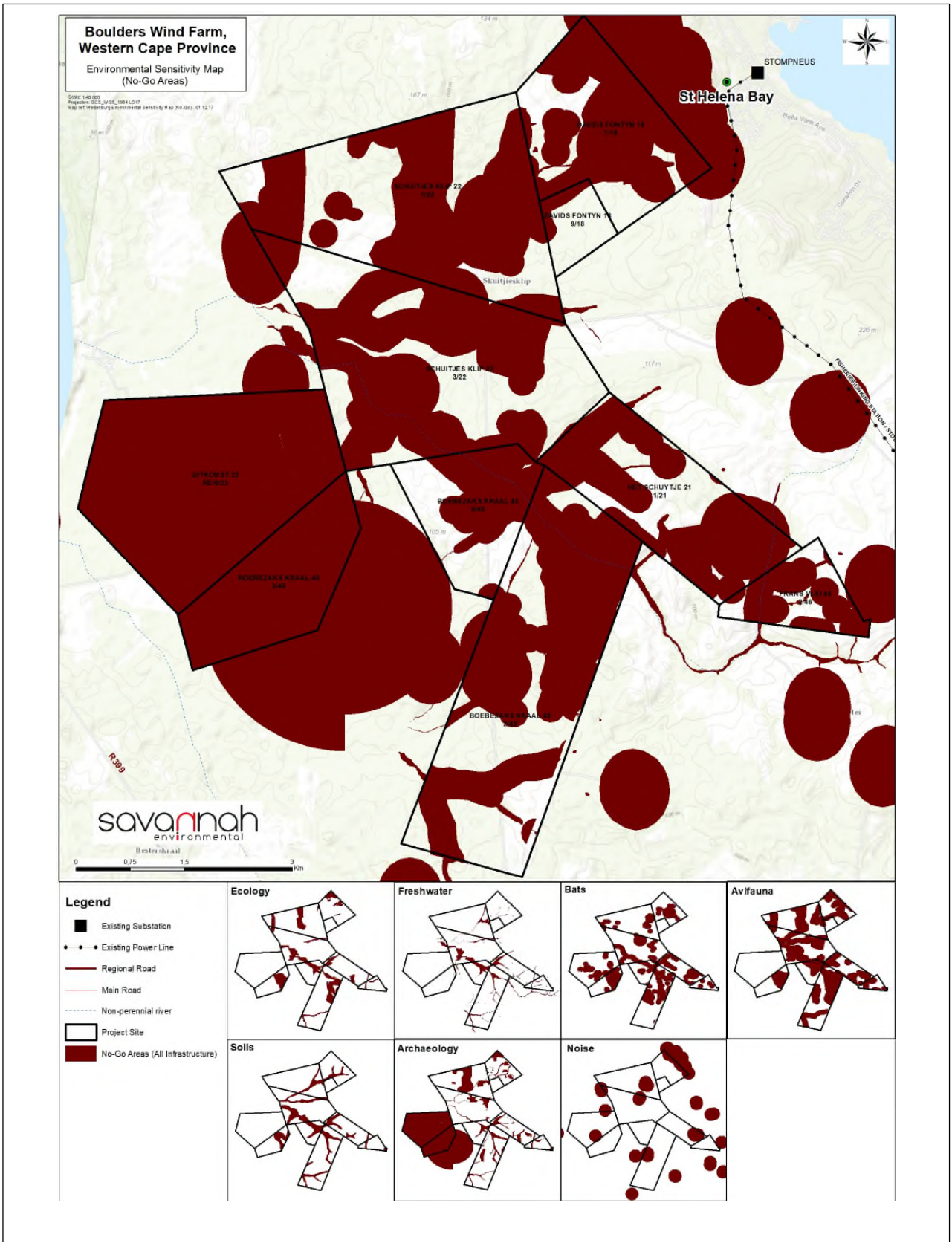

Figure 1: Environmental Sensitivity Map for the proposed Boulders Wind Farm which indicates the no-go areas located within the project site. The contributing sensitivities are detailed in the inset figures (refer to Appendix Q for A3 map)

DEFINITIONS AND TERMINOLOGY

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

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

Commence: The start of any physical activity, including site preparation and any other activity on site furtherance of a listed activity or specified activity, but does not include any activity required for the purposes of an investigation or feasibility study as long as such investigation or feasibility study does not constitute a listed activity or specified activity.

Commercial Operation date: The date after which all testing and commissioning has been completed and is the initiation date to which the seller can start producing electricity for sale (i.e. when the project has been substantially completed).

Commissioning: Commissioning commences once construction is completed. Commissioning covers all activities including testing after all components of the wind turbine are installed.

Construction: Construction means the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity. Construction begins with any activity which requires Environmental Authorisation.

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

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

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

Decommissioning: To take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned. This usually occurs at the end of the life of a facility.

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

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

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

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

Emergency: An undesired/ unplanned event that results in a significant environmental impact and requires the notification of the relevant statutory body, such as a local authority.

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

Environment: the surroundings within which humans exist and that are made up of:
i. The land, water and atmosphere of the earth;
ii. Micro-organisms, plant and animal life;
iii. Any part or combination of (i) and (ii) and the interrelationships among and between them; and
iv. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

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

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

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

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

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

Heritage: That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act of 2000).

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

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

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

Method statement: A written submission to the ECO and the site manager (or engineer) by the EPC Contractor in collaboration with his/her EO.

Mitigation hierarchy: The mitigation hierarchy is a framework for managing risks and potential impacts related to biodiversity and ecosystem services. The mitigation hierarchy is used when planning and implementing development projects, to provide a logical and effective approach to protecting and conserving biodiversity and maintaining important ecosystem services. It is a tool to aid in the sustainable management of living, natural resources, which provides a mechanism for making explicit decisions that balance conservation needs with development priorities

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

No-go areas: Areas of environmental sensitivity that should not be impacted on or utilised during the development of a project as identified in any environmental reports.

Pollution: A change in the environment caused by substances (radio-active or other waves, noise, odours, dust or heat emitted from any activity, including the storage or treatment or waste or substances.

Pre-construction: The period prior to the commencement of construction, this may include activities which do not require Environmental Authorisation (e.g. geotechnical surveys).

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

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

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

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

Tower: The tower, which supports the rotor, is constructed from tubular steel. It is between 80m and 120m tall. The nacelle and the rotor are attached to the top of the tower. The tower on which a wind turbine is mounted is not just a support structure. It also raises the wind turbine so that its blades safely clear the ground and so it can reach the stronger winds at higher elevations. The tower must be strong enough to support the wind turbine and to sustain vibration, wind loading and the overall weather elements for the lifetime of the wind turbine.

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

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

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

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APPENDICES LIST

CHAPTER 1: INTRODUCTION

Vredenburg Windfarm (Pty) Ltd is proposing the development a commercial wind farm and associated infrastructure on a site located approximately 14km north of Vredenburg in the Saldanha Bay Local Municipality, under the jurisdiction of the greater West Coast District Municipality in the Western Cape (refer to **Figure 1.1**). The proposed project is to be known as the Boulders Wind Farm.

A preferred project site[2], with an extent of approximately 5084ha has been identified by Vredenburg Windfarm (Pty) Ltd as a technically suitable area for the development of the Boulders Wind Farm with a contracted capacity of up to 140MW that can accommodate up to 45 wind turbines. It is within the identified project site that a development footprint[3] will be designed by the developer through consideration of the sensitive environmental features and buffers identified within this final Scoping report. The project site is the area under assessment in the Environmental Impact Assessment (EIA) process and is located directly adjacent to the existing operational West Coast One Wind Energy Facility, and comprises the following ten farm portions (refer to **Figure 1.1**):

- Boebezaks Kraal 2/40
- Boebezaks Kraal 3/40
- Boebezaks Kraal 5/40
- Frans Vlei 2/46
- Schuitjes Klip 3/22
- Schuitjes Klip 1/22[4]
- Davids Fontyn 9/18
- Davids Fontyn 7/18
- Het Schuytje 1/21
- Uitkomst RE/6/23

Local level issues associated with the siting of the planned wind farm are being considered within site-specific studies and assessments through the EIA process in order to delineate areas of potential sensitivity within the project site. The nature and extent of the Boulders Wind Farm, as well as potential environmental impacts associated with the construction, operation and decommissioning phases are explored in more detail in this final Scoping Report. Once constraining factors have been determined, the layout of the wind turbines and infrastructure can be planned to minimise social and environmental impacts.

[2] The project site is the area, inclusive of 10 farm portions, with an extent of 5084ha, within which the Boulders Wind Farm development footprint will be located.

[3] The development footprint of the Boulders Wind Farm will be located within the 5084ha project site and will be a much smaller area within which the wind turbines and associated infrastructure will be constructed and operated in. The development footprint will be subject to detailed design by the developer through the consideration of sensitive environmental features which need to be avoided by the wind farm.

[4] During the Scoping report review period comment was received from Montero Mining and Exploration via a letter dated 02 April 2018 (**Appendix C8(a)**). The I&AP brought to light that there is a prospecting right (WC30/5/1//12//10090 PR) on the farm Schuitjes Klip 1/22. Montero intends to apply for a Mining Right over the property and establish the Duyker Eiland Phosphate Project, however no mining right has been granted to date.

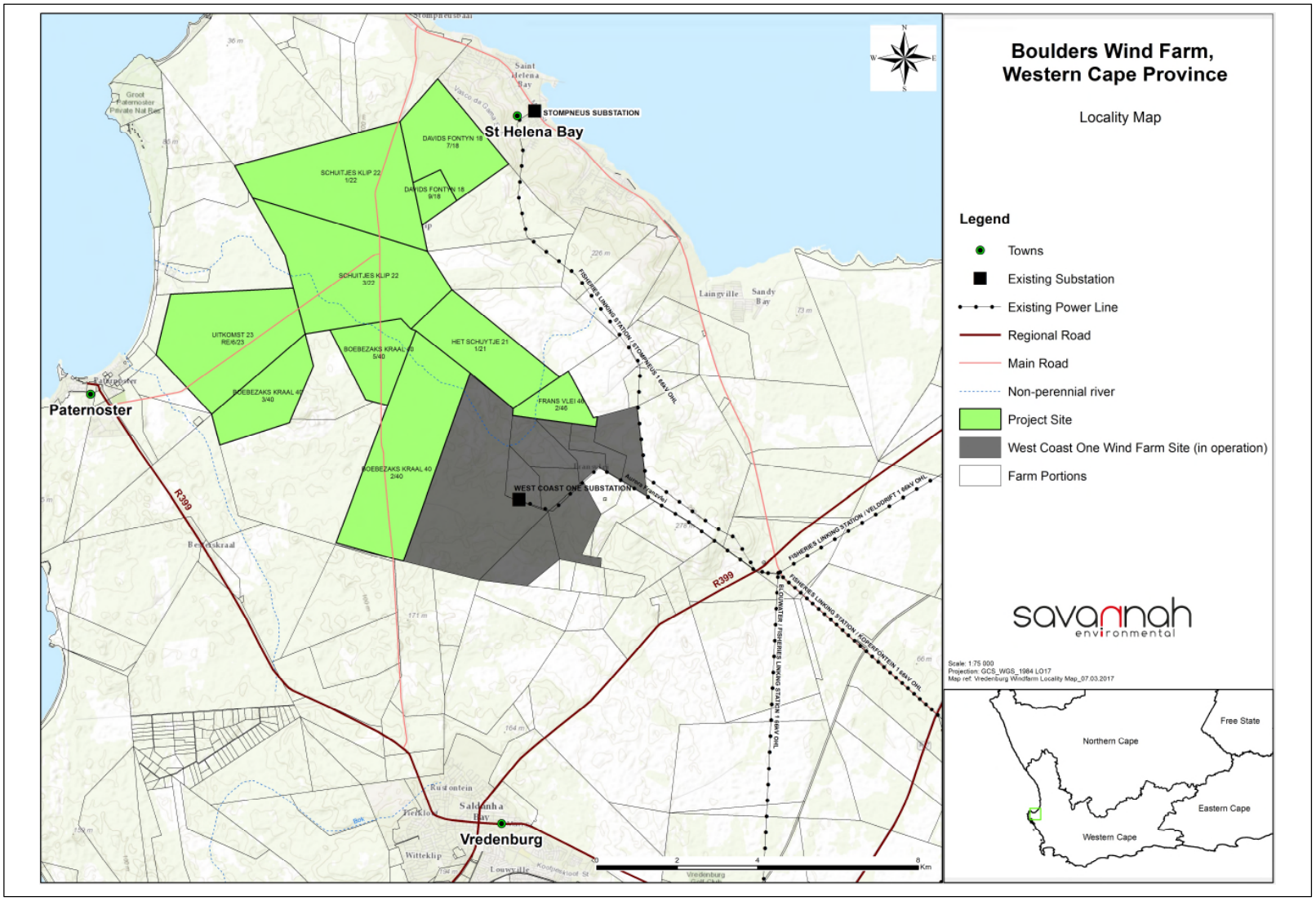


Figure 1.1: Locality map of the project site within which the Boulders Wind Farm is proposed to be developed (refer to **Appendix Q**)

This final Scoping Report consists of nine chapters, which include:

- **Chapter 1** provides background to the proposed project and the environmental impact assessment.
- **Chapter 2** describes the activities associated with the project (project scope) and provides insight of the available technologies.
- **Chapter 3** provides the Regulatory and Planning Context.
- **Chapter 4** outlines the process which was followed during the Scoping Phase of the EIA process, including the consultation programme that was undertaken and input received from interested and affected parties.
- **Chapter 5** describes the existing biophysical and socio-economic environment.
- **Chapter 6** provides an identification and evaluation of the potential issues associated with the proposed wind farm and associated infrastructure.
- **Chapter 7** presents the conclusions of the scoping evaluation for the wind farm.
- **Chapter 8** describes the Plan of Study for EIA.
- **Chapter 9** provides references used to compile the final Scoping report.

It is the developer's intention to bid the Boulders Wind Farm under the Department of Energy's (DoE) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme. The power generated from the project will be sold to Eskom and will feed into the national electricity grid. Ultimately, the project is intended to be a part of the renewable energy projects portfolio for South Africa, as contemplated in the Integrated Resource Plan.

1.1. Legal Requirements as per the EIA Regulations, 2014 (as amended)

This final Scoping report has been prepared in accordance with the requirements of the EIA Regulations published on 08 December 2014 (and amended on 07 April 2017) promulgated in terms of Chapter 5 of the National Environmental Management Act (Act No 107 of 1998). This chapter of the final Scoping report includes the following information required in terms of Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(a)(i) the details of the EAP who prepared the report and (ii) the expertise of the EAP to carry out scoping procedures; including a curriculum vitae	The details of the EAP has been who prepared the report is included in section 1.4. The Curriculum vitae of the Savannah Environmental team and the relevant specialists have been included as **Appendix A**.
(b) the location of the activity, including (i) the 21 digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name and (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties	The location of the proposed Boulders Wind Farm has been included under section 1.2 and within **Table 1.1**.
(c) a plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken	A locality map illustrating the location of the Boulders Wind Farm has been included as **Figure 1.1**.

1.2. Project Overview

The project site identified for the Boulders Wind Farm is located approximately 7km east of Paternoster, 7km south-west of St Helena Bay and 14km north of Vredenburg (measured from the centre of the project site) within an area which has been historically used for dryland agricultural activities (including small-grain, cattle and sheep farming) (refer to **Table 1.1**). The project site is also located directly adjacent to the existing operational West Coast One Wind Energy Facility. The Boulders Wind Farm project site will accommodate the following infrastructure, which will enable the wind farm to supply a contracted capacity of up to 140MW:

- Up to 45 wind turbines with a maximum hub height of up to 120m. The tip height of the turbines will be up to 165m;
- Concrete foundations to support the turbines;
- Cabling between the turbines, to be laid underground where practical;
- An on-site substation of up to 200m x 200m in extent to facilitate the connection between the wind farm and the electricity grid;
- An overhead 132kV power line, with a 32m servitude, to connect the facility to the electricity grid[5] ;
- A transformer station for each wind turbine;
- Access roads to the site and between project components with a width of approximately 6m;
- Laydown areas, crane hardstand pads, administrative buildings and offices.

Turbines use kinetic energy from the wind to generate electricity. In essence, the blades of the turbine are turned by the wind and the energy captured is converted into electrical energy and supplied to the electricity grid for use in homes and elsewhere. The wind farm is to be constructed within a project site of approximately 5084ha, and together with the associated infrastructure listed above will constitute a development footprint of approximately 55ha, which is less than 1% of the total site. This will be confirmed in the project layout in the EIA phase. The facility is proposed to have a contracted capacity of up to 140MW, depending on the final turbine type selected and the facility layout authorised. The optimal position for each turbine will be defined in order to optimise the energy generating potential of the wind resource, taking into consideration any environmental sensitivities identified through the EIA process. A more detailed description of the final development footprint (i.e. facility layout) will be provided during the EIA Phase of the project.

Table 1.1: Details of the project site location of the proposed Boulders Wind Farm

Province	Western Cape Province
District Municipality	West Coast District Municipality
Local Municipality	Saldanha Bay Local Municipality
Ward number(s)	Ward 11
Nearest town(s)	Paternoster (7km west) St Helena Bay (7km north-east) Vredenburg (14km south)

[5] The construction of the 132kV overhead power line will be assessed as part of a separate Basic Assessment process which will consider feasible alternatives for the power line route. A 200m corridor will be assessed for the power line.

Farm name(s), Portion number(s) and SG 21 Digit Code (s)	Boebezaks Kraal 2/40 - C04600000000004000002
	Boebezaks Kraal 3/40 - C04600000000004000003
	Boebezaks Kraal 5/40 - C04600000000004000005
	Frans Vlei 2/46 - C04600000000004600002
	Schuitjes Klip 3/22 - C04600000000002200003
	Schuitjes Klip 1/22 - C04600000000002200001
	Davids Fontyn 9/18 - C04600000000001800009
	Davids Fontyn 7/18 - C04600000000001800007
	Het Schuytje 1/21 - C04600000000002100001
	Uitkomst RE/6/23 - C04600000000002300006
Current zoning	Agricultural

This EIA application pertains to the Boulders Wind Farm. A separate Basic Assessment (BAR) application will be lodged with the Department of Environmental Affairs for the grid connection infrastructure required to connect the Boulders Wind Farm to the Eskom Distribution network.

1.3. Requirement for an Environmental Impact Assessment Process

The construction and operation of the proposed Boulders Wind Farm is subject to the requirements of the EIA Regulations published in terms of Section 24(5) of the National Environmental Management Act (NEMA) 107 of 1998. This section provides a brief overview of the EIA Regulations, 2014 (as amended in April 2017) and their application to this project.

NEMA is the national legislation that provides for the authorisation of 'listed activities'. In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these activities must be considered, investigated, assessed and reported on to the competent authority that has been charged by NEMA with the responsibility of granting environmental authorisations. As this is a proposed electricity generation project and thereby considered to be of national importance, the National Department of Environmental Affairs (DEA) is the competent authority[6] and the Western Cape Department of Environmental and Development Planning (DEA&DP) will act as a commenting authority.

The need to comply with the requirements of the EIA Regulations, 2014, ensures that the competent authority is provided with the opportunity to consider the potential environmental impacts of a project early in the project development process and to assess if potential environmental impacts can be avoided, minimised or mitigated to acceptable levels. Comprehensive, independent environmental studies are required in accordance with the EIA Regulations, 2014, to provide the competent authority with sufficient information in order to make an informed decision.

[6] In terms of Government Notice 779 of 01 July 2016, the Minister of Environmental Affairs is the competent authority for all activities which relate to the Integrated Resource Plan (IRP) 2010-2030 and any updates thereto.

An EIA is an effective planning and decision-making tool for the project developer as it allows for the identification and management of potential environmental impacts. It provides the opportunity for the developer to be forewarned of potential environmental issues, and allows for the resolution of the issues reported on in the Scoping and EIA reports as well as dialogue with interested and affected parties (I&APs).

The EIA process comprises two phases (i.e. Scoping and Impact Assessment) and involves the identification and assessment of environmental impacts though the undertaking of independent specialist studies, as well as public participation. The process followed in these two phases is as follows:

» The **Scoping Phase** includes the identification of potential issues associated with the project through a desktop study (considering existing information) and consultation with affected parties and key stakeholders. This phase considers the broader project site in order to identify and delineate any environmental fatal flaws, no-go or sensitive areas. Following a public review period of the Scoping report, this phase culminates in the submission of a final Scoping report and Plan of Study for the EIA to the competent authority for consideration and acceptance.
» The **EIA Phase** involves a detailed assessment of the potentially significant positive and negative impacts (direct, indirect, and cumulative) identified in the Scoping Phase. This phase considers a proposed development footprint within the project site, and includes detailed specialist investigations as well as public consultation. Following a public review period of the EIA report, this phase culminates in the submission of a final EIA report and an Environmental Management Programme (EMPr), including recommendations of practical and achievable mitigation and management measures, to the competent authority for final review and decision-making.

1.4. Details of Environmental Assessment Practitioner

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

Savannah Environmental is a specialist environmental consulting company providing a holistic environmental management service, including environmental assessment and planning to ensure compliance and evaluate the risk of development; and the development and implementation of environmental management tools. Savannah Environmental benefits from the pooled resources, diverse skills and experience in the environmental field held by its team.

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

» *Lisa Opperman*, the principle author of this report. She holds a Bachelor degree with Honours in Environmental Management and has two (2) years of experience in the environmental field. Her key focus is on environmental impact assessments, public participation, environmental management plans

and programmes, as well as mapping using ArcGIS for a variety of environmental projects. She is currently involved in several EIAs for renewable energy projects across the country.

» *Gabriele Stein,* the public participation consultant for this project. She has ten (10) years of consulting experience in public participation and social research. Her experience includes the design and implementation of public participation programmes and stakeholder management strategies for numerous integrated development planning and infrastructure projects. Her work focuses on managing the public participation component of Environmental Impact Assessments and Basic Assessments undertaken by Savannah Environmental.

» *Karen Jodas*, is a registered Professional Natural Scientist and holds a Master of Science degree. She has 20 years of experience consulting in the environmental field and is the EAP for the project. Her key focus is on strategic environmental assessment and advice; management and co-ordination of environmental projects, which includes integration of environmental studies and environmental processes into larger engineering-based projects and ensuring compliance to legislation and guidelines; compliance reporting; the identification of environmental management solutions and mitigation/risk minimising measures; and strategy and guideline development.

In order to adequately identify and assess potential environmental impacts associated with the proposed Boulders Wind Farm, the following specialist sub-consultants have provided input into this scoping report:

Specialist	Area of Expertise
Simon Todd of Simon Todd Consulting	Ecology
Craig Campbell of Bioinsight South Africa	Avifauna
Stacey Jordaan of Gaia Environmental Services	Bats
Stephen van Staden of Scientific Aquatic Services	Freshwater systems
Johann Laubscher and Freddie Ellis of Stellenbosch University	Soils and Agricultural Potential
Morné de Jager of Enviro-Acoustic Research	Noise
Lourens du Plessis of LoGIS	Visual
Tony Barbour of Tony Barbour Environmental Consulting and Research	Social
Tim Hart and Kathryn Smuts of ACO Associates	Cultural Heritage and Archaeology
John Pether	Palaeontology
Shawn Johnston	Facilitation of public consultation meetings

Appendix A includes the curricula vitae for the environmental assessment practitioners from Savannah Environmental and the specialist consultants.

CHAPTER 2: DESCRIPTION OF THE PROPOSED PROJECT

This chapter provides an overview of the Boulders Wind Farm and details the project scope which includes the planning/design, construction, operation and decommissioning activities. This chapter also explores site and technology alternatives as well as the 'do nothing' option. Lastly, it explores the use of wind energy as a means of power generation.

2.1 Legal Requirements as per the EIA Regulations, 2014 (as amended)

This chapter of the final scoping report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(f) a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location	The need and desirability of the Boulders Wind Farm within the proposed project site has been included in section 2.4.
(h)(i) details of all the alternatives considered	The details of the alternatives considered as part of the Boulders Wind Farm and as part of the Scoping Phase have been included in section 2.5.
(h)(ix) the outcome of the site selection matrix	Refer to section 2.4.2 for a description of the selection of the proposed project site.
(h)(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such	The details of the alternatives considered as part of the Boulders Wind Farm and as part of the Scoping Phase have been included in section 2.5.

2.2 Nature and extent of the Boulders Wind Farm

In responding to the growing electricity demand within South Africa, the need to promote renewable energy and sustainability within the Western Cape Province, as well as the country's targets for renewable energy, Vredenburg Windfarm (Pty) Ltd is proposing the development of a commercial wind energy facility and associated infrastructure on a site located north of Vredenburg to add new capacity to the national electricity grid. The Boulders Wind Farm will be developed in a single phase, and will comprise up to 45 turbines with a contracted capacity of up to 140MW. The optimum turbine for use at the site is yet to be determined, and it is considered that each turbine could have a generating capacity of up to 3.15MW[7], with a hub height of up to 120m. The final turbine capacity and model will be dependent on what is deemed suitable for the site in relation to, among other things, further studies of the wind regime, terrain, and potential environmental constraints.

[7] The 3.15MW capacity of the individual turbines is a predicted maximum per turbine and the final decision regarding the final turbine capacity will be based on the facility layout and technical and environmental considerations.

2.2.1. Project Site and Development Footprint

The project site is located within the Saldanha Bay Local Municipality and the West Coast District Municipality and includes the following 10 properties[8]:

- Boebezaks Kraal 2/40
- Boebezaks Kraal 3/40
- Boebezaks Kraal 5/40
- Frans Vlei 2/46
- Schuitjes Klip 3/22
- Schuitjes Klip 1/22[9]
- Davids Fontyn 9/18
- Davids Fontyn 7/18
- Het Schuytje 1/21
- Uitkomst RE/6/23

The project site identified for the Boulders Wind Farm is located approximately 7km east of Paternoster, 7km south-west of St Helena Bay and 14km north of Vredenburg (measured from the centre of the project site).

The wind farm is to be constructed within the project site, comprising an area of approximately 5084ha, and together with the associated infrastructure listed the project will have a development footprint[10] of less than 1% of the total project site.

Access to the project site is ample with the presence of an existing secondary gravel road traversing the length of project site. Along with the existing secondary gravel road, existing public and private farm roads are also present. The secondary gravel road located within the project site is the Stompneus Bay Secondary Road which traverses the project site in a north-south direction and a north-western direction (there are two legs of the secondary gravel road which meet in the centre of the project site) and provides access from Vredenburg to the project site and to Britannia Bay, as well as access from Paternoster to the project site. The Regional road (R399) is the main road providing access to the general area within which the project site is located and is also the road from which the Stompneus Bay Secondary Gravel Road stems.

Once environmentally constraining factors have been determined through the EIA process, and long-term site-specific wind data is available from the wind monitoring conducted on site, the layout of the wind

[8] The ten affected properties included as part of the Boulders Wind Farm are collectively known as the project site.

[9] During the Scoping report review period comment was received from Montero Mining and Exploration via a letter dated 02 April 2018 (**Appendix C8(a)**). The I&AP brought to light that there is a prospecting right (WC30/5/1//12//10090 PR) on the farm Schuitjes Klip 1/22. Montero intends to apply for a Mining Right over the property and establish the Duyker Eiland Phosphate Project, however no mining right has been granted to date.

[10] The development footprint of the Boulders Wind Farm will be located within the 5084ha project site and will be a much smaller area within which the wind turbines and associated infrastructure will be constructed and operated in. The development footprint will be subject to detailed design by the developer through the consideration of sensitive environmental features which need to be avoided by the wind farm.

turbines and associated infrastructure can be appropriately determined. The optimal position for each turbine will be determined using specialist software and the turbines will be appropriately spaced to optimise the energy generating potential of the wind resource, taking into consideration any environmental sensitivity which might be identified through the EIA process. A more accurate understanding of the final development footprint will be determined during the EIA Phase with the availability of a facility layout plan.

2.2.2. Components of the Boulders Wind Farm

The project site is proposed to accommodate both the wind turbines as well as the associated infrastructure which is required for such a facility including, but not limited to:

» Up to 45 wind turbines with a maximum hub height of up to 120m. The tip height of the turbines will be up to 165m;
» Concrete foundations to support the turbines;
» Cabling between the turbines, to be laid underground where practical;
» An on-site substation of up to 200m x 200m in extent to facilitate the connection between the wind farm and the electricity grid;
» An overhead 132kV power line, with a 32m servitude, to connect the facility to the electricity grid[11];
» A transformer station for each wind turbine;
» Access roads to the site and between project components with a width of approximately 6m;
» Laydown areas, crane hardstand pads, administrative buildings and offices.

A summary of the details and dimensions of the planned infrastructure associated with the project is provided in **Table 2.1.**

Table 2.1: Details or dimensions of typical infrastructure required for the 140MW Boulders Wind Farm project

Infrastructure	Footprint and dimensions
Number of turbines	Up to 45 turbines
Hub Height	Up to 120m
Tip Height	Up to 165m
Contracted Capacity	Up to 140MW (individual turbines up to 3.15MW in capacity each)
Tower Type	Steel or concrete towers can be utilised at the site. Alternatively, the towers can be of a hybrid nature, comprising concrete towers with top steel sections.
Area occupied by the on-site facility substation	~ 200m x 200m, as standard requirement for similar infrastructure.
Capacity of on-site facility substation	33kV/132kV
Area occupied by laydown areas	Up to four laydown areas each with a size of 100m x 50m. The total area for laydown areas will be approximately 20 000m^2 (i.e. 2 ha).
Access and internal roads	Existing roads on farms will be used where feasible and practical. The width of the access roads will be approximately 6m (this is also relevant for existing roads). The

[11] The construction of the 132kV overhead power line will be assessed as part of a separate Basic Assessment process which will consider feasible alternatives for the power line route.

	total length of the access roads is expected to be less than 35km in length (this will be confirmed in the EIA Phase). The roads will be of a gravel nature.
Crane hardstand area	Approximately 3800m^2 per turbine (which includes pre-assembly area and storage area at each turbine)
Turbine foundation	Approximately 380m^2 per turbine
Grid connection	The existing Fransvlei Substation or the existing Fransvlei-Aurora 132kV power line located to the south-east of the project site are considered as potential connection points for the project.
Underground cabling	Underground cabling between the turbines is preferred and will be installed at a depth of 1.5m.

Table 2.2 below provides the details regarding the requirements and the activities to be undertaken during the Boulders Wind Farm project development phases (i.e. construction phase, operation phase and decommissioning phase). **Table 2.3** provides photographs of the construction phase of a wind farm similar to the Boulders Wind Farm.

2.2.3 Project Development Phases Associated with the Boulders Wind Farm

Table 2.2: Details of the Boulders Wind Farm project development phases (i.e. construction, operation and decommissioning)

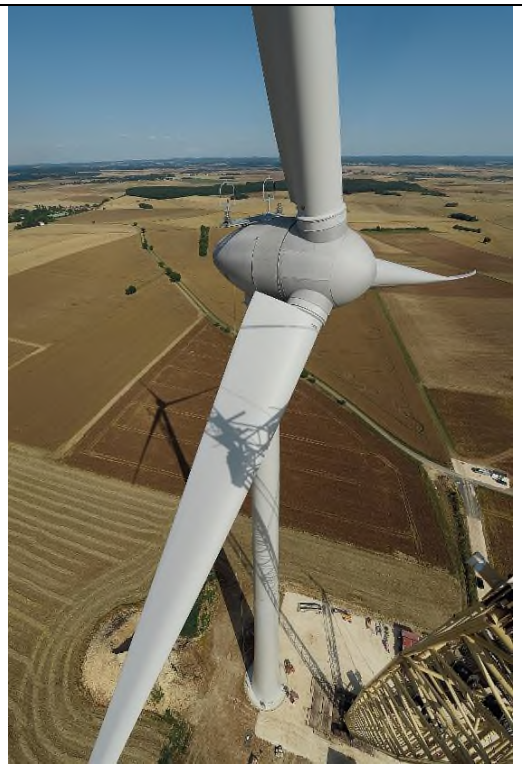
Construction Phase	
Requirements	» Project receives Environmental Authorisation from DEA, preferred bidder allocation granted by Department of Energy, a generating license issued by NERSA, and a Power Purchase Agreement secured with Eskom. » Duration dependent on number of turbines, expected to be 24 months for Boulders Wind Farm. Construction is envisaged to begin in either 2020 or 2021, depending on the DoE's next REI4P. » Create direct construction employment opportunities. Approximately 350 employment opportunities will be created (2.5 jobs per 1MW) » No on-site labour camps. Employees to be accommodated in the nearby towns such as Vredenburg, and transported to and from site on a daily basis. » Overnight on-site worker presence would be limited to security staff. » Waste removal and sanitation will be undertaken by a sub-contractor. » Electricity required for construction activities will be generated by a generator. Where low voltage connections are possible, they will be considered. » Water required for the construction activities and phase will be supplied by the municipality. In addition, where possible borehole water will be used. Should water availability at the time of construction be limited, water will be transported to site via water tanks. Water will be used for sanitation and potable water on site as well as construction works.
Activities to be undertaken	
Conduct surveys prior to construction	» Including, but not limited to, a geotechnical survey, site survey and confirmation of the turbine micro-siting footprint, survey of the on-site substation site and survey of power line servitude to determine and confirm tower locations and all other associated infrastructure.
Establishment of access roads to the Site	» Access/haul roads and internal access roads within the site will be established at the commencement of construction. » Existing access roads would be utilised to minimise impact, and upgraded where required. » Access between the turbines for construction and/or maintenance activities within the development footprint. » Internal service road alignment will be up to 6m wide. To be informed by the final micro-siting/positioning of the wind turbines.
Undertake site preparation	» Including the clearance of vegetation at the footprint of each turbine, establishment of the laydown areas, the establishment of internal access roads and excavations for foundations. » Stripping of topsoil to be stockpiled, backfilled, removed from site and/or spread on site. » To be undertaken in a systematic manner to reduce the risk of exposed ground being subjected erosion. » Include search and rescue of floral species of concern (where required) and the identification and excavation of any sites of cultural/heritage value (where required).
Establishment of	» Four laydown areas for the storage of wind turbine components, including the cranes required for tower/turbine assembly and civil engineering

laydown areas and batching plant on site	construction equipment. » Laydown areas will also accommodate building materials and equipment associated with the construction of buildings. » A crane hardstand at each turbine position where the main lifting crane will be erected and/or disassembled. Each hardstand to be approximately 3800m^2 in extent. This will also include the pre-assembly area and storage area at each turbine. » No borrow pits will be required, infilling or depositing materials will be sourced from licenced borrow pits within the surrounding areas. » A temporary concrete batching plant of 50m x 50m in extent to facilitate the concrete requirements for turbine foundations.
Construct foundation	» Concrete foundations to be constructed at each turbine location of approximately 380m^2 in extent. » Excavations to be undertaken mechanically. » Concrete foundation will be constructed to support a mounting ring. » Depending on geological conditions, the use of alternative foundations may be considered (e.g. reinforced piles).
Transport of components and equipment to and within the site	» Turbine units to be transported includes the tower segments, hub, nacelle, and three rotor blades. » Components to be transported to the site in sections on flatbed trucks by the turbine supplier. Imported components to be transported from the Port of Saldanha and/or Cape Town. » Components considered as abnormal loads in terms of Road Traffic Act (Act No 29 of 1989) due to dimensional limitations (abnormal length of the blades) and load limitations (i.e. the nacelle) will require a permit for the transportation of the abnormal loads on public roads. » Specialised construction and lifting equipment to be transported to site to erect the wind turbines. » Civil engineering construction equipment to be brought to the site for the civil works (e.g. excavators, trucks, graders, compaction equipment, cement trucks, site offices etc.). » Components for the establishment of the substation (including transformers) and the associated infrastructures to be transported to site. » Dimensional requirements of the load (length/height) may require alterations to the existing road infrastructure (e.g. widening on corners), accommodation of street furniture (e.g. street lighting, traffic signals, telephone lines etc.) and protection of road-related structures (i.e. bridges, culverts, portal culverts, retaining walls etc.) as a result of abnormal loading. » Transportation will take place via appropriate National and Provincial roads, and the dedicated access/haul road to the site.
Construction of the turbine	» A lifting crane will be utilised to lift the tower sections, nacelle and rotor into place. » Approximately 1 week is required to erect a single turbine depending on climatic conditions. » Lifting cranes are required to move between the turbine sites.
Construction of the substation	» One on-site substation to be constructed within the development footprint. » Substation will be constructed with a high-voltage (HV) yard footprint of up to 200 m x 200 m. » Turbines to be connected to the substation via underground cabling. » Substation position will be informed by the final micro-siting/positioning of the wind turbines.
Connection of wind turbines to the substation	» Each wind turbine to be connected to the on-site substation via underground electrical cables. » Excavation of trenches are required for the installation of the cables. Trenches will be approximately 1.5m deep. » Underground cables are planned to follow the internal access roads, as far as possible.

Establishment of ancillary infrastructure	» A workshop, contractor's equipment camp, temporary storage areas and a construction compound will be required. » Service buildings for site offices, storage and safe refuelling areas are also required. » Establishment will require the clearing of vegetation, levelling and the excavation of foundations prior to construction.
Connect substation to the power grid	» On-site 33/132 kV or 22/132 kV substation to connect the wind farm either to the existing Fransvlei Substation or the Fransvlei-Aurora 132kV power line. » Connection via an overhead 132kV power line (located within a 32m servitude) in order to evacuate the generated electricity. » Authorised route for the 132kV power line (to be undertaken as part of a separate Basic Assessment process) will be assessed, surveyed, and pegged prior to construction.
Temporary infrastructure	» Contractor's camp is required to accommodate offices, stores, workshops, fuel storage etc. (sizes and numbers to be confirmed later in process). » Establishment will require the clearing of vegetation, levelling and preparation of hardened areas suitable for the placing of containers and the construction of stores and workshops.
Undertake site rehabilitation	» Commence with rehabilitation efforts once construction completed in an area, and all construction equipment is removed. » On commissioning, access points to the site not required during the operation phase will be closed and prepared for rehabilitation.
Operation Phase	
Requirements	» Duration will be 20-25 years. » Requirements for security and maintenance of the project. » Employment opportunities relating mainly to operation activities and maintenance. Approximately 50 jobs will be available during the 20 year operation period.
Activities to be undertaken	
Operation and Maintenance	» Full time security, maintenance and control room staff. » All turbines will be operational except under circumstances of mechanical breakdown, inclement weather conditions, or maintenance activities. » Wind turbines to be subject to periodic maintenance and inspection. » Disposal of waste products (e.g. oil) in accordance with relevant waste management legislation. » Areas which were disturbed during the construction phase to be utilised should a laydown area be required during operation.
Decommissioning Phase	
Requirements	» Decommissioning of the Boulders Wind Farm infrastructure at the end of its economic life. » Potential for repowering of the facility, depending on the condition of the facility at the time. » Expected lifespan of approximately 20 - 25 years (with maintenance) before decommissioning is required. » Decommissioning activities to comply with the legislation relevant at the time.
Activities to be undertaken	

Site preparation	» Confirming the integrity of site access to accommodate the required equipment and lifting cranes. » Preparation of the site (e.g. laydown areas and construction platform). » Mobilisation of construction equipment.
Disassemble and remove turbines	» Large crane required for the disassembling of the turbine and tower sections. » Components to be reused, recycled, or disposed of in accordance with regulatory requirements. » All parts of the turbine would be considered reusable or recyclable except for the blades. » Concrete will be removed to a depth as defined by an agricultural specialist and the area rehabilitated. » Cables will be excavated and removed, as may be required

Table 2.3: Photographs of the construction phase of a wind farm similar to the Boulders Wind Farm



2.3 Project Need and Desirability

The South African Government recognises the need to diversify the mix of energy generation technologies within the country and to reduce the country's reliance on fossil fuels which contribute towards climate change and are therefore not environmentally friendly. To address the need for generation capacity from renewable energy technologies, several planning and policy documents were developed in line with Government's vision for the country, as well as international conventions and policy.

As part of the EIA process the need and desirability for the development of the Boulders Wind Farm needs to be considered and explained in order to provide context regarding the realistic benefits that the development will add on national, provincial and local levels. The need and desirability of the Boulders Wind Farm is summarised below, and the sections which follow elaborate on the need and desirability for the development of the Boulders Wind Farm.

The need and desirability of the Boulders Wind Farm included:

» The project site has high wind resources as confirmed by onsite wind monitoring campaigns. The economic viability of a wind farm and success in the REIPPP programme is directly depend on the strength of the wind resource.
» The location of the facility directly adjacent to an operational wind farm (West Coast One), which has demonstrated the area to be receptive to wind farm development. The site borders the operational facility and is viewed as a natural extension of the facility.
» Proximity to available grid connectivity via the Fransvlei-Aurora 132kV power line, located 2km south east of the project site.
» The national need for establishment of additional generation capacity through renewable energy resources.
» The local need for community upliftment through additional employment opportunities within the project area and economic development contributions in terms of the REIPPP Programme.
» Site extent and the option for the current land use and agricultural activities to be retained.
» Landowner support for wind farm development.
» The proximity to the Port of Saldanha, the regional and secondary roads for use during the construction and operation phases for the transportation of material and components.

2.3.1 Need for the development of the Boulders Wind Farm

The overarching objective for the wind energy facility planning process is to maximise electricity production through exposure to the wind resource, while minimising infrastructure, operational and maintenance costs, as well as social and environmental impacts. The Boulders Wind Farm is proposed to be constructed outside of the urban edge of the surrounding towns on privately owned properties currently zoned for agricultural use. The affected farm portions have not been considered for an alternative land use such as urban or industrial development.

There is an urgent need for additional electricity generation facilities to secure South Africa's energy supply which is considered to be essential for continuous economic and social development, the avoidance of power outages and decentralising the electricity generation capacity in the country and therefore stabilising the national electricity grid.

» International level considerations

South Africa has signed and ratified the Paris Agreement in 2016. The Paris Agreement is a legally binding instrument that will be utilised to guide the process of universal action on climate change. The Agreement brings all nations into a common cause of acting collectively to address the threat of climate change within the context of sustainable development and efforts to eradicate poverty. It sets the goal of holding the increase of the global average temperature to well below 2 degrees Celsius and pursuing efforts to limit the global temperature increase to 1.5 degrees Celsius. In recent times, the effects of global warming and climate change are becoming all the more evident and will have severe impacts on mankind and other species. The ever-increasing amount of CO2 by human contribution has been identified as one of the key drivers for global warming. The electricity sector is one of the main contributors in the increase in CO2. Through the development of renewable energy technologies, an opportunity is created that enables electricity generation without adding additional CO2 emissions. It is expected that with the development of the Boulders Wind Farm and the associated wind electricity generated a saving of approximately 7 000 000 tons of CO2 gas emissions will occur while also supplying approximately 84 000 South African households with clean renewable electricity.

The Boulders Wind Farm will deliver a significant amount of renewable electricity to South Africa which will assist the country in changing the electricity sector from being fossil fuel dominated to an electricity sector based on clean renewable energy which is considered as beneficial for the global and South African challenge to combat global warming and climate change and fulfil South Africa's commitment to the Paris Agreement.

» National considerations

The need for the proposed Boulders Wind Farm at a National Level is also linked to increasing pressure on countries to increase their share of renewable energy generation due to concerns such as exploitation of non-renewable resources, ensuring national energy supply meets our economic growth and the rising cost of fossil fuels. In order to meet the long-term goal of a sustainable renewable energy industry, a target of producing 8 400 MW from wind by the year 2030 has been set by the Integrated Resources Plan (IRP) for Electricity. Ministerial determinations have called for a procurement of 13 125 MW of renewable energy from independent power producers (IPPs) of which 6 360 MW has been allocated to wind energy projects (Department of Energy, 2016).

At present, a significant quantity of power supplied to the Western Cape is generated in the Eskom coal-fired power stations elsewhere in the country (predominantly located in Mpumalanga) and transmitted over 1000km to the Cape via the national transmission network. A portion of the Province's electricity is, however, generated locally, including energy from the Koeberg Nuclear Power Plant, the Acacia Gas Turbines, the Palmiet Pumped Storage Facility, the Open Cycle Gas Turbine plants at Atlantis and Mossel Bay (peaking power) and several IPP-operated renewable energy facilities, including West Coast One Wind Farm as well as Hopefield Wind Farm. The City of Cape Town also produces a small amount of electricity through the Steenbras Pumped Storage facility and local gas turbines. Although Eskom has transmission power line strengthening plans in place to assist in securing electricity supply for the Western Cape, there are a range of other options that may be preferable. This includes the diversification of the energy supply mix and the broadening of the localised energy generation options.

» Provincial considerations

At a provincial level, the project will contribute towards the target of 15% renewable energy for the Western Cape Province and reduction in carbon emissions, as set by the White Paper on Sustainable Energy (the purpose of which is to create an enabling policy environment in the Western Cape in order to promote and facilitate energy generation from renewable sources, as well as efficient energy use technologies and initiatives). In addition, it is in line with the Climate Change Strategy and Action Plan for the Western Cape in that it would contribute to one of the four programmes which are prioritised (i.e. the reduction of the Province's carbon footprint which is identified as the key mitigatory response) and its associated strategies (including promotion of energy efficiency (including demand management), and the development of renewable and alternate sustainable energy resources).

The Western Cape Provincial Growth and Development Strategy (PGDS) lays great emphasis on the extreme vulnerability of the Province to climate change (generally hotter, drier conditions are predicted for the Western Cape in the long-term), and is aligned with the Western Cape Climate Change Strategy. The PGDS notes that, with current available budgeting, a key necessary intervention is that, "assistance needs to be provided in the development of new economic sectors e.g. the renewable energy sector, solar, wind and wave energy and water sector." The Boulders Wind Farm is in line with this identified intervention.

Renewable energy projects are currently under development within the Western Cape as part of the Department of Energy's Renewable Energy Independent Power Producer Programme (REIPPP). In addition, a number of projects are proposed for development within the Province. The Boulders Wind Farm would provide a further opportunity for wind energy development, with the aim of contributing to the Provincial target for 15% renewable energy.

» District and Local level considerations

From a district and local level the need for the development of the Boulders Wind Farm is reflected within the West Coast District Municipality and Saldanha Bay Local Municipality planning documentation.

The following planning policies make reference to the need for the development of renewable energy facilities as part of the district municipality:

* The West Coast District Municipality Integrated Development Plan (IDP) (2017-2022) has stated that it will continue the promotion of renewable energy within the district and that energy planning for the area should consider the cost of energy at present and in future, the effectiveness and implementation of energy efficiency and the impact of renewables.

* The West Coast District Municipality Spatial Development Framework (SDF) (2014) considers that the wind resources in the district are substantial and comparably high when considering the rest of the country. The SDF also states that the demand for renewable energy has increased and will continue to increase as infrastructure develops within the area and the population growth results in more demand for electricity in the future. The SDF also places focus on the implementation of energy efficiency to minimise the collective carbon footprint of the area and the possibility that renewable energy can become a key sector within the district. With the development of the renewable energy sector spin-off benefits will also be realised through the development of the

manufacturing and distribution of renewable energy components which will also add to positive socio-economic growth and development within the district.

Considering the requirements for the development of a wind energy facility within the West Coast District Municipality, it is considered that there is a definite need and desirability for developments of such a nature through the district's commitment to the promotion of renewable energy developments, as well as the need for a reduced carbon footprint within the area.

The following planning policies make reference to the need for the development of renewable energy facilities as part of the local municipality:

* When considering the local context the Saldanha Bay Integrated Development Plan (IDP) (2017-2022) supports the completion and the upgrade of the Vredenburg Substation which is a major project within the area which can strengthen the distribution for renewable energy throughout the area. Also, the Local Government Energy Efficiency and Renewable Energy Strategy considers renewable energy options as a significant component of the local energy supply, however only in cases where the developments are considered to be technically and economically feasible and contribute to low carbon development and local economic growth and sustainability. The project developer has also indicated that local socio-economic benefits will be realised with the development of the Boulders Wind Farm, specifically in line with the socio-economic development goals under the REIPPP programme, which will include:
  i) the realisation of the local needs and requirements within the area,
  ii) job creation within an area which has been primarily focused on fishing that has subsequently declined through the years,
  iii) the creation of a second income for the affected landowners,
  iv) an increase in the standard of living and
  v) overall economic and social upliftment within the area.

When considering the overall need for the development of the Boulders Wind Farm it is clear that the need and desirability is not only supported on a national level but also at the provincial, district, and most importantly, the local level.

Considering the need for sustainable development and the efforts to eradicate poverty, the positive social and socio-economic benefits of the construction and operation of the Boulders Wind Farm under the current South African bidding process can be highlighted and achieved. The development of wind farms enable large investment into the Country. Local content requirements lead to the creation of local industry and the creation of highly qualified jobs and unskilled positions in the industrial sector. The construction and operation phases associated with the project will lead to various employment opportunities and skills development, which in turn will assist in the alleviation of social and socio-economic challenges in the areas. There are also strong economic and social benefits for local communities through their participation in the project earnings. Further positive social and socio-economic benefits will be realised by landowners, where a payment of lease to the owners of the affected properties leads to a secondary income and assists them with effectively maintaining their current farming activities in the current economic climate.

Therefore, considering the above needs for the project it can be concluded that the Boulders Wind Farm will contribute to the reduction of the human impact on global warming and therefore assisting with the

survival of species on a local scale, while also assisting with the alleviation of poverty through improving the economic and social structures from national, provincial and local levels.

The feasibility of the proposed project site for the development of the Boulders Wind Farm also provides an indication of the desirability of the development within the site. The section below provides a description of the process followed to identify a feasible project site for the development of the Boulders Wind Farm.

2.3.2 Desirability of the Boulders Wind Farm location determined through Site Selection and Pre-Feasibility Analysis

Vredenburg Windfarm (Pty) Ltd has been investigating the development of a 140MW wind energy facility within the Saldanha Bay area since 2010. Two fundamental technical aspects were considered by the developer for a wind energy facility which included the availability of a wind resource and the availability of sufficient grid connection capacity. The developer concluded that should either or both of the fundamental aspects not be available or sufficient to meet the project needs, that it will not be economically viable to development a wind farm within such an area.

During the site selection process, undertaken in 2010, the developer considered the wind resource within the Saldanha Bay area to be sufficient for the development of a wind energy facility, and commenced with a long-term wind resource measurement campaign which confirmed that the wind resource, as a fundamental aspect, is available.

Further, the developer considered the availability of sufficient grid connection capacity within the area. At the time of the site selection process no wind energy facilities had been developed within the area and the only grid connection option that was available was the Aurora Substation, which is an Eskom Transmission Substation. No Eskom distribution infrastructure was available at the time. However, during the site selection process it was confirmed that capacity was available at the Eskom Aurora Substation and that future distribution upgrades and extensions would be taking place.

Due to the sufficient wind resource and future plans for the upgrade and extension of the distribution infrastructure many developers were attracted to the area for the potential of the development of a wind energy facility.

Vredenburg Windfarm (Pty) Ltd then set out to identify land parcels for the development of a wind farm within the Vredenburg area and the West Coast Peninsula. The identification of potential areas and properties for the development formed part of an in-depth site selection process, undertaken in 2011. The screening assessment included various independent specialist studies to provide a tool for the developer to understand the environmental constraints and sensitivities associated with the potential areas identified for development. Through the consideration of the environmental sensitivities the least environmentally sensitive farms were identified and secured, and the rest of the properties were discarded due to the environmental risks associated with them. Therefore, the site selection process has lead the developer in terms of identifying an appropriate project site for the development of the Boulders Wind Farm which is considered to be feasible from an environmental perspective.

After the completion of the screening assessment it was found that the Langebaanweg Air Force Base radar could not accommodate wind turbines due to a radar interference. A buffer of 18.5km from the Air Force Base was identified as the area within which no wind turbine may be located. The implementation

of the buffer resulted in a total area of 280km^2 surrounding Langebaanweg being considered as unsuitable for the construction of wind turbines, even if the area is considered as suitable from an environmental and technical perspective. The buffer also resulted in constraints regarding the connection of a wind energy facility into the national grid due to the fact that the potential connection points to the grid, including the Aurora Substation, and most of the other Eskom infrastructure was located within the Air Force Base Exclusion area. This meant that any wind energy facilities will have to be located outside of the buffer and within a great distance from the potential connection points, resulting in cost implications for the project. **Figure 2.1** illustrates the extent of the 18.5km buffer associated with the exclusion zone for the Langebaanweg Air Force Base. **Appendix O** includes the correspondence from the Langebaanweg Air Force Base in the applied buffer area of 18.5km.

Within the second round of the Renewable Energy Independent Power Producer Procurement (REIPPP) Programme the first project in the Saldanha Bay area was successful, namely the West Coast One wind energy facility. This project took advantage of the strong wind resource and was situated outside of the Langebaanweg Air Force Base radar exclusion zone. However, in order to connect the project to the national grid, an extensive power line had to be constructed to connect the facility to the Aurora Substation.

In response, the Eskom Fransvlei-Aurora 132kV power line was constructed to provide capacity for the West Coast One Wind Energy Facility, and additional Eskom infrastructure has been authorised through the Eskom Saldanha Strengthening Project to support the predicted growth in the number of future developments in the Saldanha Bay area. To date approximately 25% of the Fransvlei-Aurora 132kV power line's capacity is being utilised, and therefore ample capacity is still available for future projects. The Fransvlei-Aurora 132kV power line is located south-east of the project site and traverses the West Coast One wind energy facility, which is located directly adjacent to the Boulders Wind Farm. Therefore, it was confirmed that an available point of connection to the grid, as a fundamental aspect, is available.

Therefore, the site selection process has lead the developer in terms of identifying an appropriate project site for the development of the Boulders Wind Farm which is considered to be feasible and suitable from an environmental and technical perspective.

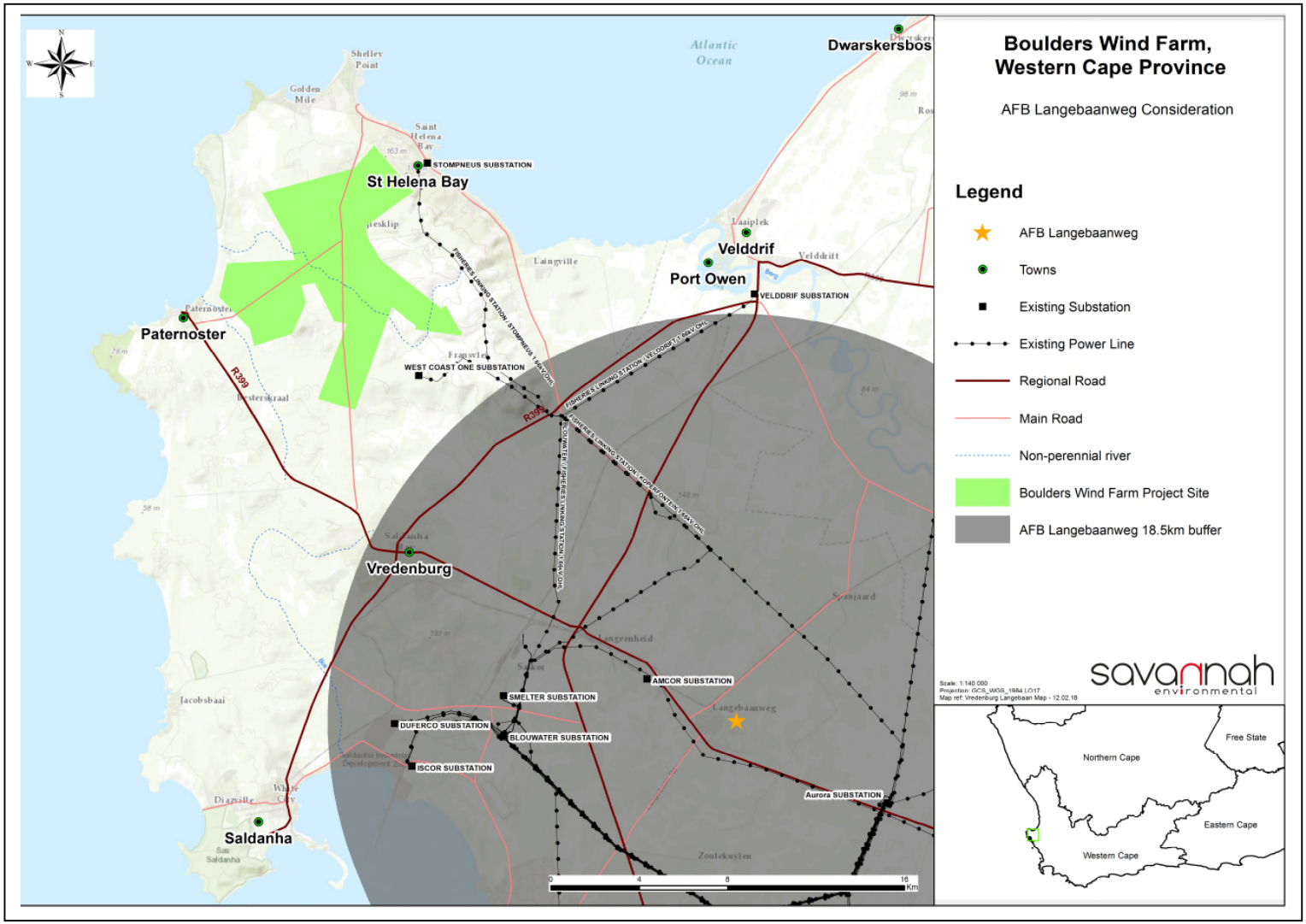


Figure 2.1: The extent of the Langebaan Air Force Base exclusion zone (18.5km buffer) within which no wind turbines are permitted

2.3.3 Receptiveness of the Site Contributing to the Need and Desirability of the Boulder Wind Farm

The project site located north of the town Vredenburg has been identified by the developer as a desirable site based on extensive pre-feasibility analysis of significant areas in the Western Cape Province as well as the site's technical suitability considering the technical requirements for the development of a wind farm (refer to Section 2.4.1 and 2.4.2 above for more details in this regard). The site displays characteristics which make it a preferred site for a wind farm. These include:

Extent of the project site: The affected properties desirable for and available for the wind farm development cover an area of 5084ha. This area is sufficient for the proposed Boulders Wind Farm and allows for avoidance of environmental sensitivities should these be present.

Site access: Access to the project site is ample with the presence of existing a secondary gravel road traversing the length of project site. Along with the existing secondary gravel road, existing farm roads are also present. The secondary gravel road located within the project site is the Stompneus Bay Secondary Road which traverse the project site in a north-south direction and a north-western direction (there are two legs of the secondary gravel road which meet in the centre of the project site) and provides access from Vredenburg to the project site and to Britannia Bay, as well as access from Paternoster to the project site. The Regional road (R399) is the main road providing access to the general area within which the project site is located and is also the road from which the Stompneus Bay Secondary Gravel Road stems.

Current land use and character: The West Coast One wind energy facility is located directly adjacent to the identified Boulders Wind Farm, which includes infrastructure such as 47 turbines, access roads and grid infrastructure. The broader area and the project site has a rural character and is used for dryland agriculture (dominated by small-grain, cattle and sheep farming) with very few built structures outside of the boundaries of the existing towns. The current land use of the site is agricultural which is desirable as the majority of farming practices can continue in tandem to the construction and operation of the wind farm. The landowners are supportive of the development and do not view the development as a conflict with their current land use practices. This has been proven to be the case at the adjacent West Coast One wind energy facility. The small towns north of Vredenburg are concentrated along the coastline and are at a minimum distance of 7km from the project site (measured from the centre of the project site).

Grid connection and capacity: Grid access is deemed favourable for this site due to the close proximity of the existing Fransvlei-Aurora 132kV power line located to the south-east of the project site. This line, together with the Saldanha grid strengthening project authorised in 2017 allow for the connection of future developments in the area. The distance to the point of connection to the grid directly affects construction costs and losses associated with power transmission over a distance. In order to connect the wind farm to the grid a 132kV overhead power line will need to be constructed to connect into either the existing Fransvlei Substation or the existing Fransvlei-Aurora 132kV power line[12][13].

[12] This has been confirmed by Eskom in a cost estimate letter.

[13] The construction of the 132kV overhead power line will be assessed as part of a separate Basic Assessment process.

Wind resource: This is considered to be the main criteria determining the feasibility of the proposed development, as the resource will affect the efficiency and economic viability of the wind farm. The Boulders Wind farm is located in an area where the West Coast One wind energy facility has already been developed under the REIPPP Programme. It is proven that the area has high wind resources. The project site is currently being monitored by two wind monitoring masts to confirm the onsite wind resource. Wind monitoring has been taking place on the project site since 2011 using 85m and 120m wind monitoring masts to confirm the wind resource and regime and inform the turbine selection process. High wind resources, which are considered to be an excellent resource for wind farm development, have been confirmed with certainty, with the mean annual wind speeds exceeding 8m/s at 120m above ground level.

Proximity to Towns with a Need for Socio-Economic Upliftment: The Saldanha Bay Local Municipality has an employment rate of 23% (i.e. 10 587 unemployed individuals). The agriculture, forestry and fishing sector employed the largest number of people in in the Saldanha Bay Local Municipality in 2016. This is attributed to the coastal location with numerous fishing activities. The mining sector conversely employed the least. A decline in employment across most sectors of the economy took place between 2008 and 2010. This can be attributed to the global financial crisis, followed by the national economy's recession observed during this period. The agriculture, forestry and fishing sector particularly experienced a decline in employment numbers from 2007 to 2011 in the area. Through a decline in the employment opportunities of the area local residents have turned to illegal fishing activities, especially the removal of crayfish, which is considered to be a negative impact on the coastal environment of the area.

The proposed wind farm has a potential to create much needed employment for unskilled locals during the construction phase. Training opportunities will also be afforded to qualified local people who can be up-skilled to undertake certain roles during the construction and operation phases.

In terms of the needs on the local community, the IDPs identified the need for development, social services, education and employment opportunities in this area. The project has the potential to make a positive contribution towards the identified community needs. In terms of the economic development requirements of the REIPPP programme, the project will commit benefits to the local community, including job creation, localisation and community ownership. A percentage of the revenue per annum from the operational wind energy facility will be made available to the community through a social beneficiation scheme, in accordance with the DoE bidding requirements of the REIPPP programme. Therefore, the potential for creation of employment and business opportunities, and the opportunity for skills development for the local community is significant.

Secondary social benefits can be expected in terms of additional spend in the nearby towns due to the increased demand for goods and services.

Considering the above, it is clear that a need for employment opportunities is present within the area, as well as the socio-economic benefits which will be associated with it. These benefits would include an increase in the standard of living for the local residents within the area as well as overall financial and economic upliftment.

Proximity to Access Road for Transportation of Material and Components: As material and components would need to be transported to the site during the construction phase of the Boulders Wind Farm,

accessibility was a key factor in determining the viability of the project, particularly taking transportation costs (direct and indirect) into consideration and the impact of this on project economics. The proximity of the project site to the Port of Saldanha is considered as beneficial to the development due to the fact that transportation of the project materials and components during the construction and operation phases can be undertaken through the use of this facility.

Sufficient access is available in the surrounding areas and within the site for a development of this nature (i.e. a development which is heavily dependent on the transportation of materials and components). The Regional Road (R399) provides access to the area surrounding the project site. Direct access to the site is possible via the existing Stompneus Bay Secondary Gravel Road which traverses the project site. Where possible, existing roads will be used for the development, and in instances where access roads are not available or the existing road conditions are not adequate new access roads will be constructed or existing roads will be upgraded.

2.3.4 Benefits of Renewable Energy and the Need and Desirability thereof

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

Increased energy security: Given that renewables can often be deployed in a short timeframe and in a decentralised manner close to consumers, they offer the opportunity for improving grid strength and supply quality in the short-term, while reducing expensive distribution losses. As a result of the power constraints in the first half of 2015, power generators meant to be the "barely-ever-used" safety net for the system (diesel-fired gas turbines) were running at > 30% average load factor in the first half of 2015. Load shedding occurred during 82 days in the first half of 2015 (out of 181 days). Results of a CSIR Energy Centre study for the period January to June 2015 (CSIR, August 2015), concluded that the already implemented renewable projects (wind and solar) within the country avoided 203 hours of so-called 'unserved energy'. During these hours the supply situation was so tight that some customers' energy supply would have had to be curtailed ('unserved') if it had not been for the renewables. The avoidance of unserved energy cumulated into the effect that during 15 days from January to June 2015 load shedding was avoided entirely, delayed, or a higher stage of load shedding prevented due to the contribution of the wind and PV projects[14].

Resource saving: It is estimated that the achievement of the targets in the Renewable Energy White Paper will result in water savings of approximately 16.5 million kilolitres per annum. As an already water-stressed nation, it is critical that South Africa engages in a variety of water conservation measures, particularly due to the detrimental effects of climate change on water availability. Renewable energy also translates into revenue savings, as fuel for renewable energy facilities is free while compared to the continual purchase of fuel for conventional power stations. Results of a CSIR Energy Centre study for January – June 2015 (CSIR, August 2015) have quantified the contribution from renewable energy to the national power system and the economy over the first 6 months of 2015 compared to the 12 months of 2014:

[14] (http://ntww1.csir.co.za/plsql/ptl0002/PTL0002_PGE157_MEDIA_REL?MEDIA_RELEASE_NO=7526896)

2015 (6 months)	2014 (12 months)
R3.60 billion saving in diesel and coal fuel costs	R3.64 billion saving in diesel and coal fuel costs
200 hours of unserved energy avoided, saving at least an additional R1.20 billion–R4.60 billion for the economy	120 hours of unserved energy avoided, saving at least an additional R1.67 billion for the economy
Generated R4.0 billion more financial benefits than cost	Generated R0.8 billion more financial benefits than cost

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

Economics: As a result of the excellent resource and competitive procurement processes, both wind power and solar PV power are now proven in South Africa as cheaper forms of energy generation than coal power. They offer excellent value for money to the economy and citizens of South Africa while benefitting society as a whole through the development of clean energy.

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

Climate friendly development: The uptake of renewable energy offers the opportunity to address energy needs in an environmentally responsible manner and thereby allows South Africa to contribute towards mitigating climate change through the reduction of greenhouse gas (GHG) emissions. South Africa is estimated to be currently responsible for approximately 1% of global GHG emissions (and circa half of those for which Africa is responsible) and is currently ranked 9th worldwide in terms of per capita carbon dioxide emissions. The renewable energy sector saved South Africa 1.4 million tons of carbon emissions over the first 6 months of 2015[15]. It is expected that with the development of the Boulders Wind Farm and the associated wind electricity generated a saving of approximately 7 000 000 tons of CO2 gas emissions will occur while also supplying approximately 84 000 South African households with clean renewable electricity.

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

Employment creation: The development, procurement, installation, maintenance and management of renewable energy facilities have significant potential for job creation and skills development in South Africa. Employment for South African citizens including people from communities local to the IPP

[15] http://www.iol.co.za/capetimes/renewable-energy-saving-sa-billions-csir-1.1903409#.VkNjdJq6FeU

operations in the Northern Cape were 11 652 job years as at the end of June 2015 (Department of Energy. 2015).

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

Support to a new industry sector: The development of renewable energy offers the opportunity to establish a new industry within the South African economy, which will create jobs and skill local communities which have potential for further renewable energy projects.

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

2.4 Alternatives Considered in the Scoping Phase

In accordance with the requirements outlined in Appendix 2 of the EIA Regulations 2014, as amended in April 2017, the consideration of alternatives including site and technology alternatives, as well as the "do-nothing" alternative should be undertaken. The follow sections address this requirement.

This final Scoping report identifies environmental sensitivities within the project site which will be used to inform the layout alternatives to be assessed in detail by specialist studies in the EIA phase of the process. There is therefore no comparative assessment of location and footprint alternatives at this stage in the process as information of sufficient detail is not yet available to inform this assessment.

2.4.1 Site-specific Alternatives

As a prospective Independent Power Producer, Vredenburg Windfarm (Pty) Ltd is seeking suitable sites for wind energy facilities across South Africa and has identified suitable sites using the following drivers:

- Wind characteristics (including speed);
- Site accessibility;
- Distance to the nearest grid connection point: a function of power line limits, substation capacity and load flows; and
- Environmental and social aspects.

Wind resources in the Western Cape are believed to be amongst the best in South Africa. Therefore, the potential to develop wind energy facilities as part of the Western Cape Sustainable Energy Strategy is considered to be high. In terms of the Wind Atlas for South Africa (WASA), the average wind speed as measured across the Province at a height of 100 m is between 5 and 7 m/s (refer to **Figure 2.2**).

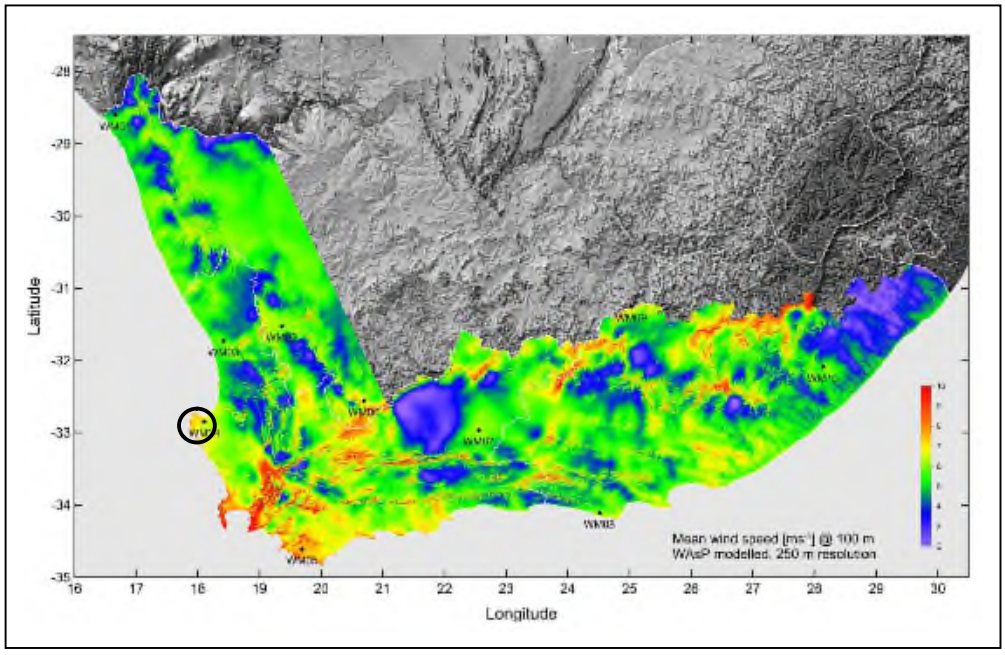


Figure 2.2: WASA map. The general area of the project site is indicated by the black circle.

In light of this potential for wind energy for power generation within the Western Cape, Vredenburg Windfarm (Pty) Ltd, as an independent power producer, is proposing to establish a commercial wind energy facility on a site north of the town of Vredenburg in the Western Cape.

The proposed project site falls within an area identified as being Negotiable, Possible, Preferred or Highly Preferred for wind energy development[16], with some small areas indicated as being Restricted in terms of the Western Cape Regional Methodology for Wind Energy Site Selection (May, 2006). The methodology as tested within the DEA&DP assessment is intended to be used as a tool for regulating wind energy developments in the Province through an effective method of determining appropriate locations for such projects based on a combined "criteria based" and "landscape based" assessment method. A key step in the generation of the final output map (refer **Figure 2.3**) is the merging of positive and negative criteria relating to technical and environmental 'thresholds' with landscape issues related to visibility, landform and land cover.

The use of colour shading is used to illustrate the degree of "positive" or the extent of "negative" factors. The dark green areas illustrate areas where wind turbines would face the least constraints in terms of all environmental and planning criteria considered. Refer to **Table 2.4** below.

[16] The location of the existing West Coast One wind energy facility seems to be located more within the Negotiable and Restricted zones.

Table 2.4: The score provided in terms of the criteria mapped for the DEA&DP assessment.

		SCORE		
1	Coincidence of more than one negative criteria		(Highly) Restricted	-5
2	Negative criteria		Restricted	-2
3	Negative and positive criteria overlap		Negotiable B	-1
4	Areas not scoring negative or positive		Negotiable A	0
5	Positive criteria		Preferred	+2
6	Coincidence of more than one positive criteria		(Highly) Preferred	+5

The Boulders Wind Farm project site was identified as being the most technically feasible and viable project site within the broader area for further investigation in support of an application for authorisation by way of EIA due to a number of characteristics associated with the site (refer to Section 2.4.2 and 2.4.3). The environmental feasibility of the project site for the proposed development is to be determined through the EIA process currently being undertaken for the site.

Vredenburg Windfarm (Pty) Ltd therefore confirms the 5084ha area (project site), ~14km north of Vredenburg as the preferred project site for the development of the Boulders Wind Farm.

2.4.2 Activity Alternatives

Vredenburg Windfarm (Pty) Ltd is a renewable energy project developer and as such will only consider renewable energy technologies. Considering the available natural energy resources within the area and the current significant restrictions placed on other natural resources such as water it is considered that wind energy is the only option for the area. The northern areas of the country (most notably the Northern Cape) have superior irradiation levels, and are preferred areas for the development of solar energy facilities as they have a much better solar resource than the project site. Solar sites also are considered as total loss in terms of continued land use practises for the project site, which impacts on the use of the area and the continuation of agricultural and/or other land-use activities. There are only a few sites in South Africa with a wind resource as good as this site, and therefore this site can afford a fairly long grid connection and still be very competitive, however grid connection infrastructure to connect the wind farm to the national grid is present within the vicinity of the project site.

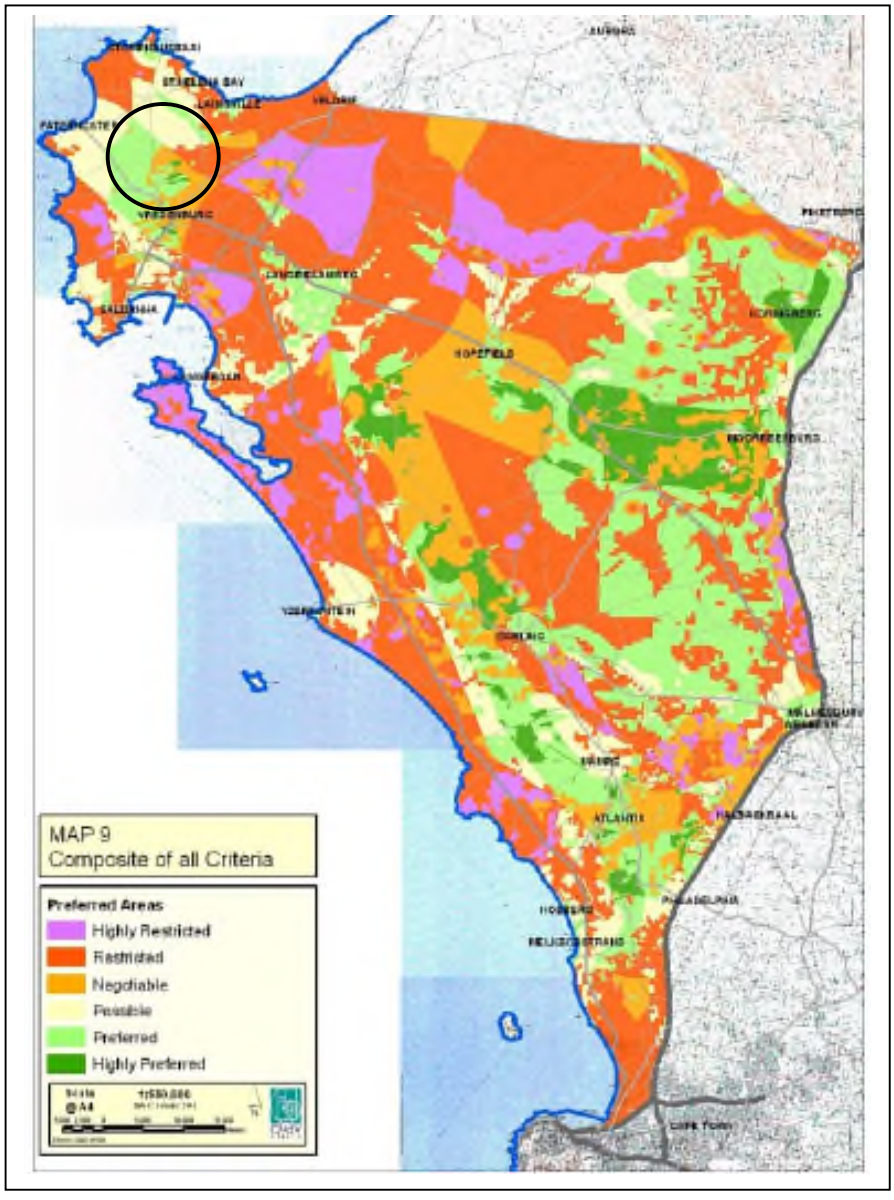


Figure 2.3: Final output map from the DEA&DP assessment illustrating the results from the merging of positive and negative criteria relating to technical and environmental 'thresholds' (extracted from Western Cape Regional Methodology for Wind Energy Site Selection (May, 2006)). The project site near Vredenburg is contained within the black circle and shows ratings of Highly Preferred, Preferred and Negotiable, with small areas shown as Restricted to be affected.

2.4.3 Technology Alternatives

As Vredenburg Windfarm (Pty) Ltd is an IPP, only renewable energy technologies are being considered for the generation of up to 140MW (contracted capacity). Considering the local resources available (i.e. wind and solar irradiation) for such technologies, the footprint requirements for such developments and the current land use in the project site, the project site is considered most suitable for the establishment of a wind farm. This has been confirmed through the on-site wind measurement campaign undertaken by the developer.

Solar energy technology would not be viable within the project site location due to the topography of the landscape as well as the increased development footprint impact it poses on agricultural land (i.e. total loss of an area located within the development footprint of a solar energy facility). Also, solar energy developments are much more viable in the Northern Cape than the Western Cape due to a higher solar irradiance

Once environmental constraining factors have been determined through the EIA process, and more detailed site-specific wind data is available from the wind monitoring on site, Vredenburg Windfarm (Pty) Ltd will be considering various wind turbine options. The preferred option will be informed by efficiency as well as environmental impact and constraints (such as noise associated with the turbine and sensitive biophysical features). The wind turbines being proposed for the Boulders Wind Farm will be up to 3.15 MW[17] in capacity. The turbines are proposed to have a hub height of up to 120 m, with an overall turbine height of up to 165m.

In addition, the most optimal layout will be determined considering the mitigation hierarchy in order to maximise the capacity of the site while minimising environmental impacts. The main focus of the mitigation hierarchy will mainly relate to the avoidance of all identified no-go areas or sensitive features within the project site, and consider feasible and appropriate mitigation measures in order to minimise the impact of the development on any remaining sensitive features.

Vredenburg Windfarm (Pty) Ltd therefore confirms wind energy technology as the preferred technology alternative for the development of the Boulders Wind Farm.

2.4.4 Layout Footprint Design Alternatives

The overall aim of the facility layout (i.e. development footprint) is to maximise electricity production through exposure to the wind resource, while minimising infrastructure, operation, and maintenance costs, and social and environmental impacts. Specialist software is available to assist developers in selecting the optimum position for each turbine. This micro-siting information will inform the specialist impact assessments at the EIA Phase. The planning process will also include the positioning of other ancillary infrastructure, including, but not limited to, access roads, laydown areas, power line and substation site.

An overall environmental scoping sensitivity map has been provided in order to illustrate the sensitive environmental features located within the project site which needs to be considered and, in some instances completely avoided by the development footprint (refer to Chapter 7). Once more detailed information is available from an environmental and planning perspective for the broader site, a detailed micro-siting exercise will be undertaken to effectively 'design' the wind farm facility layout and the turbine positions within the project site, which will be known as the development footprint. Through the process of determining constraining factors and environmentally sensitive areas, the layout of the wind turbines footprint and infrastructure will be planned and adjusted if necessary to ensure the avoidance of no-go

[17] The 3.15MW capacity of the individual turbines is a predicted maximum per turbine and the final decision regarding the final turbine capacity will be based on the facility layout and technical and environmental considerations.

areas and mitigation of sensitive environmental features. A detailed facility layout will be developed and will be made available as a layout alternative for assessment and ground-truthing by the independent specialists in the EIA phase. Where further conflicts are predicted, a mitigation strategy will be developed to meet the objectives of the mitigation hierarchy (avoid, minimise, mitigate).

2.4.5 Grid Connection Alternatives

Planning and design for the transmission of the power generated at the wind farm is being undertaken as part of the separate application for Environmental Authorisation, however consideration of the power line route must be undertaken by the developer in order to ensure that the route is appropriate from a technical and environmental perspective. The route will also be informed through understanding the local power requirements and the stability of the local electricity network.

As part of the separate Basic Assessment Process to be undertaken two alternative power line corridors will be assessed and considered. The power line will have a capacity of 132/11kV and will be constructed within a 32m wide servitude which will be located within a broader power line corridor assessed as part of the Basic Assessment.

Therefore, the consideration of grid connection alternatives do not form part of this application for Environmental Authorisation, and will be assessed within a separate Basic Assessment Process.

2.4.6 The 'do-nothing' Alternative

The 'do-nothing' alternative is the option of Vredenburg Windfarm (Pty) Ltd not constructing the Boulders Wind Farm within the proposed project site. This would result in no environmental or social impacts as a result of a wind farm in this area, i.e. no negative impacts associated with the construction of the facility; but also no positive impacts which will be beneficial to the local residents and communities.

Should the "do-nothing" alternative be implemented the current land-use of the project site will continue, which is related to agricultural activities. However, due to the current restrictions on natural resources, such as the availability and security of water, experienced within the area and the Western Cape Province the continuation of these activities are not considered to be sustainable from an environmental and economic perspective. Therefore, with the implementation of the 'do-nothing' alternative the opportunity will be lost to enable a long-term sustainable land-use for the affected properties and secure economic income and socio-economic development for a period of 20-25 years.

With the implementation of mitigation measures for the mitigation of significant impacts as well as the enhancement of positive impacts, it is considered that the positive impacts can outweigh the negative impacts for a facility of this nature in this location, as evidenced by the operational West Coast One wind energy facility.

The electricity demand in South Africa is placing increasing pressure on the country's existing power generation capacity and the resultant restrictions are severely damaging the economy and the natural environment. There is, therefore, a need for additional electricity generation options to be developed throughout the country which will address the current issues experienced. The 'do nothing' option in terms of implementing renewable energy projects results in a scenario where a fossil fuel or nuclear facility must rather be developed as the need for power does not go away. Environmental considerations aside, these

have long lead times (considerably longer than the time required to implement renewable energy projects) and hence the South African economy and its citizens will suffer. Furthermore, the exploitation of a renewable energy resource, as promoted by the South African Government, would also not be realised, and the reliance on fossil fuel energy sources would not be reduced, as has been committed to.

The purpose of the proposed Boulders Wind Farm is to add new capacity for the generation of renewable energy to the national electricity mix and to aid in achieving the goal of a 43% share of all new power generation being derived from independent power producers (IPPs), as targeted by the Department of Energy (DoE). It is fully aligned with government policy – aligns with policy at all three levels of government (see Chapter 3 of this Scoping Report) and for it not to be implemented is at odds with the said policies.

The Western Cape Province also considers the development of renewable energy developments within the Province as a necessity to combat the effects of climate change and global warming. If the 'do-nothing' alternative is implemented the opportunity will be lost to add to the cause of reducing global warming and climate change.

The 'do-nothing' alternative would also result in the additional power from this highly efficient and competitive renewable energy facility not being added to the electricity grid and for the associated socio-economic benefits not being available to enhance the lives of South Africans and the South African economy as a whole.

At this time the EAP and Specialists believe that there are no fatal flaws or reasons for the Boulders Wind Farm not to be evaluated or assessed further. The "do nothing" alternative will be further assessed within the EIA phase of the process.

2.4.7 Summary of all Alternatives considered as part of the Boulders Wind Farm

The above sections describe the alternatives being considered as part of the Boulders Wind Farm. **Table 2.5** provides an overview of the alternative being considered as part of the project:

Table 2.5: Summary of the alternatives considered as part of the Boulder Wind Farm project.

Type of Alternatives Considered	Description of the Alternative relating to the Boulders Wind Farm
Site-specific Alternatives	After a thorough and detailed site selection process one project site has been identified for the development of the Boulders Wind Farm due to site specific characteristics such as the wind resource and its classification considered to be Negotiable, Possible, Preferred or Highly Preferred for wind energy development (depending on the section of the project site being considered) in terms of the Western Cape Regional Methodology for Wind Energy Site Selection (May, 2006). The project site 5084ha in extent which is considered to be large enough for the development of a wind farm with a contracted capacity of up to 140MW.
Activity Alternatives	Only the development of a renewable energy facility is considered by Vredenburg Windfarm (Pty) Ltd. Due to the location of the project site only the development of a wind energy facility is considered as feasible considering the natural resources available to the area.
Technology Alternatives	Only the development of a wind energy facility is considered due to the characteristics of the site, including the natural resources available.
Layout Footprint Design	One layout for the development of the Boulders Wind Farm will be considered which will

Type of Alternatives Considered	Description of the Alternative relating to the Boulders Wind Farm
Alternatives	be designed in line with the environmental sensitivities identified during this scoping phase. The detailed facility layout will be made available as a layout alternative for assessment and ground-truthing by the independent specialists in the EIA phase. Where further conflicts are predicted, a mitigation strategy will be developed to meet the objectives of the mitigation hierarchy (avoid, minimise, mitigate).
Grid Connection Alternatives	Only the development of the on-site substation forms part of this application for environmental authorisation. The location of the on-site substation will be designed to consider the most optimal position from a technical and environmental sensitivity perspective.
'Do-nothing' Alternative	The option to not construct the development of the Boulders Wind Farm. With the implementation of mitigation measures for the mitigation of significant impacts as well as the enhancement of positive impacts, it is considered that the positive impacts can outweigh the negative impacts for a facility of this nature in this location, as evidenced by the operational West Coast One wind energy facility. Opportunities and benefits associated with a new development in the Vredenburg area will be lost.

2.5 Wind Energy as a Power Generation Technology

Wind power is the conversion of wind energy into a useful form, such as electricity, using wind turbines. The use of wind for electricity generation is a non-consumptive use of a natural resource, and produces an insignificant quantity of greenhouse gases in its lifecycle. Wind power consumes no fuel for continuous operation, and has no emissions directly related to electricity production.

Wind energy is one of the fastest growing electricity generating technologies and features in energy plans worldwide. Operation does not produce carbon dioxide, sulphur dioxide, mercury, particulates, or any other type of air pollution, as with fossil fuel power sources.

Environmental pollution and the emission of CO_2 from the combustion of fossil fuels constitute a threat to the environment and human health. The use of fossil fuels is reportedly responsible for ~70% of greenhouse gas emissions worldwide. The climate change challenge needs to include a shift in the way that energy is generated and consumed. Worldwide, many solutions and approaches are being developed to reduce emissions. However, it is important to acknowledge that the more cost effective solution in the short-term is not necessarily the least expensive long-term solution. This holds true not only for direct project cost, but also indirect project cost such as impacts on the environment. Renewable energy is considered as a 'clean source of energy' with the potential to contribute greatly to a more ecologically, socially and economically sustainable future. The challenge now is ensuring wind energy projects are able to meet all economic, social, and environmental sustainability criteria.

Wind energy has the attractive attribute that the fuel is freely available. The economics of a wind energy project crucially depend on the wind resource at the site. Detailed and reliable information about the speed, strength, direction, and frequency of the wind resource is vital when considering the installation of a wind farm, as the wind resource is a critical factor to the success of the installation.

Wind speed is the rate at which air flows past a point above the earth's surface. Average annual wind speed is a critical siting criterion, since this determines the cost of generating electricity. With a doubling of average wind speed, the power in the wind increases by a factor of 8, so even small changes in wind

speed can produce large changes in the economic performance of a wind farm (for example, an increase of average wind speed from 22 km/hr to 36 km/hr (6 m/s to 10 m/s) increases the amount of energy produced by over 130%). Wind turbines can start generating at wind speeds of between 10 km/hr to 15 km/hr (~3 m/s to 4 m/s), with nominal wind speeds required for full power operation varying between ~45 km/hr and 60 km/hr (~12.5 m/s to 17 m/s). Wind speed can be highly variable and is affected by a number of factors, including surface roughness of the terrain.

Wind power is a measure of the energy available in the wind.

Wind direction at a site is important to understand as it influences the turbulence over the site, and therefore the potential energy output. However, wind turbines can extract energy from any wind direction as the nacelle automatically turns to face the blades into the predominant wind direction at any point in time.

South Africa in general can be considered as having a moderate wind resource as compared to Northern Europe (Scandinavia), Great Britain and Ireland, New Zealand and Tasmania. Typical annual wind speeds range from 15 km/hr to 5 km/hr (4 m/s to 7 m/s) around South Africa's southern, eastern and western coastlines (with more wind typically closer to the coastline).

The wind speed measurements taken at a particular site are affected by the local topography (extending to a few tens of kilometres from the mast) or surface roughness. This is why local on-site monitored wind speed data is so important for detailed wind farm design. The effect of height variation/relief in the terrain is seen as a speeding-up/slowing-down of the wind due to the topography. Elevation in the topography exerts a profound influence on the flow of air, and results in turbulence within the air stream, and this has to be taken into account in the placement of turbines.

A wind resource measurement and analysis programme is planned to provide measured data and a prediction of the facility's expected energy production over its lifetime. The design (and micro-siting) of a wind farm is sensitive to the predominant wind directions and wind speeds for the site. Although wind turbines are able to yaw to the direction of the wind, the micro-siting must consider the wind direction and strength of the wind in the optimal positioning of the turbines.

Wind turbines typically need to be spaced approximately 2 to 3xD apart, and 5 to 7xD where a turbine is behind another (D = the diameter of the rotor blades). This is required to minimise the induced wake effect that the turbines might have on each other. The micro-sitting of the turbines will be determined using industry software systems once a viable development footprint for the establishment of the wind farm has been determined (through the consideration of both technical and environmental criteria), which will automatically consider the spacing requirements.

2.5.1 How do wind turbines function?

Wind turbines, like windmills, are mounted on a tower to capture the most energy. The kinetic energy of wind is used to turn a wind turbine to generate electricity. At increased height above ground, they can take advantage of the faster and less turbulent wind. Turbines catch the wind's energy with their propeller-like blades. Usually, two or three blades are mounted on a shaft to form a rotor. Generally a wind turbine consists of three rotor blades and a nacelle mounted at the top of a tapered steel or concrete tower. The

mechanical power generated by the rotation of the blades is transmitted to the generator within the nacelle.

Turbines are able to operate at varying speeds. The amount of energy a turbine can harness depends on both the wind velocity and the length of the rotor blades. It is anticipated that the turbines utilised for the project will have a hub height of up to 120m, with an overall turbine height of up to 165m. Wind turbines can start generating at wind speed of between 10 km/hr to 15 km/hr (~3 m/s to 4 m/s), with nominal wind speeds required for full power operation varying between ~45 km/hr and 60 km/hr (12.5 m/s and 17 m/s).

The capacity of the wind energy facility will depend on the wind turbine chosen by Vredenburg Windfarm (Pty) Ltd (turbine capacity and model that will be deemed most suitable for the site). Turbines from up to 4MW in capacity are being considered for the site. Up to a maximum of 45 turbines are estimated for the project site.

2.5.2 Main Components of a Wind Turbine

The turbine consists of the following major components:

» The rotor
» The nacelle
» The tower
» The foundation unit

Figure 2.4 below provides an illustration of a wind turbine, as well as the main components associated with it.

The Rotor

The portion of the wind turbine that collects energy from the wind is called the rotor. The rotor comprises of three rotor blades. The rotor blades use the latest advances in aeronautical engineering materials science to maximise efficiency. The greater the number of turns of the rotor the more electricity is produced. The rotor converts the energy in the wind into rotational energy to turn the generator. The rotor has three blades that rotate at about 15 to 28 revolutions per minute (rpm). The speed of rotation of the blades is controlled by turning the blades to face into the wind ('yaw control'), and changing the angle of the blades ('pitch control') to make the most use of the available wind.

The rotor blades function in a similar way to the wing of an aircraft, utilising the principles of lift**.** When air flows past the blade, a wind speed and pressure differential is created between the upper and lower blade surfaces. The pressure at the lower surface is greater and therefore acts to "lift" the blade. When blades are attached to a central axis, like a wind turbine rotor, the lift is translated into rotational motion. Lift-powered wind turbines are well suited for electricity generation.

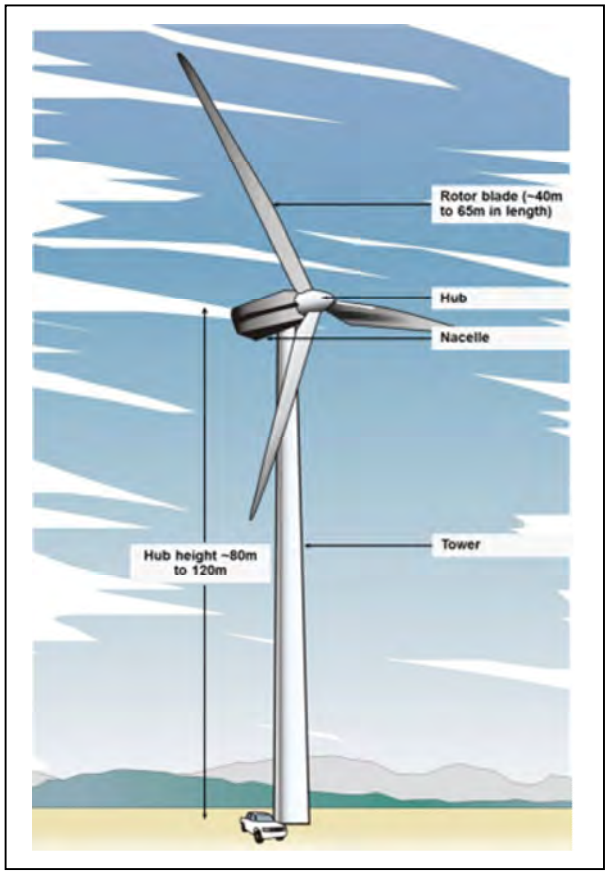


Figure 2.4: Illustration of the main components of a wind turbine

The nacelle

The nacelle at the top of the tower accommodates the generator, anemometer for monitoring the wind speed and direction, cooling and electronic control devices, and yaw mechanism. Geared nacelles generally have a longer form/ structure than gearless turbines (as shown in **Figure 2.5**).

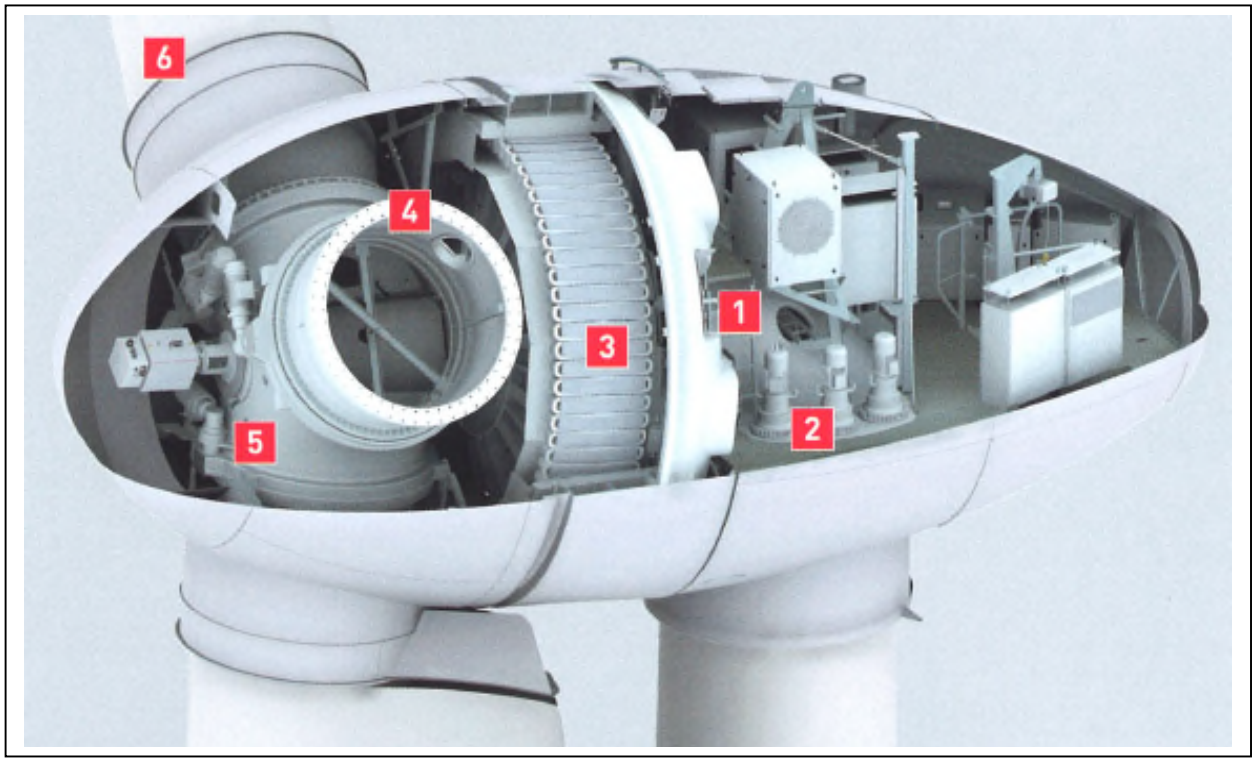


Figure 2.5: Detailed structure of a typical gearless nacelle of a wind turbine. The following components are illustrated 1) main carrier, 2) yaw drive, 3) annular generator, 4) blade adapter, 5) rotor hub and 6) rotor blade (Enercon Product Overview, March 2014)

The tower

The tower is a hollow structure (steel or concrete or a combination of the two materials) allowing access to the nacelle (up to 120m in height). The height of the tower is a key factor in determining the amount of electricity a turbine can generate. Small transformers may occur outside each turbine tower, depending on what make and model of turbine is deemed most suitable for the site. Such a transformer would have its own foundation and housing around it. Alternatively, the transformer could be housed within the tower. The transformers convert the electricity to the correct voltage for transmission into the national energy grid.

The tower on which a wind turbine is mounted is not just a support structure. It also raises the wind turbine so that its blades safely clear the ground and so it can reach the stronger winds at higher elevations. The tower must be strong enough to support the wind turbine and to sustain vibration, wind loading and the overall weather elements for the lifetime of the wind turbine.

The foundation

The foundation is used to secure each wind turbine to the ground. These structures are commonly made of reinforced concrete and are designed to withstand the vertical loads (weight) and lateral loads (wind).

2.5.3 Operating Characteristics of a Wind Turbine

A turbine is designed to operate continuously, unattended and with low maintenance for more than 20 years or >120 000 hours of operation. Once operating, a wind farm can be monitored and controlled remotely, with a mobile team for maintenance, when required.

The cut-in speed is the minimum wind speed at which the wind turbine will generate usable power. This wind speed is typically between 10 and 15 km/hr (~3 m/s and 4 m/s).

At very high wind speeds, typically over 90 km/hr (25 m/s), the wind turbine will cease power generation and shut down. The wind speed at which shut down occurs is called the cut-out speed. Having a cut-out speed is a safety feature which protects the wind turbine from damage. Normal wind turbine operation usually resumes when the wind drops back to a safe level.

It is the flow of air over the blades and through the rotor area that makes a wind turbine function. The wind turbine extracts energy by slowing the wind down. The theoretical maximum amount of energy in the wind that can be collected by a wind turbine's rotor is approximately 59%. This value is known as the Betz Limit. If the blades extracted 100% of the wind's energy, a wind turbine would not work because the air, having given up all its energy, would entirely stop. Therefore, if a blade were 100% efficient then it would extract 59% of the energy as this is the maximum (due to Betz law). In practice, the typical collection efficiency of a rotor is 35% to 45%. A complete wind energy system incurs losses through friction etc. and modern systems end up converting between 20-25% of the energy in the air into electricity which equates to 34 - 42% of the maximum (due to Betz Law).

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

CHAPTER 3: REGULATORY AND PLANNING CONTEXT

3.1 Legal Requirements as per the EIA Regulations, 2014 (as amended)

This chapter of the final scoping report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(e) a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process	Chapter 3 as a whole provides an overview of the policy and legislative context which is considered to be associated with the development of the Boulders Wind Farm. The regulatory and planning context has been considered at national, provincial and local levels.

3.2. Strategic Electricity Planning in South Africa

The need to expand electricity generation capacity in South Africa is based on national policy and is informed by on-going strategic planning undertaken by the Department of Energy (DoE). The regulatory hierarchy of policy and planning documentation that support the development of an energy generation project of this nature consists of three tiers of authority who exercise control through both statutory and non-statutory instruments – that is National, Provincial and Local levels. These policies are discussed in more detail in the following sections, along with the provincial and local policies or plans that have relevance to the development of the proposed Boulders Wind Farm.

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

- *Department of Energy (DoE)*: This Department is responsible for policy relating to all energy forms, including renewable energy, and is responsible for developing and approving the IRP (Integrated Resource Plan for Electricity).
- *National Energy Regulator of South Africa (NERSA):* This body is responsible for regulating all aspects of the electricity sector, and will ultimately issue licenses for renewable energy developments to generate electricity.
- *Department of Environmental Affairs (DEA):* This Department is responsible for environmental policy and is the controlling authority in terms of NEMA and the EIA Regulations. The DEA is the competent authority for this project, and charged with granting the relevant environmental authorisation.
- *The South African Heritage Resources Agency (SAHRA):* SAHRA is a statutory organisation established under the National Heritage Resources Act, No 25 of 1999, as the national administrative body responsible for the protection of South Africa's cultural heritage.
- *Department of Transport – South African Civil Aviation Authority (SACAA):* This department is responsible for aircraft movements and monitoring through the use of radar, which are aspects that influence renewable energy development location and planning.
- *South African National Roads Agency Limited (SANRAL):* This Agency is responsible for the regulation and maintenance of all national routes.

» *Department of Water and Sanitation (DWS):* This Department is responsible for water resource protection, water use licensing and permits.
» *The Department of Agriculture, Forestry and Fisheries (DAFF):* This Department is the custodian of South Africa's agriculture, fisheries and forestry resources and is primarily responsible for the formulation and implementation of policies governing the Agriculture, Forestry and Fisheries Sector. This Department is also responsible for the issuing of permits for impacts on protected tree species.
» *The Department of Science and Technology:* This department is the administrating authority for the Astronomy Geographical Advantage Act (Act No 21 of 2007).
» *Department of Mineral Resources (DMR):* Approval from the DMR is required to use land surface contrary to the objects of the Act in terms of Section 53 of the Mineral and Petroleum Resources Development Act, (Act No 28 of 2002). In terms of the Act, approval from the Minister of Mineral Resources is required to ensure that proposed activities do not sterilise a mineral resource that might occur on site.

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

» *Provincial Government of the Western Cape – Department of Environmental Affairs and Development Planning (DEA&DP):* This department is the responsible authority for review of environmental assessments and development planning applications within the Western Cape. DEA&DP is the commenting authority for this project.
» *Department of Transport and Public Works (Western Cape):* This department is responsible for Provincial roads within the Western Cape, and for the granting of exemption permits for the conveyance of abnormal loads on public roads.
» *CapeNature:* This Department's involvement relates specifically to the biodiversity and ecological aspects of the proposed development activities on the receiving environment to ensure that developments do not compromise the biodiversity value of an area. The Department considers the significance of impacts specifically in threatened ecosystems as identified by the National Spatial Biodiversity Assessment or systematic biodiversity plans.
» *Western Cape Department of Agriculture:* This Department's involvement relates specifically to sustainable agricultural resource management and land care.
» *Heritage Western Cape:* The provincial heritage resources authority within the Western Cape. This public entity seeks to identify, protect and conserve the rich and diverse heritage resources of the Western Cape. HWC is mandated to promote co-operative governance between national, provincial and local authorities for the identification, conservation and management of heritage resources.
» *Catchment Management Agencies (CMA):* The Western Cape West Coast Rivers CMA is responsible for evaluating and issuing licenses pertaining to water use.

At the **Local Level** the local and municipal authorities are the principal regulatory authorities responsible for planning, land use and the environment. In the Western Cape, both the local and district municipalities play a role.

» The local municipality is the Saldanha Bay Local Municipality.
» The district municipality is the West Coast District Municipality.

3.3. Policy and Planning Considerations on International, National, Provincial and Local Levels

Policy and Planning on an International Level

South Africa has committed to various international policies which relate to environmental concerns, specifically that of climate change and global warming. **Table 3.1** below provides a summary of the international policies and plans that South Africa has made commitments towards, and how the development of the Boulders Wind Farm aligns with the thinking or commitments of these agreements.

Table 3.1: International policies and plans relevant to the Boulders Wind Farm

Policy or Plan	Is the development of the Boulders Wind Farm aligned with this policy or plan?
The Kyoto Protocol, 1997	Yes. The protocol calls for the reduction of South Africa's greenhouse gas emissions through actively cutting down on using fossil fuels, or by utilising more renewable resources. The development of the Boulders Wind Farm will add capacity to the renewable energy sector of the country and strengthen the commitment and action plan to achieve the requirements as set out in the protocol.
United Nations Framework Convention on Climate Change and COP21 – Paris Agreement	Yes. South Africa supports the adoption of the Paris Agreement which has the main objective of addressing the climate change issue and marks the first international political response to climate change. South Africa has set out a goal of 17,8GW of renewable energy by 2030 within the IRP. Through the development of renewable energy projects (including the Boulders Wind Farm) additional renewable energy will be made available to the country, which in turn will demonstrate the contribution that South Africa is making to the global response to climate change specifically relating to the development of the renewable energy sector.

Policy and Planning on a National Level

Further to the South African government's commitment in August 2011 to support the development of 3,725MW of renewable energy capacity, the Department of Energy (DoE) initiated the Renewable Energy Independent Power Producer Procurement (REIPPP) Programme to procure renewable energy from the private sector in a series of rounds. To date, the DoE has procured more than 6 000MW of renewable energy capacity from 92 independent producers, with 37 having started commercial operation, adding 1 860MW to the National electricity grid.

Other national policies and plans adopted by South Africa, which are considered to be relevant to the development of the Boulders Wind Farm has been summarised in **Table 3.2**.

Table 3.2: National policies, plans and legislation relevant to the Boulders Wind Farm

Policy, Plan or Legislation	Is the development of the Boulders Wind Farm aligned with this policy, plan or legislation?
White Paper on the Renewable Energy Policy of the Republic of South Africa (2003)	Yes. This White Paper fosters the uptake of renewable energy in the economy and has a number of objectives that need to be met, including that equitable resources are invested in renewable technologies. South Africa is also endowed with renewable energy resources that can be sustainable alternatives to fossil fuels, but which have so far remained largely untapped. The development of additional renewable energy projects will promote the use of the abundant South African renewable energy resources and contribute to long-term energy security and diversification of the energy mix.
The National Energy Act (2008)	Yes. One of the objectives of the Act was to promote diversity of supply of energy and its sources. In this regard, the preamble makes direct reference to renewable resources which states that provision must be made for the increased generation and consumption

	of renewable energies. Considering the support for renewable energy developments within the Energy Act, the Boulders Wind Farm project promotes diversity of supply of energy and the source of supply, in line with the Act's requirements.
The Electricity Regulation Act, 2006 (Act No. 4 of 2006), as amended	Yes. The Act establishes a national regulatory framework for the electricity supply industry of the country and introduces the National Energy Regulator as the custodian and enforcer of the National Electricity Regulatory Framework. The Act also provides for licences and registration as the manner in which generation, transmission, distribution, trading and the import and export of electricity are regulated. The development of the Boulders Wind Farm project will have to ensure compliance with this Act as a license for the generation of electricity will be required.
Renewable Energy Policy in South Africa	Yes. Support for the Renewable Energy Policy is guided by a rationale that South Africa has a very attractive range of renewable energy resources, particularly solar and wind, and that renewable applications are, in fact, the least cost energy service in many cases from a fuel resource perspective (i.e. the cost of fuel in generating electricity from such technology); more so when social and environmental costs are taken into account. However, the National Energy Policy acknowledges that the development and implementation of renewable energy applications has been neglected in South Africa. Challenges regarding the implementation of renewable energy has been identified. Through the development of renewable energy projects (including the Boulders Wind Farm project), additional renewable energy will be made available which will assist with the further growth and development of the renewable energy sector.
National Development Plan (NDP)	Yes. The NDP contains a plan aimed at eliminating poverty and reducing inequality by 2030 and identifies 9 key challenges and associated remedial plans. Managing the transition towards a low carbon national economy is identified as one of the 9 key national challenges. Expansion and acceleration of commercial renewable energy is identified as a key intervention strategy. The plan also sets out steps that aim to ensure that, in 20 years, South Africa's energy system looks very different to the current situation: coal will contribute proportionately less to the primary-energy needs, while gas and renewable energy resources – especially wind, solar and imported hydroelectricity – will play a much larger role. Through the development of renewable energy projects (including the Boulders Wind Farm project), additional renewable energy will be available which will assist in expanding the renewable energy sector of the country and add to the diversification of the energy mix which is moving away from coal and towards the use of gas and renewable energy.
Integrated Energy Plan (IEP)	Yes. The IEP takes into consideration the crucial role that energy plays in the entire economy of the country and is informed by the output of analyses founded on a solid fact base. Eight key objectives were identified which relate mainly to the security, cost, access, diversity, efficiency, impact in terms of emissions, conservation and social benefits in terms of energy planning. The IEP recognises the potential of renewable energy for power generation and with the additional renewable energy to be generated by the Boulders Wind Farm a contribution to the objective will be made. Also, with the development of the proposed wind farm the eight key objectives in terms of energy planning will be met, even if only to a limited extent.
Integrated Resource Plan 2010 - 2030	Yes. Ministerial determinations have called for a procurement of 13 125 MW of renewable energy from independent power producers (IPPs) of which 6 360 MW has been allocated to wind energy projects (Department of Energy, 2016). The development of the Boulders Wind Farm has the potential to contribute up to 140MW of wind energy which will support the Government's target of 6 360MW of electricity generated by wind energy facilities.
Strategic Integrated Projects (SIP)	Yes. In 2010, a National Development Plan was drafted to address socio economic issues affecting development in South Africa. These issues were identified and placed under 18 different Strategic Integrated Projects (SIPs) to address the spatial imbalances of the past

	by addressing the needs of the poorer provinces and enabling socio-economic development. The development of renewable energy projects (including the Boulders Wind Farm) will support the Strategic Integrated Projects within two SIPs which relate to the development of the wind farm and the development of the associated infrastructure. This include SIP 8 – green energy in support of the South African economy; and SIP 9 – electricity generation to support socio-economic development.
National Climate Change Response Strategy	Yes. This strategy aims to address issues identified as priorities for dealing with climate change in the country. The focus of the strategy is adapting to climate change; developing a sustainable energy programme; adopting an integrated response by the relevant government departments; compiling inventories of greenhouse gases; accessing and managing financial resources; and research, education, and training. The development of renewable energy projects (including the Boulders Wind Farm) will ensure additional uptake of renewable energy into the national grid which will reduce the need for the use of coal as an energy resource and thereby assisting in the alleviation of climate change and global warming.

Policy and Planning on a Provincial Level

Policies and plans have been adopted by the Western Cape Province for the management of the area and are considered to be relevant to the development of the Boulders Wind Farm. **Table 3.3** provides a summary of the relevant provincial plans and policies.

Table 3.3: Provincial policies and plans relevant to the Boulders Wind Farm

Policy or Plan	Is the development of the Boulders Wind Farm aligned with this policy or plan?
White Paper on Sustainable Energy for the Western Cape (2010)	Yes. The White Paper forms part of Provincial Government Western Cape's (PGWC) strategy aimed at removing a number of barriers (e.g. energy pricing, legal, institutional, low levels of investment confidence, insufficient knowledge) currently frustrating the province's energy goals by preventing the adoption and commercialisation of clean energy (including electricity generation from renewable sources such as wind and solar) technologies and initiatives. The White Paper notes that, with regard to sources of renewable energy, wind and solar both represent commercially viable options in the province. Considering that the development of wind energy facilities is a viable option in the Western Cape Province the development of the Boulders Wind Farm is in line with the White Paper.
Western Cape Draft Strategic Plan (WCDSP) (2014-2019)	Yes. The strategic plan identifies five strategic goals for the 2014-2019 period which includes creating opportunities for growth and jobs; improving education outcomes and opportunities for youth development; increasing wellness and safety, and tackling social skills; enabling a resilient, sustainable, quality and inclusive living environment; and embedding good governance and integrated service delivery through partnerships and spatial alignment. The development of the Boulders Wind Farm will assist the Western Cape provincial government with achieving some of the five strategic goals (even if only to a limited extent) and is therefore considered as a desired development within the Province.
Western Cape Provincial Spatial Development Framework (PSDF) (2014)	Yes. The PSDF responds to a number of associated escalating risks, including understanding the spatial implications of known risks (e.g. climate change and its economic impact and sea level rise, flooding and wind damage associated with extreme climatic events); and energy insecurity, high levels of carbon emissions, and the economic impacts of the introduction of a carbon tax. With the development of the Boulders Wind Farm additional renewable energy will be available within the national grid and the escalating risks experienced within the Province may be slightly alleviated, especially in terms of energy security. Carbon emissions will also be addressed to a limited

	extent as no emissions are to be associated with the development.
Guidelines for the Management of Development on Mountains, Hills and Ridges in the Western Cape (2002)	Yes. The aim of the Guideline is to provide a decision-making framework with regard to developments which includes listed activities in terms of National Environmental Management Act Regulations, and which are proposed in an environment which is characterised by mountains, hills and ridges. The Guideline notes that mountains, hills and ridges are subject to a range of development pressures. It should be noted that the proposed Boulders Wind Farm project site is located in a landscape which is considered to be fairly flat with only Kasteelberg (a hill) located within the area. The project site excludes Kasteelberg.

Policy and Planning on a District and Local Level

These strategic policies at the district and local level have similar objectives for the respective areas, namely to accelerate economic growth, create jobs, uplift communities and alleviate poverty. The proposed development is considered to align with the aims of these policies.

Table 3.4 below provides a summary of the district and local level policies and plans considered to be relevant to the development of the Boulders Wind Farm.

Table 3.4: District and local policies and plans relevant to the Boulders Wind Farm

Policy or Plan	Is the development of the Boulders Wind Farm aligned with this policy or plan?
West Coast District Municipality Spatial Development Framework (WCSDF) (2012-2016)	Yes. The SDF lists three goals that underpin the West Coast District Spatial Strategy and Vision, namely: * enhancing the capacity and quality of infrastructure in the areas with the highest economic growth potential; * creating an enabling environment for employment, economic growth and tourism development, while promoting access to public amenities such as education and health facilities and * enhancing and protecting the key biodiversity and agricultural assets in the district and plan to minimise the human footprint on nature, while also mitigating the potential impact of nature (climate change) on the residents of the district. The development of the Boulders Wind Farm will contribute to the three goals through the development of infrastructure associated with the project, the creation of employment opportunities, skills learning opportunities and economic growth in the area and minimisation of the impact of the development through the consideration and avoidance of the sensitive environmental features present within the project site and the implementation of appropriate mitigation measures in order to reduce the significance of the impact. .
West Coast District Municipality Integrated Development Plan (IDP) (2017-2022)	Yes. The IDP includes a Climate Change Strategy. In this regard the IDP notes that the West Coast area will become a very dry area with less rainfall and less water. Of relevance to the Boulders Wind Farm, the IDP notes that the approach to addressing the challenges includes reducing greenhouse gas emissions from energy by switching to renewable energy.
Saldanha Bay Local Municipality Spatial Development Framework (SDF) (2017)	Yes. The SDF makes no reference to the establishment of renewable energy facilities (including wind farms) as a potential threat to the area, and specifically as a potential threat to tourism. With specific reference to wind farms, the framework notes that two wind farms are operating, one north of Vredenburg and one east of Hopefield. The framework also states that these wind farms form the core of two much bigger areas currently under application for further wind farms. The framework therefore acknowledges the potential for future development of wind farms in the Saldanha Bay Local Municipality.

Saldanha Bay Integrated Development Plan (IDP) (2017-2022)	Yes. The IDP notes that the Saldanha Bay area plays an important role in the broader strategic framework of the South African Government as driven by the National Development Plan and National Growth Plan. In this regard, Saldanha Bay was identified as a presidential priority development region in 2011 by the National Planning Commission. The National Development Plan 2012 (NDP) identifies the Greater Saldanha region as a special intervention area, attributed to the natural deep water harbour and industrial development prospects that warrant its designation as a national growth management zone. Therefore, considering the nature of the Boulders Wind Farm and the location of the project site within the Saldanha Bay Local Municipality it can be concluded that the proposed development is in line with the IDP.
Saldanha Bay Local Municipality Medium Term Economic Development Strategy (2013)	Yes. The strategy states that Western Cape has developed their Medium Term Strategic Plan (MTSP). The renewable energy sector and green technology sector are considered to be sectors of focus. The development of the Boulders Wind Farm falls within the two sectors of focus stated.

3.4. Legislation and Guidelines

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

- National Environmental Management Act (Act No. 107 of 1998).
- EIA Regulations, published under Chapter 5 of NEMA (GNR R326 in Government Gazette No 40772 of December 2014, as amended in April 2017).
- Guidelines published in terms of the NEMA EIA Regulations.
- Provincial Government Western Cape, Department of Environmental Affairs and Development Planning: Guideline for Environmental Management Plans, 2005.
- International guidelines – the Equator Principles, the IFC Performance Standards, the Sustainable Development Goals, World Bank Environmental and Social Framework, and the and World Bank Group Environmental, Health, and Safety Guidelines (EHS Guidelines).

Several other Acts, standards or guidelines have also informed the project process and the scope of issues evaluated in the scoping report, and to be addressed in the EIA. **Table 3.5** below provides an outline of the legislative permitting requirements applicable to the Boulders Wind Farm as identified at this stage in the project process.

Table 3.5: Relevant legislative permitting requirements applicable to the Boulders Wind Farm

Legislation	Applicable Requirements
National	
National Environmental Management Act (Act No 107 of 1998)	The EIA Regulations have been promulgated in terms of Chapter 5 of the Act. Listed activities which may not commence without an environmental authorisation are identified within these Regulations. In terms of S24(1) of NEMA, the potential impact on the environment associated with these listed activities must be assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation. In terms of the NEMA EIA Regulations GN R326, R327, R325 and R324 of April 2017, a Scoping and EIA Process is required to be undertaken for the proposed Boulders Wind Farm.
Environment Conservation Act (Act No 73 of 1989)	Developments are required to comply with the limits set within the National Noise Control Regulations (GN R154 dated 10 January 1992).
National Water Act (Act No 36 of 1998)	Water uses under Section 21 of the Act must be licensed, unless such water use falls into one of the categories listed in S22 of the Act or falls under the general authorisation (and then registration of the water use is required). Consumptive water uses may include the taking of water from a water resource and storage - Sections 21a and b. Non-consumptive water uses may include impeding or diverting of flow in a water course - Section 21c; and altering of bed, banks or characteristics of a watercourse - Section 21i.
Minerals and Petroleum Resources Development Act (Act No 28 of 2002)	A mining permit or mining right may be required where a mineral in question is to be mined (e.g. materials from a borrow pit) in accordance with the provisions of the Act. Requirements for Environmental Authorisation of mining related activities are as detailed within the NEMA EIA Regulations (GNR324 – 326). Section 53 Department of Mineral Resources: Approval from the Department of Mineral Resources (DMR) may be required to use land surface contrary to the objects of the Act in terms of section 53 of the Mineral and Petroleum Resources Development Act, (Act No 28 of 2002): In terms of the Act approval from the Minister of Mineral Resources is required to ensure that proposed activities do not sterilise a mineral resource that might occur on site.
National Environmental Management: Air Quality Act (Act No 39 of 2004)	No air emissions will result from the Boulders Wind Farm and therefore no air emissions license is required to be obtained. Reporting to the Air Emissions Licensing Authority (AELA) on emissions from small boilers (such as may be used for auxiliary power supply sources) would be required. Dust control Regulations have been promulgated under the Air Quality Act. In this regard, a dust monitoring plan may be

Legislation	Applicable Requirements
	required to be implemented if required by the AELA.
National Heritage Resources Act (Act No 25 of 1999)	This Act Provides for the protection of all archaeological and palaeontological sites, and meteorites (S35), the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority (S36), and lists activities which require developers or any person who intends to undertake the activities to notify the responsible heritage resources authority and furnish it with details regarding the location, nature, and extent of the proposed development (S38). A heritage permit is required should any sites of heritage significance be impacted by the Boulders Wind Farm.
National Environmental Management: Biodiversity Act (Act No 10 of 2004)	» Provides for the MEC/Minister to identify any process or activity in such a listed ecosystem as a threatening process (S53) » A list of threatened and protected species has been published in terms of S 56(1) - Government Gazette 29657. » Three government notices have been published, i.e. GN R 150 (Commencement of Threatened and Protected Species Regulations, 2007), GN R 151 (Lists of critically endangered, vulnerable and protected species) and GN R 152 (Threatened or Protected Species Regulations). » Provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (National Environmental Management: Biodiversity Act: National list of ecosystems that are threatened and in need of protection, (G 34809, GN 1002), 9 December 2011). » This Act also regulates alien and invader species. » A permit is required to be obtained to impact on any species listed in terms of this Act or associated Regulations. » The Department of Environmental Affairs (DEA) published Regulations on Alien and Invasive Species (AIS) in terms of the National Environmental Management: Biodiversity Act, on Friday 1st August 2014. A total of 559 alien species are now listed as invasive, in four different categories. A further 560 species are listed as prohibited, and may not be introduced into the country.
Conservation of Agricultural Resources Act (Act No 43 of 1983)	» No permitting requirements in terms of this Act are expected to be applicable to the project under investigation. » Prohibition of the spreading of weeds (S5) » Classification of categories of weeds and invader plants (Regulation 15 of GN R1048) and restrictions in terms of where these species may occur. » Requirement and methods to implement control measures for alien and invasive plant species (Regulation 15E of GN R1048).
National Forests Act (Act No. 84 of 1998)	» According to this Act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. The prohibitions provide that 'no person may cut, damage, disturb, destroy or remove any protected tree, or collect,

Legislation	Applicable Requirements
	remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister'. » A permit is required to be obtained to impact on any species listed in terms of this Act or associated Regulations.
National Veld and Forest Fire Act (Act 101 of 1998)	In terms of S12 the applicant must ensure that the firebreak is wide and long enough to have a reasonable chance of preventing the fire from spreading, not causing erosion, and is reasonably free of inflammable material. » In terms of S17, the applicant must have equipment, protective clothing, and trained personnel for extinguishing fires.
Hazardous Substances Act (Act No 15 of 1973)	This Act regulates the control of substances that may cause injury, or ill health, or death due to their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products. Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc., nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared as Group I or Group II substance • Group IV: any electronic product; and • Group V: any radioactive material. The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)	The Minister may by notice in the Gazette publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. The Minister may amend the list by – » Adding other waste management activities to the list. » Removing waste management activities from the list. » Making other changes to the particulars on the list. In terms of the Regulations published in terms of this Act (GN 921 of November 2013), a Basic Assessment or Environmental Impact Assessment is required to be undertaken for identified listed activities in support of an application for a waste license.

Legislation	Applicable Requirements
	Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that: » The containers in which any waste is stored, are intact and not corroded or in any other way rendered unlit for the safe storage of waste. » Adequate measures are taken to prevent accidental spillage or leaking. » The waste cannot be blown away. » Nuisances such as odour, visual impacts and breeding of vectors do not arise; and » Pollution of the environment and harm to health are prevented.
National Road Traffic Act (Act No 93 of 1996)	» The technical recommendations for highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. » Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts. » The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations. » A permit is required to be obtained for the transportation of abnormal loads.
Aviation Act (Act No 74 of 1962) 13th amendment of the Civil Aviation Regulations (CARS) 1997	Any structure exceeding 45m above ground level or structures where the top of the structure exceeds 150m above the mean ground level, the mean ground level considered to be the lowest point in a 3km radius around such structure. Structures lower than 45m, which are considered as a danger to aviation shall be marked as such when specified. Overhead wires, cables etc., crossing a river, valley or major roads shall be marked and in addition their supporting towers marked and lighted if an aeronautical study indicates it could constitute a hazard to aircraft. Section 14 of Obstacle limitations and marking outside aerodrome or heliport – CAR Part 139.01.33 relates specifically to appropriate marking of wind energy facilities.
Provincial	
Western Cape Noise Control Regulations (Provincial Notice 200/2013) of 20 June 2013	The control of noise in the Western Cape is legislated by the Western Cape Noise Control Regulations in terms of Section 25 of the Environment Conservation Act (Act 73 of 1989).

Legislation	Applicable Requirements
	In terms of Regulation 2 "A per son may not cause a disturbing noise; or allow a disturbing noise to be caused by any person, animal, machine, device, apparatus, vehicle, vessel or model aircraft, or any combination thereof."
The Nature and Environmental Ordinance 19 of 1974, (as amended by the Western Cape Nature Conservation Laws Amendment Act, Act 2 of 2000)	The Nature and Environmental Ordinance 19 of 1974, (as amended by the Western Cape Nature Conservation Laws Amendment Act, Act 2 of 2000) defines the protection status of plants as follows: * ''endangered flora'' means flora of any species which is in danger of extinction and is specified in Schedule 3 or Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, Washington, 1973; provided that it shall not include flora of any species specified in such Appendix and Schedule 4; (therefore all Schedule 3 species) * ''protected flora'' means any species of flora specified in Schedule 4 or Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, Washington, 1973; provided that it shall not include any species of flora specified in such Appendix and Schedule 3 * ''indigenous unprotected flora'' means any species of indigenous flora not specified in Schedule 3 or 4.
Western Cape Transportation Amendment Act of 1996	The provincial MEC may grant a permit to undertake works within 200m of the published route upon receipt of a report assessing the potential impacts thereof.
Western Cape Biodiversity Spatial Plan (2017)	The Western Cape Biodiversity Spatial Plan (WCBSP) is a spatial tool that forms part of a broader set of national biodiversity planning tools and initiatives that are provided for in national legislation and policy. It comprises the Biodiversity Spatial Plan Map of biodiversity priority areas, accompanied by contextual information and land use guidelines that make the most recent and best quality biodiversity information available for use in land use and development planning, environmental assessment and regulation, and natural resource management.

CHAPTER 4: APPROACH TO UNDERTAKING THE SCOPING PHASE

An Environmental Impact Assessment (EIA) process refers to that process (in line with the EIA Regulations, 2014, as amended April 2017) which involves the identification and assessment of direct, indirect, and cumulative environmental impacts associated with a proposed project/ activity. The EIA process comprises two main phases: i.e. **Scoping Phase** and **EIA Phase**. The EIA process culminates in the submission of an EIA Report (including an Environmental Management Programme (EMPr) to the competent authority for decision-making. The EIA process is illustrated below:

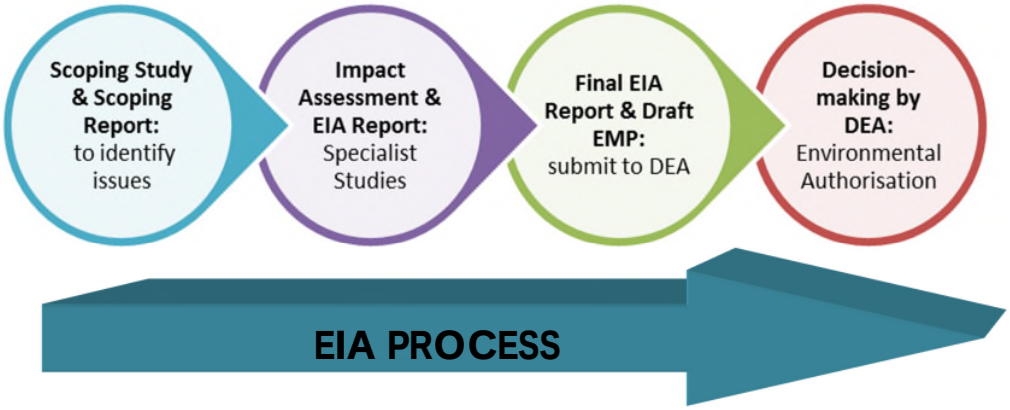


Figure 4.1: The Phases of an EIA Process as per the EIA Regulations, 2014

In terms of the EIA Regulations (2014) of GN R326, a Scoping and EIA Study are required to be undertaken for the proposed Boulders Wind Farm. In accordance with the EIA Regulations, this scoping process aimed at identifying and evaluating potential issues associated with the proposed project, and defining the extent of studies required within the EIA. This was achieved through an evaluation of the Boulders Wind Farm involving the consideration of previous assessments undertaken within the area, specialist surveys and studies, as well as a consultation process with key stakeholders (including relevant government authorities) and interested and affected parties (I&APs).

4.1 Legal Requirements as per the EIA Regulations, 2014 (as amended)

This chapter serves to outline the process which was followed during the Scoping Phase of the EIA process. This chapter includes the following information required in terms of the EIA Regulations, 2014 - Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(d) a description of the scope of the proposed activity, including (i) all listed and specified activities triggered and (ii) a description of the activities to be undertaken, including associated structures and infrastructure	All listed activities triggered in terms of the EIA Regulations 2014, as amended, have been included in Table 4.1. A description has also been provided in Table 4.1 of how the relevant listed activities are applicable to the Boulders Wind Farm.
(h)(ii) details of the public participation process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs	The details of the public participation process undertaken for the Boulders Wind Farm to date is included in section 4.4 of this chapter

(h)(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them	Issues raised by I&APs to date have been included as part of the Comments and Responses Report (**Appendix C**). Following the 30-day review period all comments on the Scoping report have been included into the Comments and Responses report (Appendix C8) and considered and addressed in this final Scoping report submitted to DEA for their consideration.

4.2 Relevant Listed Activities

In terms of the EIA Regulations, 2014, as amended published within GN R327, GN R325 and GN R324, the following 'listed activities' are currently identified to be triggered by the development of the Boulders Wind Farm and associated infrastructure. The proposed development activities trigger at least one listed activity from GN R325 and therefore require a full Scoping and EIA. The Scoping and EIA process is regulated by Chapter 4, Part 3 and Appendices 2, 3, 4 and 6 of the 2014 EIA Regulations.

Table 4.1: Listed activities currently identified to be triggered by the development of the Boulders Wind Farm

Number and date of the relevant notice:	Activity No(s) (in terms of the relevant notice):	Listed activity	Description of project activity that triggers listed activity
GN 327, 07 April 2017	11 (i)	The development of facilities or infrastructure for the transmission and distribution of electricity – (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.	***The project will include the development of an on-site substation and transformers with a capacity of more than 33kV and less than 275kV outside of an urban area.***
GN 327, 07 April 2017	12 (ii)(a)(c)	The development of – (ii) infrastructure or structures with a physical footprint of 100 square meters or more; where such development occurs- (a) within a watercourse; or (c) within 32 meters of a watercourse, measured from the edge of a watercourse	***Associated infrastructure and structures with a physical footprint of 100m² or more, such as turbines, grid connection infrastructure, access roads, buildings or other associated infrastructure will be constructed within a watercourse or within 32 meters of a watercourse located within the project site.***
GN 327, 07 April 2017	19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.	***The upgrade or construction of road access for the Boulders Wind Farm will lead to material of more than 10m³ being deposited into or removed from watercourses.***
GN 327, 07 April 2017	24 (ii)	The development of a road- (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres	***The Boulders Wind Farm will require access roads with sections wider than 8m in width, to be constructed as a result of logistical construction vehicle specification and operational***

Number and date of the relevant notice:	Activity No(s) (in terms of the relevant notice):	Listed activity	Description of project activity that triggers listed activity
			requirements.
GN 327, 07 April 2017	28 (ii)	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes of afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare.	***The development of the Boulders Wind Farm will take place within a project site with an extent of 5084ha which has been historically used, and is currently used for agricultural activities. The development footprint of the facility (infrastructure and associated areas) will cover an area greater than 1 hectare on land currently used for agriculture outside of an urban area.***
GN 327, 07 April 2017	56 (ii)	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre – (ii) where no reserve exists, where the existing road is wider than 8 metres	***The Boulders Wind Farm will require the widening of portions of an existing road by more than 6m, or the lengthening of a road by more than 1km to accommodate the logistical construction requirements to access the site and associated infrastructure.***
GN 325, 07 April 2017	1	The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more.	***The Boulders Wind Farm will generate an electricity output of more than 20MW. The wind farm is expected to have a contracted capacity of up to 140MW.***
GN 325, 07 April 2017	15	The clearance of an area of 20 hectares or more of indigenous vegetation.	***Land clearance of an area of 20 hectares or more of indigenous vegetation will occur during the construction phase of the facility and associated infrastructure.***
GN 324, 07 April 2017	4 (i)(ii)(aa)	The development of a road wider than 4 metres with a reserve less than 13,5 metres - (i) in the Western Cape; (ii) in areas outside urban areas; (aa) in areas containing indigenous vegetation	***Access road wider than 4m will be constructed outside of urban areas within areas containing indigenous vegetation, in the Western Cape.***
GN 324, 07 April 2017	10 (i)(ii)	The development and related operation 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 meters – (i) in the Western Cape; (ii) in all areas outside urban areas.	***The construction and operation of the Boulders Wind Farm will require the storage of dangerous goods (i.e. fuels and oils) with a combined capacity of up to 80m^3. The development will take place within the Western Cape outside of urban areas.***
GN 324, 07 April 2017	12(i)(i)(ii)	The clearance of an area of 300 square metres or more of indigenous vegetation; (i) in the Western Cape;	***An area of 300 square metres or more of indigenous vegetation cover will be cleared for infrastructure and associated***

Number and date of the relevant notice:	Activity No(s) (in terms of the relevant notice):	Listed activity	Description of project activity that triggers listed activity
		(i) within any 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 and; (ii) within critical biodiversity areas identified in bioregional plans.	***areas within the Boulders Wind Farm. The project site is located in the Western Cape, within an area which contains two endangered ecosystems, the Saldanha Granite Strandveld and the Saldanha Flats Strandveld. The project site also contains CBA 1 and CBA 2 areas as identified in the Western Cape Biodiversity Spatial Plan (WCBSP) of 2017.***
GN 324, 07 April 2017	14(ii)(a)(c)(i)(i)(ff)	The development of- (ii) infrastructure or structures with a physical footprint of 10 square meters or more; where such development occurs – (a) within a watercourse; or (c) within 32 meters of a watercourse, measured form the edge of a watercourse; (i) within the Western Cape; (i) outside urban areas; (ff) within critical biodiversity areas of ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.	***Infrastructures of more than 10m² will be developed within a watercourse and within 32m of a watercourse for the development of the Boulders Wind Farm. The project site is located in the Western Cape, outside of urban areas and within CBA 1 and CBA 2 areas as identified in the Western Cape Biodiversity Spatial Plan (WCBSP) of 2017.***
GN 324, 07 April 2017	18(i)(ii)(aa)	The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre – (i) in the Western Cape; (ii) within all areas outside urban areas; (aa) within areas containing indigenous vegetation.	***The upgrading of the roads for the project will involve widening and/or lengthening of existing access roads. The Boulders Wind Farm will require access roads to be upgraded, which will include the widening of the roads as well and lengthening of roads in some areas by more than 4m in width and more than 1km in length. The project site is located within the Western Cape, outside of urban areas and contains areas of indigenous vegetation that will be affected by this activity.***

On the basis of the above listed activities, a Scoping and an EIA Phase is required to be undertaken for the Boulders Wind Farm. This process is to be undertaken in two phases as follows:

» The Scoping Phase includes the identification of potential issues associated with the proposed project through a desktop study (including limited field work) and consultation with affected parties and key stakeholders. Areas of sensitivity within the broader project site are identified and delineated in order to identify any environmental fatal flaws, and sensitive or no go areas. Following a public review period of the report, this phase culminates in the submission of a final Scoping Report and Plan of Study for EIA to the DEA.

» The EIA Phase involves a detailed assessment of potentially significant positive and negative impacts (direct, indirect, and cumulative) identified in the Scoping Phase. This phase includes detailed specialist investigations and public consultation. Following public review of the report, this phase culminates in the submission of a Final EIA Report and an Environmental Management Programme (EMPr), including recommendations of practical and achievable mitigation and management measures, to DEA for decision-making.

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.

4.3 Objectives of the Scoping Phase

This final Scoping Report documents the evaluation of the potential environmental impacts of the Boulders Wind Farm and forms part of the EIA process. The Scoping Phase was conducted in accordance with the requirements of the EIA Regulations, 2014, as amended in April 2017, in terms of Section 24(5) of the National Environmental Management Act (NEMA; Act No 107 of 1998).

This Scoping Phase aims to:

» Identify and evaluate potential environmental (biophysical and social) impacts and benefits of the Boulders Wind Farm (including design, construction, operation and decommissioning) within the broader study area and the identified project site through a review of existing baseline data and specialist studies.
» Identify potentially sensitive environmental features and areas on the project site to inform the preliminary design process of the wind farm.
» Define the scope of studies to be undertaken within the EIA Phase.
» Provide the authorities with sufficient information in order to make a decision regarding the scope of issues to be addressed in the EIA Phase, as well as the scope and extent of specialist studies that will be required to be undertaken as part of the EIA report.

Within this context, the following objectives of the scoping process, through the undertaking of a consultative process and with the assistance of specialist input, have been met.

» Identify the policies and legislation relevant to the project;
» Motivate the need and desirability of the proposed project, including the need and desirability of the activity in the context of the preferred project site;
» Identify and confirm the preferred project and technology alternative/s;
» Identify and confirm the preferred area for development within the project site through consideration of the sensitive and no-go areas;
» Identify the key issues to be addressed in the EIA phase;
» Agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks that the project will impose on the preferred project site and through the life of the project, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the project site; and

» Identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

4.4 Overview of the Scoping Phase

The Scoping Phase has been undertaken in accordance with the amended EIA Regulations published in terms of NEMA in Government Notice 40772 of 07 April 2017. Key tasks undertaken within the scoping phase included:

» Consultation with relevant decision-making and regulating authorities (at National, Provincial and Local levels).
» Submission of the completed application form for authorisation to the competent authority (DEA) in terms of Regulations 5 and 16 of Government Notice R326 of 2017 (amended EIA Regulations, 2014).
» Undertaking a public involvement process throughout the Scoping process in accordance with Chapter 6 of Government Notice R326 of 2017 (amended EIA Regulations, 2014) in order to identify issues and concerns associated with the Boulders Wind Farm.
» Undertaking of independent specialist studies in accordance with Appendix 6 of Government Notice R326 of 2017 (amended EIA Regulations, 2014).
» Preparation of a Scoping Report and Plan of Study for EIA in accordance with the requirements of Appendix 2 of Government Notice No R326 of 2017 (amended EIA Regulations, 2014).
» Preparation of a Comments and Response Report detailing key issues raised by I&APs as part of the EIA Process.

The tasks above are discussed in further detail below.

4.4.1. Authority Consultation and Application for Authorisation in terms of GNR326 of 2014 (amended EIA Regulations, 2014)

In terms of GNR779 of 01 July 2016, the National Department of Environmental Affairs is the competent authority for activities which relate to the Integrated Resources Plan (IRP) 2010-2030, as well as the updates thereto. National DEA are therefore the competent authority for this Application for Environmental Authorisation. As the project falls within the Western Cape, the Department of Environmental and Development Planning (DEA&DP) acts as a commenting authority for the project. Consultation with these authorities has included the following:

» Pre-application meeting with DEA to confirm the EIA process to be followed for the application for authorisation for the Boulders Wind Farm, and submission of minutes of the meeting.
» Submission of the Application for authorisation to DEA.
» Submission of the Scoping Report for review by:
  * The competent authority;
  * The commenting authority; and
  * Organs of state departments which have jurisdiction in respect of the activity to which this application relates.

A record of consultation undertaken with the competent authority is contained in **Appendix B** of the final Scoping Report. A record of authority consultation undertaken with the commenting authority and organ of state departments during the Scoping Phase is included within **Appendix C**.

4.4.2. Public Participation Process

Public participation is an essential and regulatory requirement for an environmental authorisation process as stipulated in Chapter 6 of the EIA Regulations 2014 (as amended in April 2017). This Section of the final Scoping Report details the public participation process conducted during the EIA process.

The sharing of information forms the basis of the public participation process and provides Interested and Affected Parties (I&APs) with opportunities to become actively involved from the outset of the EIA Process. Comments received from I&APs are considered in the EIA process and by the project developers to enable the development of a project as environmentally and socially acceptable as is reasonably possible. The public participation process undertaken during the Scoping Phase of the EIA process is summarised in **Table 4.2** below.

Table 4.2 Summary of Public Participation Process – Scoping Phase

	Activity	Date	Objective	Evidence in PPP Appendix
Scoping Phase	Placement of advertisements (in both English and Afrikaans) in 2 newspapers (the Weslander and Die Burger)	Weslander: 07 December 2017 Die Burger: 08 December 2017	To announce the EIA process and invite I&APs to register on the I&AP database for the Boulders Wind Farm.	Refer to Appendix C2
	Stakeholder identification and compilation of I&AP database	Ongoing	To record the names and contact details of people who have submitted written comments on, or attended meetings as part of the process, people who have requested to be registered as an I&AP, and all organs of state which have jurisdiction in respect of the activity to which the application relates.	Refer to Appendix C1
	Distribution of EIA process notification letter, Background Information Document (BID) and stakeholder reply form via email.	Email distribution: 26 January 2018	To announce the EIA process, provide information on the project and invite organs of state departments, the ward councillor, rate payers associations and key stakeholder groups within the broader study area to register on the project database.	Refer to Appendix C4 and Appendix C5
	Distribution of EIA process notification letter, BID and stakeholder reply form via email and registered post.	Email distribution: 26 January 2018 Registered Post: 03 February 2018	To announce the EIA process, provide information on the project and invite affected and adjacent landowners.	Refer to Appendix C4 and Appendix C5.
	Placement of site notices	05 February 2018	Site notices, announcing the EIA process, were placed at the	Refer to Appendix C2

		affected farm properties.	
Distribution of notifications to announce the EIA process, provide information on the project and invite I&APs to comment. Make the Scoping Report available for download on Savannah Environmental's website.	28 February 2018	To inform I&APs of the availability of the Scoping Report for review and invite comment thereon during the 30-day review period.	Refer to Appendix C5
Distribution of the Scoping Report and notification letters to commenting authorities / organ of state departments via courier.	28 February 2018	To inform commenting authorities and organs of state departments of the availability of the Scoping Report for review and invite comment thereon during the 30-day review period.	Refer to Appendix C6
Placement of adverts (in both English and Afrikaans) in 2 newspapers (the Weslander and Die Burger)	Weslander: 01 March 2018 Die Burger: 01 March 2018	To inform the public of the availability of the Scoping Report for a 30-day review period and invite written comment to be submitted during the 30-day review period.	Refer to Appendix C2
30-day review period for the Scoping Report for comment.	01 March 2018 – 03 April 2018	I&APs are afforded the opportunity to submit written comments on the Scoping Report for a 30-day review period.	Refer to Appendix C6
Additional notices	07 March 2018	Additional notices were placed at the Vredenburg, St Helena Bay and Paternoster Public Libraries to ensure broader notification of the project	Refer to Appendix C2
Radio Advertisement on Radio Weskus 92.3 FM regarding the availability of the Scoping report for review (aired in English and Afrikaans)	22 March 2018 31 March 2018	The advert was aired in English on Thursday 22 March 2018 between 06:00 and 09:00 am and in Afrikaans on Saturday 31 March 2018 between 09:00 am and 12:00 pm. This was to provide further notification of the Scoping report availability.	Refer to Appendix C for recordings of the advertisments
Focus Group Meetings	06 March 2018 – 09 March 2018 and 22 March 2018 – 23 March 2018	To present the outcomes of the Scoping Report to organs of state departments, key stakeholders, impacted and adjacent landowners and provide I&APs with an opportunity to raise issues of specific concern relating to the Scoping Report and project in general. The comments raised	Refer to Appendix C7

			at these meetings have been recorded and included in an updated Comments & Responses Report, and inform the Final Scoping Report.	
	Comments and Responses Report	All comments received up until 21 February 2017, three (03) weekdays prior to the release of the Scoping Report, have been included and responded to in the Comments and Responses Report. The Comments and Responses Report has been updated with comments received on the Scoping Report during the 30-day review period. Comments have been responded to and submitted with this final Scoping Report.	All comments raised by registered I&APs needs to be documented in writing and responded to by the EAP. Comments received during the Scoping Phase have been collated into a Comments and Responses Report.	Refer to Appendix C8(a) and C8(b)

i. Identification of I&APs and Establishment of a Database

Regulation 42 of the EIA Regulations 2014 (as amended in April 2017), states that a proponent or applicant must ensure the opening and maintenance of a register of interested and affected parties and submit such a register to the competent authority, which register must contain the names, contact details and addresses of –

(a) All persons who, as a consequence of the public participation process conducted in respect of that application, have submitted written comments or attended meetings with the proponent or applicant or EAP
(b) All persons who have requested the proponent or applicant, in writing, for their names to be placed on the register; and
(c) All organs of state which have jurisdiction in respect of the activity to which the application relates

I&APs have been identified through a process of networking and referral, obtaining information from previous EIA processes undertaken and Savannah Environmental's existing stakeholder databases, liaison with potentially affected parties in the broader study area and the project site, and a registration process involving completion of a registration and comment sheet. The key stakeholder groups identified include authorities, local and district municipalities, ward councillors, government bodies and state-owned companies, directly affected and adjacent landowners, community-based organisations and non-governmental organisations. An initial list of stakeholders identified and registered on the database is listed in **Table 4.3** below:

Table 4.3: List of Stakeholders identified during the Scoping Phase

National Government Departments
Department of Agriculture, Forestry and Fisheries (DAFF)
Department of Energy (DoE)
Department of Environmental Affairs (including the Conservation & Biodiversity Directorate)
Department of Mineral Resources (DMR)
Department of Rural Development and Land Reform (DRDLR)
Department of Water and Sanitation (DWS)
Government Bodies and State Owned Companies
Eskom SOC Limited
Heritage Western Cape (HWC)
National Energy Regulator of South Africa (NERSA)
Sentech
South Africa Air Force (SAAF) (Langebaanweg Airforce Base)
South African Civil Aviation Authority (SACAA)
South African National Roads Agency Limited (SANRAL)
South African Weather Service
Square Kilometre Array: Southern Africa (SKA)
Telkom SA Ltd
Transnet
Provincial Government Departments
CapeNature
Western Cape Department of Agriculture
Western Cape Department of Economic Development and Tourism
Western Cape Department Environmental Affairs and Development Planning
Western Cape Department of Transport and Public Works
Local Government Departments
Saldanha Bay Local Municipality
Saldanha Bay Local Municipality – Ward 11
West Coast District Municipality
Key Stakeholders
Aurora Wind Power
BirdLife South Africa
Cape Chamber of Commerce & Industry
Groot Paternoster Nature Reserve
No Wind Farms Paternoster
Paternoster Rates Payers Association
South African Bat Assessment Advisory Panel (SABAAP)
St Helena Bay Rates Payers Association
West Coast Biosphere Reserve
West Coast Bird Club
Wildlife and Environment Society of South Africa (WESSA)
Landowners
Affected landowners and tenants

Neighbouring landowners and tenants

All relevant stakeholder and I&AP information has been recorded within a database of interested and affected parties (refer to **Appendix C1** for a listing of recorded parties). While I&APs have been encouraged to register their interest in the project from the start of the process, the identification and registration of I&APs will be on-going for the duration of the EIA process. The I&AP database will be updated throughout the EIA process, and will act as a record of the parties involved in the public participation process.

ii. Advertisements, Site Notices and Notifications

According to Regulation 41(2) of the EIA Regulations, 2014 (as amended in 2017), the person conducting the public participation process must take into account any relevant guideline applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of an application or proposed application.

During the Scoping Phase, site notices were placed on the boundary fences of the site where the proposed activities are to be undertaken in accordance with Regulation 41(2)(a) of the EIA Regulations, 2014 (as amended in April 2017). Ten (10) site notices were placed in total. The photographic evidence that the site notices were placed is contained in **Appendix C2**. The co-ordinates of the site notices are listed as follows:

Site Notice	South	East
1	32º 49” 17.4’	17º 8”10.4’
2	32º 48”18.8’	17º 15” 9.1’
3	32º 46” 45.1’	17º 58” 7.6’
4	32º 48” 59.08’	18º 0”35.54’
5	32º 48” 5.84’	18º 0” 24.59’
6	32º 48” 13.8’	17º 55” 42.5’
7	32º 48” 57.4’	17º 55” 25.4’
8	32º 46” 7.7’	17º 58” 3.4’
9	32º 44” 59.5’	17^{0} 58” 24.7’
10	32º 46” 18.8’	17º 58” 43.4’

In terms of Regulation 41(2)(b) of the EIA Regulations 2014 (as amended in April 2017), registered I&APs were notified in writing of the commencement of the EIA process. Written notices were distributed via email and registered post to all I&APs as identified by Savannah Environmental during the stakeholder identification process (refer to **Appendix C4 & C5**). The written notices informed I&APs, including affected and adjacent landowners of the proposed project and EIA process and include the Background Information Document (BID) available in both English and Afrikaans. The BID provided preliminary information on the Boulders Wind Farm project, the EIA process and contact details for registration as an I&AP (refer to **Appendix C3** for a copy of the BID). These notifications were sent to I&APs and landowners via email on 26 January 2018 and registered post on 03 February 2018, respectively. Evidence of this notification is contained in **Appendix C5**. A landowners map illustrating the affected and adjacent farm properties is contained in **Appendix C1**.

Additional notices notifying the public of the Boulders Wind Farm EIA process was placed at the Vredenburg, St Helena Bay and Paternoster Public Libraries on 07 March 2018. Refer to **Appendix C2** for proof.

A newspaper advertisement was placed to notify the public of the EIA process being undertaken for the Boulders Wind Farm, and invite members of the public to submit initial comments and register as I&APs for this EIA process. The advertisement was placed in both English and Afrikaans in order to inform the wider community of the project. The advertisement was placed in the Weslander on 07 December 2017 and Die Burger on 08 December 2018 (refer to **Appendix C2** for the evidence of the advertisements placed).

A second round of advertisements announcing the availability of the Scoping Report for a 30-day review period have been placed in the Weslander and Die Burger newspapers on 01 March 2018 (**Appendix C2**).

A radio advert was also aired on Radio Weskus 92.3 FM to inform the broader area of the availability of the Scoping Report. The advert was aired in English on Thursday 22 March 2018 between 06:00 and 09:00 am and in Afrikaans on Saturday 31 March 2018 between 09:00 am and 12:00 pm. Refer to **Appendix C** for recordings of the radio advertisements.

iii. Review Period of Scoping Report

Section 43 of the EIA Regulations, 2014 (as amended in April 2017) requires:

(1) A registered interested and affected party is entitled to comment, in writing, on all reports or plans submitted to such party during the public participation process contemplated in these Regulations and to bring to the attention of the proponent or applicant any issues which that party believes may be of significance to the consideration of the application, provided that the interested and affected party discloses any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application.
(2) In order to give effect to Section 24O of the Act, any State department that administers a law relating to a matter affecting the environment must be requested, subject to regulation 7(2), to comment within 30 days.

The Scoping Report was made available for a 30-day review period from **01 March 2018 – 03 April 2018**. Notifications regarding the availability of the Scoping Report for review and comment were circulated to I&APs at the commencement of the review period. I&APs were encouraged to view the Scoping Report and submit written comments. CD and hard copy versions of the Scoping Report have been circulated to Organs of State via courier at the onset of the review period. Copies of the Scoping Report were made available at:

» Vredenburg Public Library (2 Akademie Street, Vredenburg)
» Paternoster Public Library (Civic Centre Building, St Augustine's Way, Paternoster).
» St Helena Bay Public Library (2 Albertros Street, St Helena Bay).
» The report is also available for download from the website (www.savannahSA.com).

The evidence of distribution of the Scoping Report has been included in this final Scoping Report submitted to the DEA (refer to Appendix C).

iv. Stakeholder Consultation

In order to accommodate the varying needs of stakeholders and I&APs within the study area, as well as capture their views, issues and concerns regarding the project, various opportunities have been and will continue to be provided to I&APs to note their issues. I&APs were consulted through the following means:

Meetings were held with key government departments, stakeholders and landowners in March 2018. The purpose of these meetings was to introduce the project and EIA process, to facilitate comments on the EIA process and Scoping Report, as well as to record any comments raised by stakeholders regarding the Boulders Wind Farm project. The meetings that were planned to be held are listed as follows:

Organisation	Reason for Engagement
Department of Water and Sanitation	Commenting authority regarding the protection of water resources and water licensing authority.
BirdLife South Africa	Provides comments on avifaunal and wind farm interactions regarding Birds and Renewable Energy
Western Cape Department of Economic Development and Tourism	Commenting authority regarding tourism and socio-economic activities in the Western Cape Province.
Western Cape Department of Environmental Affairs & Development Planning	Commenting authority in terms of the application for EA as well as spatial planning in the province.
Heritage Western Cape	Heritage authority which provides comment on the heritage resources in the province.
CapeNature	Commenting authority which provides comment on ecology, biodiversity and conservation in the Western Cape Province.
Western Cape Department of Agriculture	Commenting authority which provides comment on agricultural activities in the province.
Groot Paternoster Nature Reserve	Interested stakeholder located within broader area of the project site.
Aurora Wind Power (West Coast One Wind Energy Facility)	Operational wind energy facility located adjacent to the project site.
West Coast Bird Club	NGO which provides comment on bird and wind farm interaction.
West Coast District Municipality	The project site falls within the jurisdiction of the West Coast District Municipality.
Saldanha Bay Local Municipality	The project site falls within the jurisdiction of the Saldanha Bay Local Municipality.
Paternoster Tourism	Key stakeholder group which represents the interests of the tourism industry in the greater Paternoster region.
Britannica Heights Bay Rate Payers Association & Ward 11 Councillor	Elected representatives which represent the interests of the Britannica Heights community.
Paternoster Rate Payers Association & Ward 11 Councillor	Elected representatives which represent the interests of the Paternoster community.
Affected and Adjacent Landowners	Affected and adjacent landowners impacted by the project.

Additional meetings were also held during the 30-day review period of the Scoping report in March 2018. These meetings included (refer to **Appendix C7**).

Organisation	Reason for Engagement
St Helena Bay Community Representatives	I&APs of the local community of St Helena Bay
Coastal Links West Coast Region – represents the fishing community in	I&APs that represent the interests of the fishing community of Paternoster.

Paternoster	
Naomi Cloete - leader of the fishing community	Leader of the Coastal Links West Coast Region and considered to be the leader of the Paternoster fishing community
Pierre Heydenrych Farm employees	Employees working on the affected properties of the project site
Nico Lombard Farm employees	Employees working on the affected properties of the project site

It must however be noted that not all parties consulted to hold a meeting felt the need to have a meeting now in the Scoping Phase. The following table provides the details of the parties who did not want to meet now in the Scoping Phase, as well as the reasons therefore.

Organisation	Response to meeting invitation
BirdLife South Africa	BirdLife South Africa (Samantha Ralston) had indicated that they are unavailable due to prior commitments. It was indicated that they would provide comments in writing on the Scoping report, however, none have been submitted to date.
Department of Water Sanitation (DWS)	DWS indicated that only a pre-application meeting would be required the in EIA phase. Comments from DWS have been received and included in the C&R report (Appendix C8(a)).
Western Cape Department of Economic Development and Tourism	The Department advised Savannah Environmental to consult GreenCape who focus on green economy initiatives in the Western Cape. Ian Scrimgeour of GreenCape advised that he would liaise with his colleagues and provide a way forward regarding input on socioeconomic, tourism and visual impacts. No further correspondence has been received to date.
Western Cape Department of Environment, Tourism and Development Planning	The Department confirmed that no meeting is required during the Scoping Phase. Comments from the Department have been received and included in the C&R report (Appendix C8(a)).

v. Identification and Recording of Comments

Section 44 of the EIA Regulations 2014, (as amended in April 2017), requires:

(1) The applicant must ensure that the comment of interested and affected parties are recorded in reports or plans that such written comments, including the response to such comments and records of meetings, are attached to the reports and plans that are submitted to the competent authority in terms of these Regulations.

(2) Where a person desires but is unable to access written comments as contemplated in sub regulation (1) due to –

(i) Lack of skills to read or write;

(ii) Disability; or

(iii) Any other disadvantage;

» *Reasonable methods or recording of comments must be provided for.*

To date, three hundred and fifty six (356) I&APs have registered themselves on the project database since the announcement of the commencement of the EIA process in December 2017.

All I&AP registrations and comments submitted to date have been collated and responded to in the Comments and Responses Report (refer to **Appendix C8(a) and C8(b)**). A summary of the main sectors/groupings from who comments have been received include:

- Landowners and residents of Britannica Heights
- Local residents from Paternoster and St Helena Bay, including representatives of the fishing and farming communities
- Organs of State Departments; and
- Community-based organisations

Comments raised during the review of the Scoping Report have been recorded, included and responded to in this final Scoping Report submitted to the DEA. The Comments and Responses Report is contained in **Appendix C8(a) and C8(b)**.

A part of the Feasibility Assessment undertaken by the project developer prior to the commencement of the EIA process, the developer engaged numerous stakeholders to obtain a sense from key entities regarding the acceptability of the proposed wind farm facility on the planned site. In response, several letters supporting the Developer in moving forward with the project were received from:

- Bester Eiendomme Trust – Impacted Landowner
- City of Cape Town Metropolitan Municipality
- Western Cape Department of Economic Development and Tourism
- Nicolaas Daniël Lombard – Impacted Landowner
- Uitkoms Boerdery Vredenburg – Pierre Heydenrych
- Abalone Hotel – Ryno Summers
- Cape Chamber of Commerce & Industry
- Saldanha Bay Municipality
- Prof Karim Sadr – University of the Witwatersrand – School of Geography, Archaeology and Environmental Studies
- Western Cape Department of Transport

As these letters were received outside of the formal public participation process and EIA process, the content of the written comments are not included in the Comments and Responses Report. The letters are, however, included in **Appendix O** as they must be considered as supporting documentation to the EIA process being undertaken.

Summary of the Public Participation Process undertaken during the Scoping Phase

Scoping Phase public participation process activities:

The public participation process for the Boulders Wind Farm commenced on 07 December 2017 with the placement of an advertisement in the Weslander newspaper (in English) to notify the public of the proposed Boulders Wind Farm EIA process. A second advert was placed (in Afrikaans) in Die Burger on 08 December 2017 in order to reach the communities located within the province and not only the region. Following the advertisements, I&APs were registered on the project database on request. All key stakeholders, including the affected and adjacent landowners, relevant commenting authorities, any organs of state with jurisdiction in the area, the ward councillor and local ratepayers associations were identified and automatically registered.

Following the commencement of the public participation process, formal notification letters notifying the registered I&APs of the EIA process were distributed together with a Background Information Document (BID) and reply form on 26 January 2018. The notification letter, BID and reply form were also sent via

registered post to registered I&APs who do not have access to emails. Site notices, as per the EIA Regulations requirements, were also placed at the affected properties of the project site (refer to Appendix C2). Additional notices notifying the public of the EIA process were placed at the Vredenburg, St Helena Bay and Paternoster Public Libraries.

A Scoping report was made available for a 30-day review period from 01 March 2018 to 03 April 2018. All registered I&APs were notified of the availability of the Scoping report for review on 28 February 2018 through the distribution of a notification letter. The letter invited the I&APs, commenting authorities and organ of state departments to review and provide written comment, and stated the review period dates, as well as the locations at which the Scoping report could be accessed. Advertisements in both English and Afrikaans were placed in the Weslander and Die Burger on 01 March 2018 informing the public of the availability of the Scoping report, as well as where a copy of the report could be accessed. In addition, two radio adverts inviting comment were aired on the local radio station, Radio Weskus 92.3 FM, on Thursday 22 March 2018 between 06:00 and 09:00 (English) and Saturday 31 March 2018 between 09:00 am and 12:00 pm (Afrikaans) as an alternative means to reach the broader community. Hard copies of reports were available at the Vredenburg, St Helena Bay and Paternoster Public Libraries. An electronic copy of the report was made available on the Savannah Environmental website. Each I&AP wanting to access the report electronically was required to request a password, which then enabled the public participation consultant to maintain a complete and accurate record and database of all parties who have interest in the project (and who choose to access the report via our online portal). A register of persons accessing the hard copy reports was also maintained at the libraries, and additional reply forms (in both English and Afrikaans) were also provided at the libraries to aid members of the public to record their comment on the report, and also to ensure that the general public had access to project information and the contact details of where registration as an I&AP could take place. All of the mechanisms used to disseminate information were intended to establish and maintain open channels of communication at varying levels, considering the diversification of interest groups in the broader area.

Through the process of identifying and registering I&APs and stakeholders, the public participation consultant contacted and consulted identified stakeholders in order to verify contact details for the project database, as well as to ensure that the stakeholder fully understood the nature and the extent of the project. The opportunity was provided, through this one-on-one consultation for stakeholders to raise their comments directly with the consultant, and these were recorded as notes for the record in February 2018 (refer to Appendix C7). As part of this process, all affected and adjacent landowners were notified of the EIA process and provided with the opportunity to arrange a meeting to discuss the project with the project team. Of the farm owners (including affected and adjacent landowners), only 3 requested meetings with the project team. The following landowners (including affected and adjacent) indicated that meetings would not be required at this stage. Evidence of this consultation is included in Appendix C7.

Nico Lombard (Farms Het Schuytje 1/21 and Frans Vlei 2/46)	Affected landowner
Tommy Bester (Farms Schuitjes Klip 1/22, Davids Fontyn 9/18 and Davids Fontyn 7/18)	Affected landowner
Anna Oosthuizen (Farm Paddy's Pad 2057)	Adjacent landowner
Carstens Kramer Familie Trust (Farms Frans Vlei 6/46, Frans Vlei 3/46, Frans Vlei 1/46, Het Schuytje RE/21, Frans Vlei 4/46, Blaauwberg RE/01/12)	Adjacent landowner
Leon Avenant (Farm Besters Kraal 4/38)	Adjacent landowner

JM Pienaar (Boebezaks Kraal 1/40)	Adjacent landowner
Louw Cronje (Farms Duyker Eiland RE/7/6 and Duyker Eiland RE/6/6)	Adjacent landowner
Oceana Group (Farm Duyker Eiland 4/6)	Adjacent landowner

During the Scoping report review period, focus group meetings were held with various stakeholder groupings within the area surrounding the project site as well as key stakeholders and commenting authorities. The groups that were consulted included commenting authorities, conservation bodies, adjacent and affected landowners, tenants, employees and farmworkers of affected properties, the Ward 11 committee, including the ward councillor, representatives of the tourism sector of Paternoster, local community members/representatives of Paternoster and St Helena Bay (including Britannica Heights) and representatives of the fishing community. The focus group meetings included the following:

Heritage Western Cape	Commenting authority on heritage resources in the Western Cape Province.
CapeNature	Commenting authority which provides comment on ecology, biodiversity
Western Cape Department of Agriculture	Commenting authority which provides comment on agricultural activities in the province.
Saldanha Bay Local Municipality	The project site falls within the jurisdiction of the Saldanha Bay Local Municipality.
West Coast District Municipality	The project site falls within the jurisdiction of the West Coast District Municipality.
West Coast Biosphere Reserve	NGO which provide comment on development undertaken or proposed to be undertaken in the Biosphere Reserve located in the Peninsula.
West Coast Bird Club	NGO which provide comment on bird communities, diversity and abundance on the West Coast, and specifically the Peninsula.
Ward 11 Committee – Ward 11 includes the area for the project site, St Helena Bay and Paternoster	Elected representatives representing the community of Ward 11 of the Saldanha Bay Local Municipality.
Britannica Heights Rate Payers and Residents – adjacent landowners to Farm Davids Fontyn 7/18 on the northern portion of the project site	Representatives of the adjacent landowners in Britannica Heights
Tourism Paternoster – representatives of the tourism sector of Paternoster and surrounds	Key representatives which represent the interests of tourism operators in Paternoster.
St Helena Bay Community Representatives	I&APs of the local community of St Helena Bay
Coastal Links West Coast Region – represents the fishing community in Paternoster	I&APs that represent the interests of the fishing community of Paternoster.
Naomi Cloete - leader of the fishing community	Leader of the Coastal Links West Coast Region and considered to be the leader of the Paternoster fishing community
Danie Kotze – adjacent landowner to the farms Boebezaks Kraal 3/40, Boebezaks Kraal 5/40 and Schuitjes Klip 3/22	Adjacent landowner
Pierre Heydenrych – affected landowner including the Farms Boebezaks Kraal 2/40, Boebezaks Kraal 3/40, Boebezaks Kraal 5/40, Schuitjes Klip 3/22 and Uitkomst RE/6/23.	Impacted landowner
Pierre Heydenrych Farm employees (16 in total)	Employees working on the affected properties of the

	project site (Farms Boebezaks Kraal 2/40, Boebezaks Kraal 3/40, Boebezaks Kraal 5/40, Schuitjes Klip 3/22 and Uitkomst RE/6/23)
Nico Lombard Farm employees (3 in total)	Employees working and also residing on the affected properties of the project site (Farms Het Schuytje 1/21 and Frans Vlei 2/46)

The same information was presented at all of the focus group meetings, and information was disseminated in English and Afrikaans. The approach of holding focus group meetings with stakeholder representatives and consulting with and *through* these representatives was considered the most efficient way to disseminate information to large numbers of stakeholders and, in turn, receive information from them. This did not, in any way, preclude individuals from either requesting meetings or submitting individual written comment.

Other parties with who meetings were requested, but where meeting requests were declined or not held in the Scoping phase due to availability included:

BirdLife South Africa	BirdLife South Africa (Samantha Ralston) indicated that written comments would be submitted on the Scoping report.
Department of Water Sanitation (DWS)	DWS indicated that only a pre-application meeting would be required in the EIA phase. Comments from DWS have been received and included in the C&R report (Appendix C8(a)).
Western Cape Department of Environment, Tourism and Development Planning	The Department confirmed that no meeting is required during the Scoping Phase. Comments from the Department have been received and included in the C&R report (Appendix C8(a)).
Western Cape Department of Economic Development and Tourism	The Department advised Savannah Environmental to consult GreenCape who focus on green economy initiatives in the Western Cape. Ian Scrimgeour of GreenCape advised that he would liaise with his colleagues and provide a way forward regarding input on socioeconomic, tourism and visual impacts.

The notes of the focus group meetings held on 06-09 March 2018 and 22-23 March 2018 have been included in Appendix C7.

Notes of verbal or telephonic consultations with I&APs and stakeholders are included in Appendix C7. Written comments were also received from I&APs prior to the release of the Scoping report for review, as well as during the 30-day review period of the Scoping report. Written comments received are included a C&RR included in Appendix C6(a) and C6(b). This includes completed reply forms. Where requested, reasonable alternative methods of recording comments were provided.

The EAP has therefore ensured that the comments of interested and affected parties have been recorded and that written comments (including the responses to written comments) and records of meetings and other verbal consultations, are appended to the final Scoping report that is submitted to the competent authority in terms of the Regulations.

Outcomes of the Scoping phase public participation process:

The public participation process followed and the activities undertaken as part of the Scoping phase are considered as sufficient and transparent in order to provide a balanced view and perception of the

Boulders Wind Farm and the EIA process from interested and affected parties, stakeholders and the local communities. The parties consulted have been diverse in type, nature, and at a spatial level. An important consideration for this public participation process was to ensure that the views of the relevant sub-groups within the communities were afforded an opportunity to be heard and considered as part of the EIA process.

The public participation process and engagement during the Scoping phase revealed the following main stakeholder groupings:

1. Organs of state, regulatory bodies, government officials and other key stakeholders – the key aspect which differentiated this grouping was the key focus of these bodies on regulatory frameworks and compliance with legislative requirements.

2. Conservation bodies, including the Cape West Coast Biosphere Reserve, bird clubs, formal and informal nature reserves and conservancies - the key aspect which differentiated this grouping was the key focus of these bodies on the conservation of the integrity of the ecological environment, with a specific focus on the potential for impact on avifauna species and the remaining intact natural habitat.

3. Local community and residents which were born and raised in the area, and mainly work within the fishing, farming and tourism industries - the key aspect which differentiated this grouping was that during the focus group meetings it was identified that they refer to themselves as the "indigenous locals" of the area, which was defined by them as being born and raised within the area. (For the purpose of this summary the term "indigenous locals" will be used.) The key focus of this grouping was on social upliftment, employment opportunities and the development of the youth. There was also a need under this grouping to have a more definitive understanding of how and to what extent they could benefit from the Boulders Wind Farm.

4. Residents, homeowners, business owners and investors who have been attracted to the area (typically not originally from the Peninsula area), the majority of which own property, and operate businesses (including businesses in the tourism industry) and are employers. The key aspect which differentiated this grouping was the key focus of these bodies on visual quality and sense of place, property values and long-term investments (new and existing), as well as the tourism potential for the area.

5. Directly affected landowners – that is, the landowners whose properties form part of the Application for Authorisation and lend their support to the project.

The primary towns, villages and residential areas from which local community members and residents provided comment on the Scoping report were from Paternoster, Groot Paternoster, Stompneus Bay, St Helena Bay, and Britannica Heights, and included representatives from both stakeholder groupings 3 and 4 as described above. The local communities have been well canvassed through the Scoping phase consultation, and every opportunity afforded for all views to be heard. Both support for and opposition to the project has been recorded.

50% of the written submissions received on the Scoping report were submitted by individuals, business and representatives from the stakeholder grouping 4 (as described above), and also included multiple

comment submissions made by an individual who hold several business and other interests in the area. The comments predominantly relate to the following:

» Visual impact on views from residences and/or tourism facilities;
» Nuisance impacts from the operation of the wind turbines, specifically relating to noise, and night lighting of turbines;
» Layout of the facility within the project site;
» Impacts on the fauna and flora of the project site and the surrounding areas (specifically avifauna and bats);
» A reduction in property values;
» Negative effect on tourism activities, which are considered to add greatly to the economy of the area.

27% of written submissions were received from regulatory bodies and conservation bodies (the stakeholder groupings 1 and 2 as described above). The comments predominantly related to the following:

» Conservation of the ecological processes and intact natural vegetation;
» Impact on the fauna of the area, including birds and bats;
» Ensuring consultation with the local communities and members of the fishing sector;
» Impact on the roads network.

The least written submissions (23%) were received from local community representatives and residents and directly affected landowners (the stakeholder groupings 3 and 5 as described above). The comments raised by the "indigenous locals" of the area related to the following:

» The true benefits of the wind farm for the community;
» The guarantee that employment opportunities and socio-economic benefits will be provided to them;
» The opportunity for skills development and growth of the youth in the communities;
» Concerns regarding the limited and declining opportunities of the fishing sector;
» Concerns regarding the weight of the comments raised by the "indigenous locals" compared to the comments received from the other homeowners, residents and business owners not originally from the area;
» Restrictions in terms of future land-use and enhancement of farming practises on the affected properties which form part of the project site due to objections raised by the surrounding community members located within the area.

In summary, the following key points were noted from the one-on-one interactions, meetings and written comments received:

» Impacts on visual quality and sense of place were raised primarily by property owners and residents of Britannica Heights and Paternoster. The proximity of the project site to these residential areas was raised to be of particular concern, and perceived to be detrimental to property values and the tourism potential for the area. Objections have been raised.
» Comments from tourism facility owners in Paternoster have indicated that the tourism industry has been very successful in the past few years (including 2017 and 2018 to date), and is still expected to grow exponentially year on year.
» Support was received regarding the approach undertaken to identify the preferred development area within the project site through the undertaking of a sensitivity analysis which considered both site-specific environmental and social constraints (refer to Chapter 7, Section 7.4 of the final Scoping report).

- The potential for impact on local and migrant birds was raised, including specific concern regarding the diversity and abundance of species using the area.
- Few comments were made regarding experiences of the construction and current operation of the existing West Coast Wind Energy Facility. Few specific problems or benefits experienced during the development of the existing wind farm were stated. Issues regarding the West Coast One Wind Energy Facility were predominantly around the permitting of the site, as opposed to its current presence in the landscape.
- The local communities are concerned regarding current income and unemployment. Benefits of and support for the project predominantly pertained to social upliftment, employment opportunities for 'indigenous locals' and the development of the youth.
- The "indigenous locals" of the area are particularly concerned regarding the weight of their comments raised on the project during the EIA process currently being undertaken. Their fear is that their voices will not be heard and considered (due to the lack of resources within their community) against the organised mobilisation of the other residents and business owners within the area.
- The affected farmers which form part of the project site raised concern regarding their prospective future plans for the use of their properties not being realised due to opposition regarding visual intrusion in the landscape. The farm owners consider the addition of wind turbines to their properties to be highly desirable due to the climatic conditions (arid and windy) in the area, and that commercial farming is becoming increasingly difficult. Farmers indicated that it is the intention to continue farming on the properties, with the wind farm providing additional income to enhance farming activities and ensure that farm employees can be retained. One key aspect which requires funds is to curb poaching of livestock, which has reached unprecedented levels.

Through the public participation process various groups with various background and social standing within the communities surrounding the project site were identified and all comments and concerns raised have been considered equally.

4.4.3. Evaluation of Issues Identified through the Scoping Process

Issues (both direct and indirect environmental impacts) associated with the Boulders Wind Farm identified within the scoping process have been evaluated through specialist studies by specialist consultants. These specialists include:

Specialist	Area of Expertise	Refer Appendix
Simon Todd of Simon Todd Consulting	Ecology	Appendix D
Stephen van Staden of Scientific Aquatic Services	Freshwater (wetlands)	Appendix E
Craig Campbell of Bioinsight	Avifauna	Appendix F
Stacey Jordaan of Gaia Environmental Services	Bats	Appendix G
Freddie Ellis and Johann Laubscher	Soils and Agricultural Potential	Appendix H
Kathryn Smuts, David Halkett and Tim Hart of ACO Associates cc and John Pether	Heritage including Archaeology and Palaeontology	Appendix I, Appendix I(a) and Appendix I(b)
Tony Barbour of Environmental Consulting and Research	Social	Appendix J
Morné de Jager of Enviro-Acoustic Research	Noise	Appendix K
Lourens du Plessis of LoGIS	Visual	Appendix L

In order to evaluate issues and assign an order of priority, the following methodology was used to identify the characteristics of each potential issue/impact for each of the proposed project components (**Appendix P**):

» Identify the **nature** of the potential impact, which includes a description of what causes the effect, what will be affected and how it will be affected.
» Identify the **extent** of the potential impact, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development) or regional.
» Identify **sensitive receptors** that may be impacted on by the Boulders Wind Farm and the **types of impacts** that are most likely to occur.
» Evaluate the **significance** of potential impacts in terms of the requirements of the EIA Regulations including nature, significance, consequence, extent, duration and probability of the impacts, the degree to which these impacts a) can be reversed; (b) may cause irreplaceable loss of resources; and (c) can be avoided, managed or mitigated.
» Identify the potential impacts that will be **considered further** in the EIA Phase through detailed investigations.

4.4.4. Final Scoping Report

The final stage in the Scoping Phase includes the capturing of comments from stakeholders and I&APs on the Scoping Report in order to refine the report and ensure that the comments and issues have been thoroughly addressed. It is this final Scoping Report upon which the competent authority, DEA, provide comment, recommendations and acceptance to undertake the EIA Phase of the process.

4.5 Assumptions and Limitations

The following assumptions and limitations are applicable to the studies undertaken within this Scoping Phase:
» All information provided by the developer to the environmental team was correct and valid at the time it was provided.
» The project site identified by the developer represents a technically suitable site for the establishment of the Boulders Wind Farm.
» The grid connection from the Boulders Wind Farm will be assessed as part of a separate Basic Assessment process, which will consider feasible alternatives for the 132kV power line route.
» Studies assume that no-go areas or impacts of high significance on the environment associated with the Boulders Wind Farm will be avoided, minimised, or mitigated.
» This report and its investigations are project-specific, and consequently the environmental team did not evaluate any other power generation alternatives.

Refer to the specialist studies in **Appendices D – L** for specialist study specific limitations.

CHAPTER 5: DESCRIPTION OF THE AFFECTED ENVIRONMENT

This section of the Scoping Report provides a description of the environment that may be affected by the proposed Boulders Wind Farm. This information is provided in order to assist the reader in understanding the possible effects of the proposed project on the environment. Aspects of the biophysical, social and economic environment that could be directly or indirectly affected by, or could affect, the proposed development have been described. This information has been sourced from both existing information available for the area as well as collected field data undertaken by specialists who have a working knowledge of the area, and aims to provide the context within which this EIA is being conducted.

5.1 Legal Requirements as per the EIA Regulations, 2014 (as amended)

This chapter includes the following information required in terms of the EIA Regulations, 2014 - Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(h)(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	The environmental attributes associated with the development of the Boulders Wind Farm is included as a whole within this chapter. The environmental attributes that are assessed within this chapter includes the following:
	» The regional setting of the broader study area and the project site indicates the geographical aspects associated with the Boulders Wind Farm. This is included in section 5.2.
	» The climatic conditions present within Vredenburg has been included in section 5.3.
	» The biophysical characteristics of the project site and the surrounding areas are included in section 5.4. The characteristics considered are topography and terrain, geology, soils and agricultural potential and the ecological profile which includes the vegetation patterns, listed plant species, critical biodiversity areas and broad-scale processes, freshwater resources, terrestrial fauna, bats and avifauna.
	» The heritage and cultural aspects (including archaeology and palaeontology) has been included in section 5.5.
	» The visual quality of the surrounding area and the project site has been considered in section 5.6.
	» The ambient noise levels and quality of the surrounding area and the project site has been considered in section 5.7.
	» The social and socio-economic characteristics associated with the broader study area and the project site has been included in section 5.8.

A more detailed description of each aspect of the affected environment is included within the specialist scoping reports contained within **Appendices D - L**.

5.2. Regional Setting: Location of the Broader Study Area and Project Site

The broader study area and the project site proposed for the development of the Boulders Wind Farm is located within the West Coast Peninsula in the Western Cape Province. The project site is located within Ward 11 of the Saldanha Bay Local Municipality and within the greater West Coast District Municipality. The Saldanha Bay Local Municipality is one of five Local Municipalities that make up the West Coast District Municipality. The Saldanha Bay Local Municipality is bordered in the west by the Atlantic Ocean, in the south by the West Coast National Park (which forms part of the West Coast District Management Area), in the north by the Bergrivier Local Municipality and the east by the Swartland Local Municipality.

The project site is situated ~14km north of Vredenburg, between the towns of Paternoster (~7km west) and St. Helena Bay (~7km north-east) (refer to **Figure 5.1**). The region has a population density of approximately 65 people per km^2 with the highest concentrations occurring in the towns of Vredenburg and Port Owen. A number of smaller towns occur along the Atlantic seaboard, and include Paternoster, Britannia Bay, Stompneus Bay, St. Helena Bay. The study area is located well outside of the local towns, and is characterised by undulating dryland agricultural fields, interspersed with numerous outcrops of the underlying granite in the form of small outcrops. Other agricultural activities include small-grain, cattle and sheep farming. A number of rolling hills occur within the area, with the *Patrysberg*, adjacent to the R399 being the largest of these. Other smaller hills include the *Klipheuwel* and the *Kasteelberg*. The indigenous vegetation in this area falls within the West Strandveld, Southwest Fynbos and West Coast Renosterveld Bioregions. This vegetation survives as isolated pockets within and between the cultivated wheat fields, and is often concentrated around the granite outcrops where it is not feasible to plough the land. <u>There is also an existing lawful land use on the farm Schuitjes Klip 1/22, which forms part of the project site. The existing lawful land use relates to a prospecting right for the proposed Duyker Eiland Phosphate Project which is a planned phosphate mine and fertilizer operation.</u>

Farmsteads are scattered within the study area, and the project site is located directly adjacent to the West Coast One wind energy facility, which includes 47 operational wind turbines which is located in the undulating landscape. Several power lines including the Fransvlei-Aurora 132kV power line and the Fisheries-Stompneus 66kV power line traverse the study area. The Eskom Aurora Substation is located 35km south-east from the project site. Other infrastructure in the greater area includes Langebaanweg located 27km south-east of the project site, as well as the Arcelor Mittal South Africa steel company located 22km to the south.

The closest major in-land water feature located within the surroundings of the project site is the Berg River mouth (at Port Owen/Velddrif) that is situated approximately 17km east of the project site. The Port of Saldanha and Langebaan are located 27km and 35km to the south-west of the project site respectively. Formal conservation areas in the region include the Groot Paternoster Private Nature Reserve, Cape Columbine Nature Reserve to the west of Paternoster, and the Paternoster Rock Island Reserve to the north. All reserves are located at distances exceeding 10km from the proposed facility. The West Coast National Park located approximately 45km south east of the study site.

Access to the site is provided by the Vredenburg to Stompneus Bay secondary road that traverses the development site in a north-south direction and a north-western direction (there are two legs of the secondary gravel road which meet in the centre of the project site). This road provides access from Vredenburg to the project site and to Britannia Bay, as well as access from Paternoster to the project site. The Regional road (R399) is the main road providing access to the general area within which the project

site is located. Vredenburg is located approximately 130 km north of Cape Town. Both Saldanha and Vredenburg are easily accessible from the R27 coastal road, which links Cape Town in the south with Velddrif in the north. **Table 5.1** below provides photographs of the project site and surrounding areas.

Table 5.1: Photographs of the project site and the surrounding areas of the Boulders Wind Farm

 Stompneus Bay Secondary Road towards St. Helena Bay with the existing West Coast One wind energy facility located to the right side of the road.	 Stompneus Bay Secondary Road towards Vredenburg with the existing West Coast One wind energy facility located to the left side of the road.
 West Coast One Wind Energy Facility wind turbines located adjacent to the project site.	 Transformed areas located within the project site.

Kasteelberg located outside of the project site to the west. Photograph taken from the Stompneus Bay Secondary Road.

View from St. Helena Bay (Britannica Heights) towards Paternoster. It must be noted that Britannica Heights is located outside of the project site, along the northern boundary. This includes views over the northern section of the project site.

Small holdings located at Britannica Heights (outside of the project site).

Views from Paternoster towards the direction of the project site with Kasteelberg and the West Coast One Wind Energy Facility located in the

	background.

5.3. Climatic Conditions

The average precipitation in this region of the Western Cape is 408 mm per annum, with a peak typically in the winter months. Vredenburg receives the lowest rainfall (1mm) in the month of February and the highest (45mm) in June. The average midday temperatures for Vredenburg range from 16.5°C in July to 25.6°C in February. The area is the coldest during July with low temperatures of 8°C on average during the night. **Figure 5.2** below provides a climate graph for the town of Vredenburg.

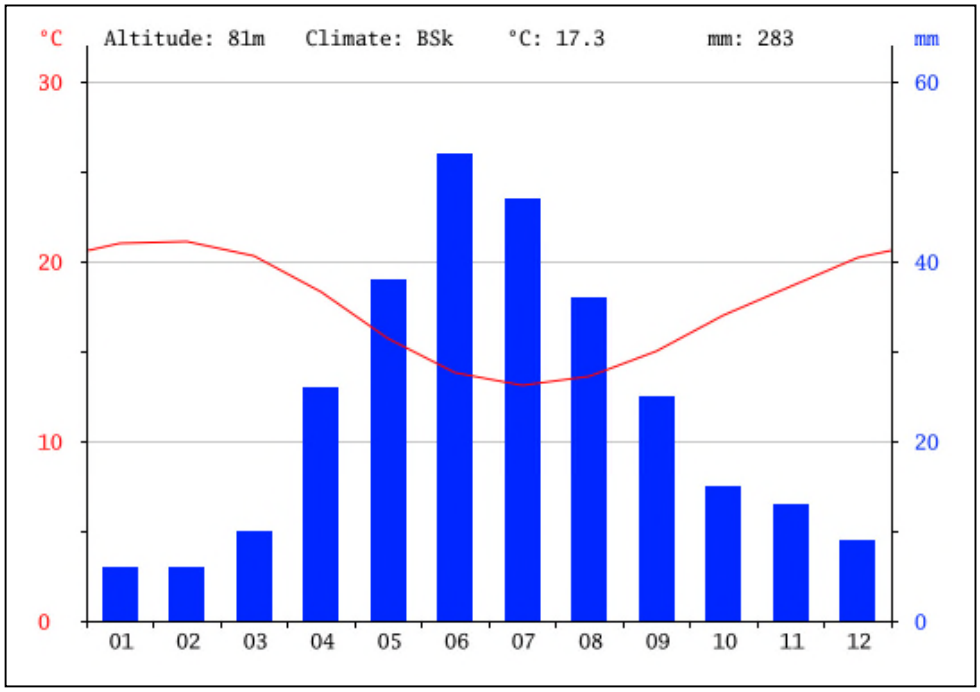


Figure 5.2 Climate graph for the town of Vredenburg, Western Cape

5.4. Biophysical Characteristics of the Study Area

The following section provides an overview and description of the biophysical characteristics of the study area and has been informed by specialist studies (**Appendix D-L**) undertaken for this scoping report.

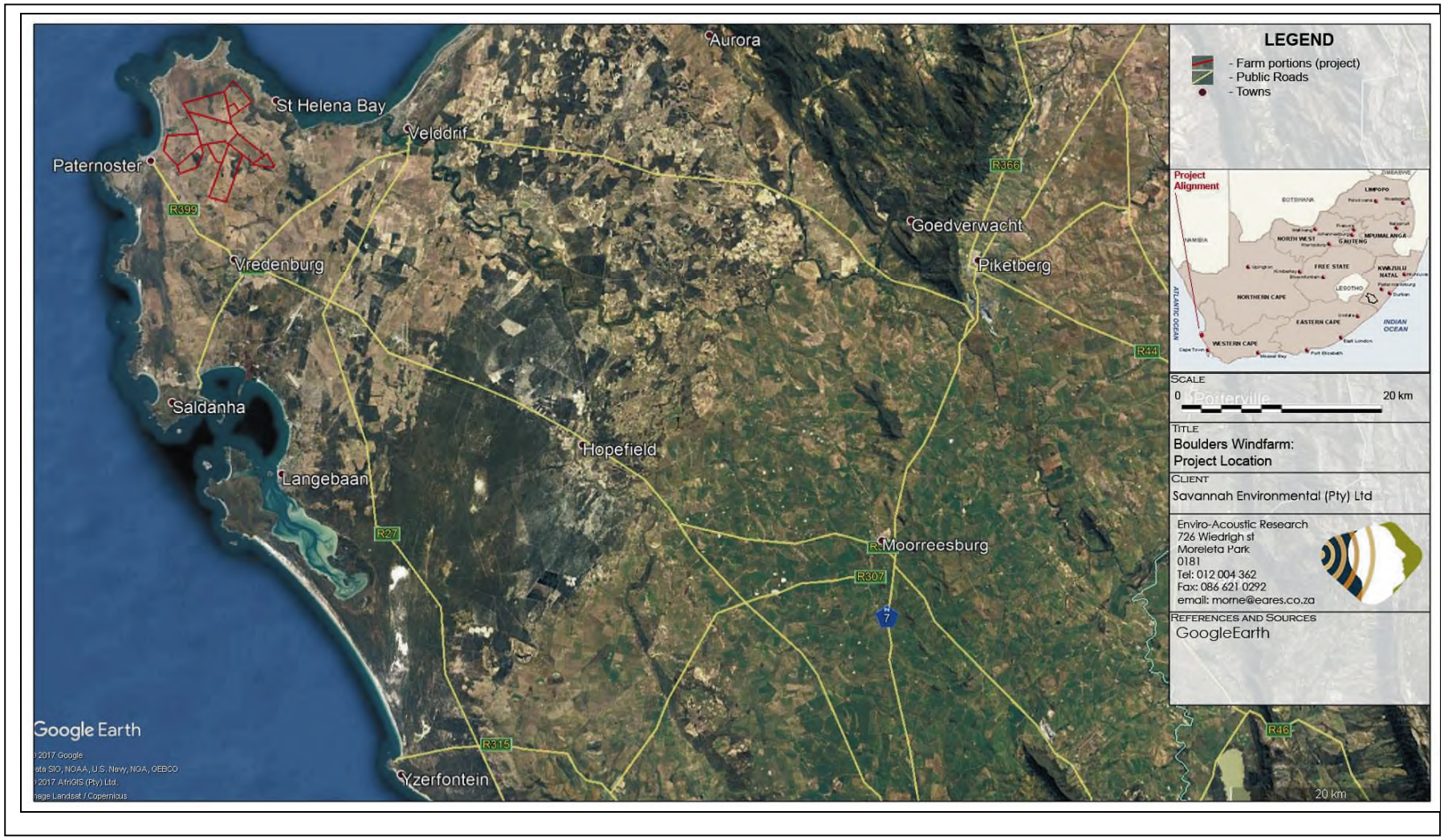


Figure 5.1: Map indicating the regional setting of the proposed Boulders Wind Farm project development site

5.4.1. Topography and Terrain

The broader study area is located on land that ranges in elevation from sea level at the coast to approximately 270m above sea level at the top of the hills. The dominant topographical unit or terrain type of the project site and the surrounding areas is moderately undulating plains to the west and plains to the east. A number of rolling hills occur within the area, with the Patrysberg, adjacent to the R399 being the largest of these. Other smaller hills include the Klipheuwel and the Kasteelberg.

5.4.2. Geology, Soils and Agricultural Potential

Geological Setting of the Project Site

The project site is dominated by successions of sandy layers that mantle the underlying granitic Vredenburg Pluton. The study area is characterised by undulating agricultural fields, interspersed with numerous outcrops of the underlying granite in the form of small koppies.

The following geological aspects are associated with the Boulders Wind Farm project site:

The Bedrock Geology: The older bedrock of the region consists of Malmesbury Group shales. Their origin dates from over 560 Ma (Ma: million years ago, Mega-annum), when muddy sediments, impure limestones and subsea basalts were deposited into the Adamastor Ocean that once existed on the western margin of the early continent.

The Sandveld Group: To the north, east and south of the granites forming the Vredenburg Peninsula the erodible shale bedrock of the Malmesbury Group has mostly been eroded away by ancient rivers to well below sea level and is buried beneath the sediments of the Sandveld Group. These sediments are of later Cenozoic age, deposited during the Neogene and Quaternary periods, i.e. during the last 20 million years.

The Early Miocene Rivers: The buried valleys eroded in the Malmesbury shales are filled with the Elandsfontyn Formation, the oldest formation of the Sandveld Group, consisting of fluvial and marsh deposits laid down by meandering rivers under humid climatic conditions. The formation does not underlie the Boulders Wind Farm project site, but is included for completeness and its notable fossil content indicating a very different palaeoclimatic regime along the West Coast.

The Marine Record: The oldest Cenozoic fossiliferous marine deposits preserved on the coastal plain are of mid-Miocene age and were laid down during and just after the Mid-Miocene Climatic Optimum ~16-14 Ma. The ancient shoreline of the transgression maximum (highest level reached by sea level) is now found about 90-120 m asl, to which it has been uplifted by the continental edge bobbing up slightly. There is apparently little obvious evidence preserved in the Saldanha region of this time when the sea lapped high against the granite hills, such as the seacliffs and boulder beaches seen elsewhere.

The Aeolian Record: During periods of lowering sea level, extensive dune plumes were blown from the ancient shorelines. These calcareous dunes, mainly composed of tiny shell fragments, are evident in the coastal landscape as the ridges, low hills and mounds beneath a capping calcrete crust. The aeolianites overlie the marine deposits of the coastal plain, resting on wind-deflation erosion surfaces formed on the

marine deposits, and are comprised of sand blown off the palaeoshorelines by southerly winds and also reworked from the marine deposits. The oldest dunes recognised comprise the Prospect Hill Formation.

Soils and Agricultural Potential of the Project Site

The entire project site is underlain by very coarse-grained Cape Granites. Due to the resistance to weathering combined with a relatively low rainfall in the area the base rock is not deeply weathered and rock outcrops are common in the more erodible landscapes. This is very obvious in the sandy colluviated topsoil layer especially on lower slope soils.

The occurrence of red/yellow apedal soils with relict hard plinthite, which usually occurs on pre-weathered granite, is evident on the highest crest and near mid-slope remnants of an older (probably Tertiary) land surface.

Shallow pans are also common in these landscapes. Some of the steeper mid-slopes have many exposed granite outcrops, illustrating incision since the Tertiary period, thereby creating a younger landscape with shallower soils.

Another very common micro-relief feature throughout almost all areas is the abundant occurrence of mounds or "heuweltjies". These are old termite mounds and cover between 20 % and 30 % of the land surface. Due to the termite activity the "heuweltjie" soils differ completely from the surrounding non-"heuweltjie" soils. They are normally calcareous and especially in the lower parts of the landscape a hardpan carbonate horizon has developed. In eroded sections, these hardpans are exposed at the surface.

The following land types are located within the Boulders Wind Farm project site (**Figure 5.3**):

» Ab215 - the soils associated with this landtype has a land capability that is considered as being unsuitable for the production of crops.
» Fb780 - the soils associated with this landtype has a land capability that is considered as being unsuitable for the production of crops.
» Fc791 – the soils associated with this landtype has a land capability that is considered as being impractical for the production of crops.
» Fc792 - the soils associated with this landtype has a land capability that is considered as being unsuitable for the production of crops.

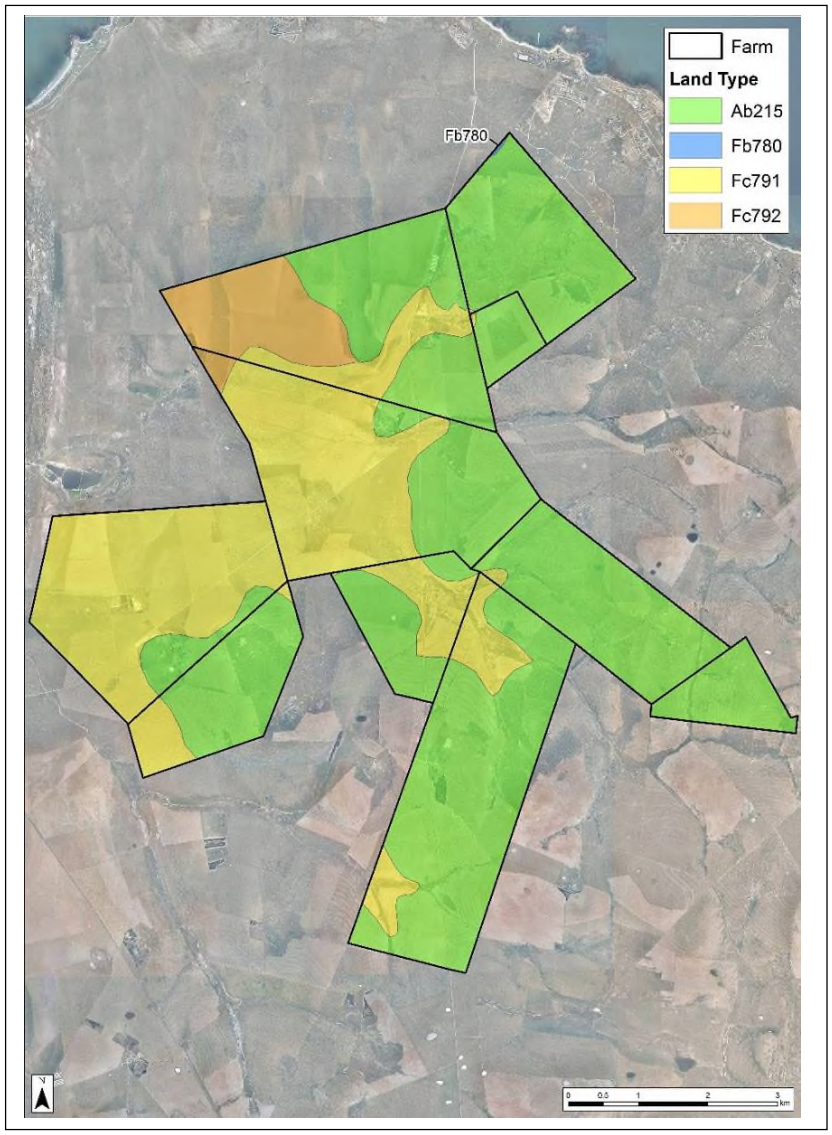


Figure 5.3: Land types associated with the Boulders Wind Farm project site

The general suitability of the existing cultivated areas within the project site are not considered as being preferred, with some limited areas recommended (subject to specific requirements) for both annual and perennial crops. Taking climate into consideration the agricultural potential is considered as marginally suitable for annual winter small grain and pastures. Land type Ab215 includes the soils that have a higher suitability for perennial crops, but the potential for growing high income crops such as wine grapes under dryland conditions is low.

The most common limitations for crop production of the soils within the project site are:

» weathering rock;
» hard plinthic horizons;
» texturally stratified alluvium;
» dense subsoil clay layers;
» wetness; and
» low clay content in top- and upper subsoils.

5.4.3. Ecological Profile of the Broader Study Area and the Project Site

The majority of the project site and the surrounding area has been transformed for crop production (refer to **Table 5.2**) and there are few remnants of intact vegetation. Remaining intact areas are associated with granite domes, rocky granite outcrops and other areas unsuitable for cultivation. These remnant patches of natural vegetation are important in supporting viable natural ecosystems with many birds, small mammals and reptiles finding refuge there. There are few brackish wetlands, vleis and streams which are sparsely distributed in the landscape, but in general the area is in a degraded or transformed state.

Table 5.2: Habitat condition in the Boulders Wind Farm project site

Habitat Condition	Percentage of habitat condition class (adding up to 100%)	Description (poor land management practises, presence of quarries, grazing / harvesting regimes etc.)
Natural	5%	Remnant Saldanha Granite Strandveld
Near Natural (includes areas with low to moderate level of alien invasive plants)	5%	Some invasion by alien plants and disturbance of soil
Degraded (includes area heavily invaded by alien plants)	5%	Limited areas of alien plants and degraded habitats since most areas are cultivated
Transformed (Includes cultivation, dams, urban, plantation, roads, etc.)	85%	Most of the arable land has been transformed by ploughing and cultivation

i. Broad-Scale Vegetation Patterns

The national vegetation map (Mucina & Rutherford 2012) for the project site is provided below in **Figure 5.4**.

The majority of the project site is mapped as falling within the **Saldanha Granite Strandveld** which occurs in the Western Cape Province, on the West Coast, on granite domes from Vredenburg to St Helena Bay and many points along the coast including Paternoster and Saldanha's North Head; also around Langebaan town and at Postberg on the Langebaan Peninsula. According to Mucina & Rutherford (2012), the vegetation consists of low to medium shrubland, containing some succulent elements, alternates with grassy and herb-rich spots supporting a rich geophyte flora.

The vegetation is listed as Endangered (WCBSP 2017) and out of the original 23 000ha, only 37% is left (DEA 2011). Almost 10% of the vegetation type is statutorily conserved in the West Coast National Park, SAS Saldanha and Columbine Nature Reserves, and a small portion in private reserves such as West Point, Groot Paternoster and Swartriet. About 70% has been transformed for cultivation or by urban development. The vegetation type has 45 Red Data Book species and 15 endemics.

Saldanha Flats Strandveld occurs to a smaller extent on the western portion of the project site. This vegetation type is distributed in the Western Cape Province on extensive coastal flats from St Helena Bay and the southern banks of the Great Berg River near its mouth in the north to Saldanha and Langebaan in the south, with the southernmost extension at the coast near Yzerfontein and Rietduin (Mucina & Rutherford 2012). The vegetation consists of sclerophyllous shrublands built of a sparse emergent and moderately tall shrub layer, with an open succulent shrub layer forming the undergrowth and has conspicuous displays of geophytes and annual herbaceous flora in spring (Mucina & Rutherford 2012).

It is listed as Endangered (up listed from the 2011 assessment of Vulnerable - WCBSP 2017) and some 11% statutorily conserved in the West Coast National Park and Yzerfontein Nature Reserve and a very small portion also in private conservation areas such as Jakkalsfontein and West Point (Mucina & Rutherford 2006). Only 48% of the original extent (76 000ha) remains (DEA 2011). More than a half has already been transformed for cultivation, road building or by urban development. It has 26 Red Data species and at least 2 endemics (DEA 2011).

Saldanha Limestone Strandveld is distributed in the Western Cape Province over a very limited area with a larger patch on the Kliprug ridge between Saldanha and Paternoster, with several smaller outliers including those between Saldanha and north of Club Mykonos on the Langebaan Lagoon (Mucina & Rutherford 2006). It occurs on slightly undulating ridges and steeper coastal slopes supporting low shrublands built of low succulent-stemmed and deciduous, fleshy leaved shrubs in deeper soils. Patches of prostrate, succulent-leaved dwarf shrubs and annual or geophytic herbs occupy cracks or shallow depressions in the exposed limestone (Mucina & Rutherford 2006).

None of the vegetation type is conserved in statutory conservation areas and only a small fraction protected in the Swartriet Private Nature Reserve. About 40% has been transformed for cultivation or by development of coastal settlements. It is considered to be Least Threatened.

Cape Inland Salt Pans occupy the low-lying areas adjacent to the drainage systems on the site. This azonal vegetation type occurs in the Western Cape and Eastern Cape (to a smaller extent), from Jakkalsrivier Valley between Graafwater and Lambert's Bay, Rocher Pan and other pans near Dwarskersbos (near Velddrif), Soutpan near Yzerfontein, Rondevlei, Paardevlei, Noordhoek (all near Cape Town), salt vleis of the Agulhas Plain, Zoutpan and several other smaller salt pans in the Albertinia region (Zoutpan, Melkhoutfontein, Vogelvlei). The vegetation occurs in small depressions dominated by low succulent scrub composed of creeping cheno¬pods and salt-tolerant herbs and grasses.

These pans are considered Least Threatened (WCBSP 2017) and 20% is statutorily conserved in the Agulhas and West Coast National Parks as well as in the Soetendalsvlei and Rocherpan Nature Reserves.

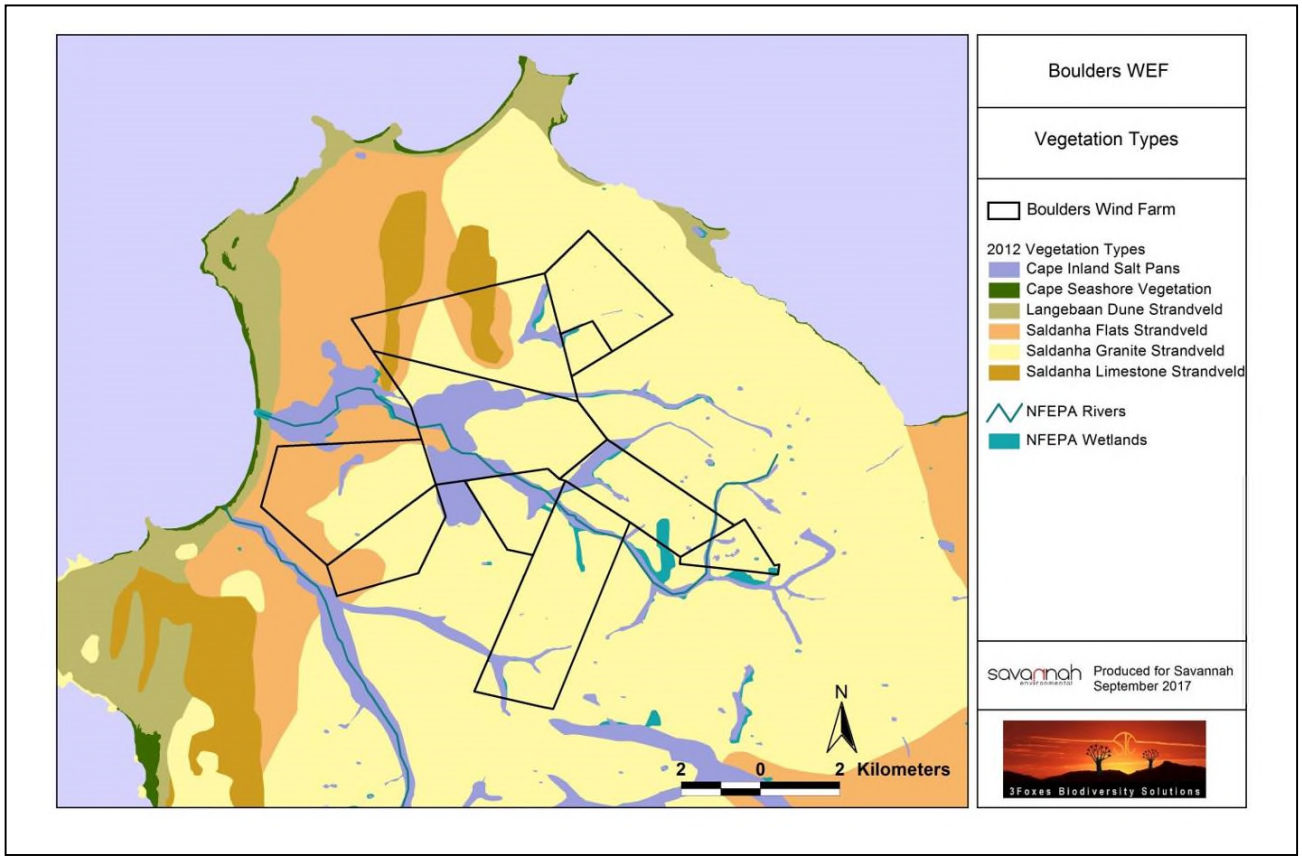


Figure 5.4: Broad-scale overview of the vegetation in and around the Boulders Wind Farm project site

ii. Listed Plant Species

Listed and protected species that occur in the wider area include 652 species, of which 11 are Critically Endangered, 33 are Endangered and 48 Vulnerable, indicating a very high proportion of species of special concern in the area. Given the high levels of transformation across most of the project site, the species richness of most areas is likely to be low. However, where reasonably intact areas remain, there is a very high probability that there will be species of conservation concern present.

iii. Critical Biodiversity Areas and Broad-Scale Processes

The project site lies within the planning domain of the Western Cape Biodiversity Spatial Plan (CapeNature 2017). This biodiversity assessment identifies Critical Biodiversity Areas (CBAs) which represents biodiversity priority areas, and are considered to be areas which should be maintained in a natural to near natural state. The CBA maps indicate the most efficient selection and classification of land portions requiring safeguarding in order to maintain ecosystem functioning and meet national biodiversity objectives.

There are CBA1 areas within the Boulders Wind Farm project site, most of which are in a natural condition and their proposed objective for use is "Maintain natural land. Rehabilitate degraded to natural or near natural and manage for no further degradation" (WCBSP 2017) (refer to **Figure 5.5**). These areas are associated with the remnants of natural vegetation associated with rocky outcrops or drainage features which occur scattered in the landscape. The Biodiversity Plan also described Farm portion 3/40 as containing a Red Data Listed species. The functioning of these CBAs is closely associated with the

extensive wetlands, of which a large proportion are classified as of high priority (NFEPA ranked 1) and are listed as aquatic CBAs and aquatic Ecological Support Areas, particularly those traversing the centre of the project site.

The site does not lie within a National Protected Area Expansion Strategy (NPAES) focus area and has therefore not been identified as an important area for future conservation area expansion.

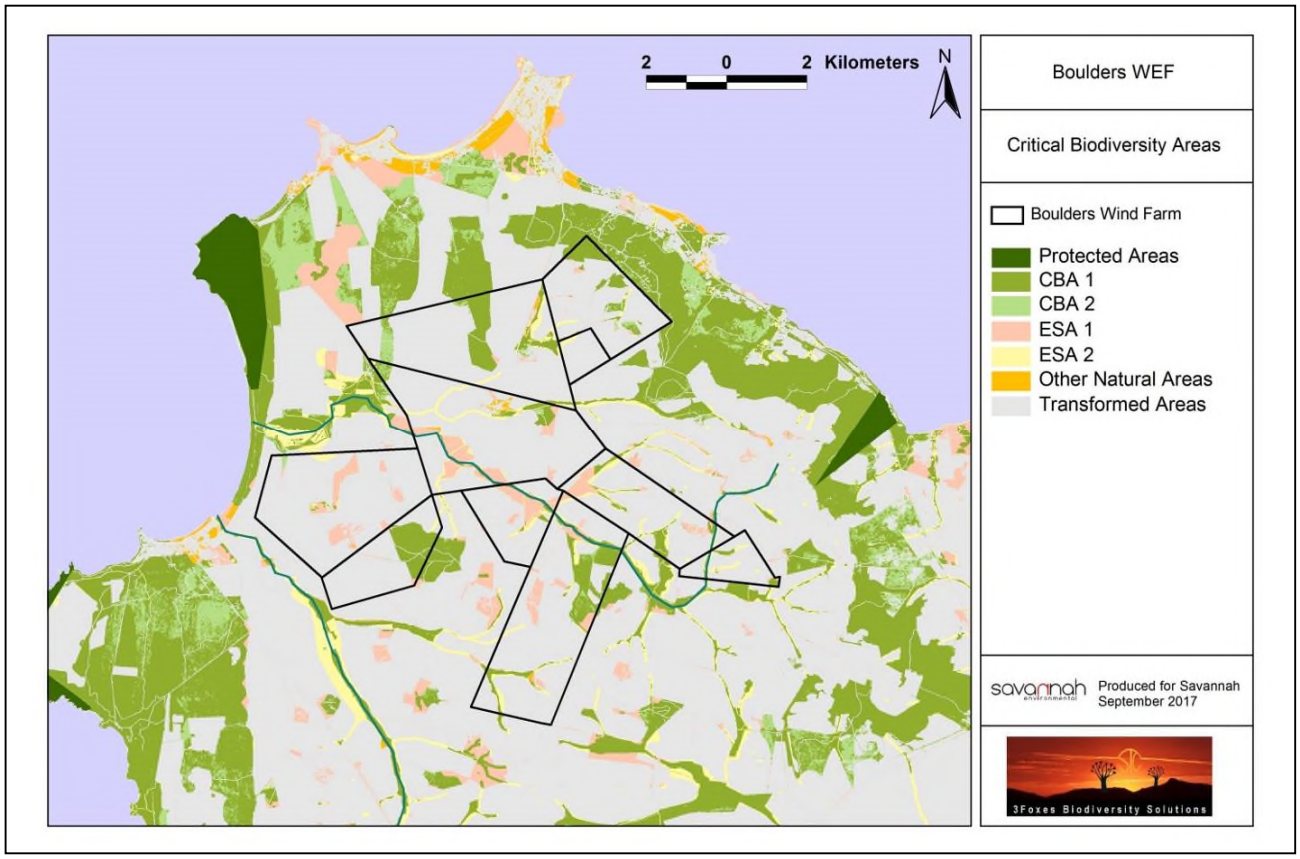


Figure 5.5: Critical Biodiversity Areas (CBAs), as per the Western Cape Biodiverstiy Spatial Plan (2017), located within the Boulders Wind Farm project site

The project site also falls within the Cape West Coast Biosphere Reserve, which extends from Milnerton in the south to Laaiplek in the north and as far inland as Malmesbury and Hopefield. There are no core areas associated with the reserve located within the project site, although it is within areas that are buffer areas and transition zones. The buffer areas are natural or transformed areas that generally coincide with the areas mapped as CBAs but are more broadly conceived in some areas, while the transition zones are transformed areas within the greater biosphere reserve which provide for contiguity between the core and buffer areas (**Figure 5.6**).

Figure 5.6: Cape West Coast Biosphere Reserve. The Boulders Wind Farm project site is located within the buffers areas and transitional zone (see yellow circle for the location of the project site) (source: http://capebiosphere.co.za/images/map.jpg).

iv Wetlands and Freshwater Resources

A floodplain wetland feature traverses the project site and several small channelled valley bottom and hillslope seep wetlands occur within the site. The majority of these features are considered to be seasonal

wetlands which contain surface water for limited periods of the year. Wetlands assessed were largely brackish in nature and are characterised by the presence of obligate and facultative wetland species including *Phragmites australis*, *Sarcocornia sp.*, *Atriplex semibaccata*, *Cyperus sp.*, *Frankenia sp.*, *Juncus kraussii* and *Lycium tetrandrum*.

The freshwater features associated with the project site have been impacted as a result of cultivation, earth moving activities, livestock grazing, dumping, and the construction of farm gravel roads through the features. These activities have resulted in the erosion and sedimentation of wetland areas. By upgrading the roads, which are currently used for farming activities, better erosion prevention and better road maintenance can be applied to prevent further degradation. The freshwater features associated with the project site are indicated as aquatic CBAs and ESAs and are likely to play an important role for the faunal species present on site

Depression wetlands are located within the project site, and at the time of the assessment lacked surface water and were characterised by bare soil or scattered individuals of wetland species such as *Sarcocornia sp*.

Numerous drainage channels were encountered traversing cultivated areas within the project site. The majority of these features have been significantly eroded as a result of the impact of surrounding cultivation and associated soil disturbance. Drainage channels are largely situated on hillslopes in steeper areas in which water does not accumulate for long enough for the formation of hydromorphic soils which are capable of supporting wetland floral species. Portions of channelled valley bottoms within the northern section of the project site have also been significantly modified and transformed as a result of surrounding agricultural activities and are currently considered to be more representative of drainage channels. Due to a lack of wetland characteristics as defined by the DWA (2005), the drainage channels cannot be considered as wetland habitat. However, the features are considered important in terms of the augmentation of downstream.

Figure 5.7 provides an indication of the wetland types and rivers associated with the Boulders Wind Farm project site.

v. Terrestrial Fauna

Mammals

The project site falls within the distribution range of 47 terrestrial mammals, excluding conservation-dependent mammals such as Eland, bats and marine mammals, and potential mammalian diversity at the site is quite high. Listed mammal species which may occur at the project site include the Grant's Golden Mole *Eremitalpa granti granti* (Vulnerable) of which 1 has been recorded in the general area, Brown Hyaena *Hyaena brunnea* (Near Threatened) and Cape Clawless Otter *Aonyx capensis* (Near Threatened).

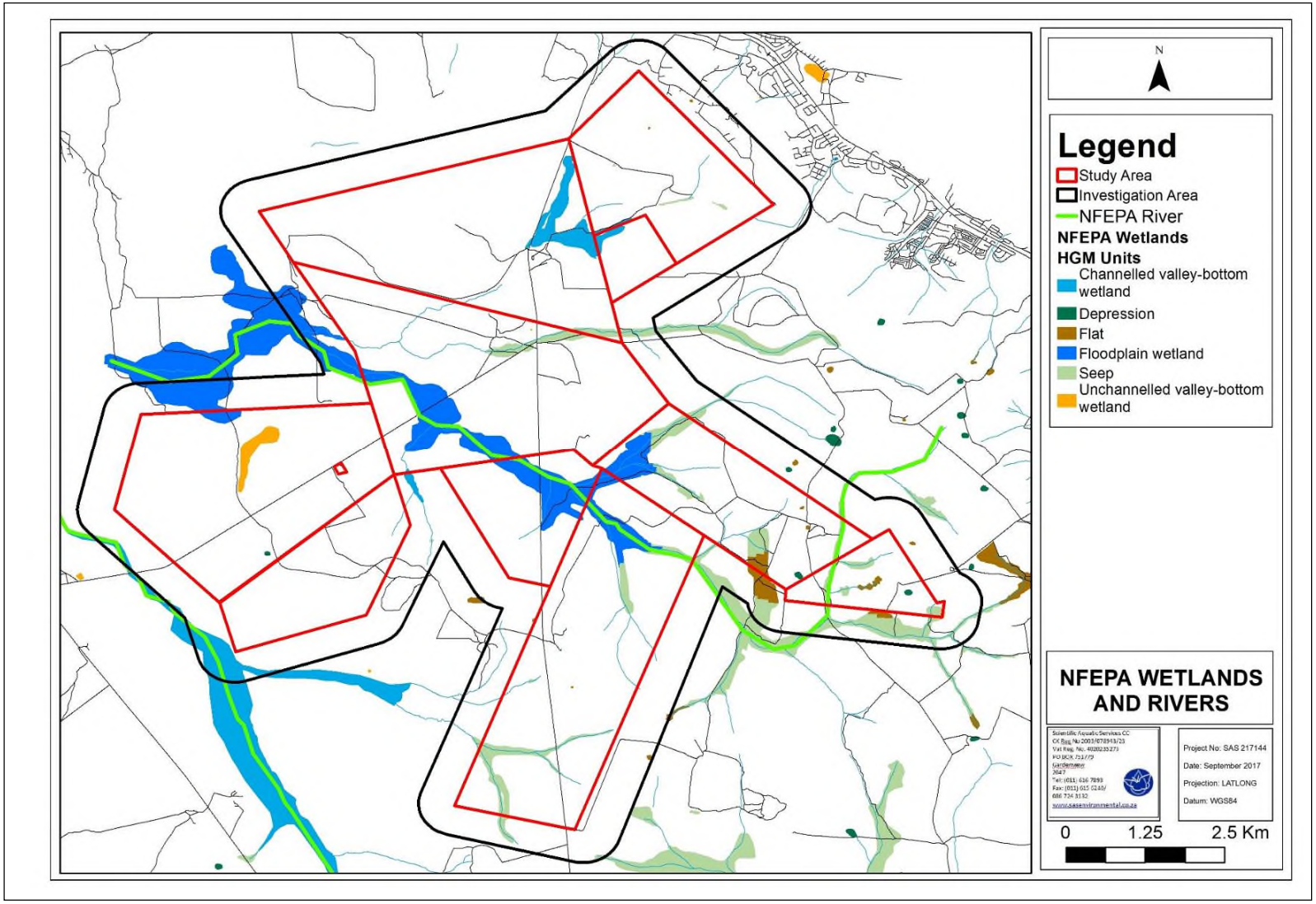


Figure 5.7: Wetland types and rivers associated with the Boulders Wind Farm project site

Reptiles

The project site lies in or near the distribution range of at least 40 reptile species. This is a comparatively low total, suggesting that reptile diversity at the project site is likely to be low. There are several listed species which could occur at the site. The Cape Dwarf Chameleon *Bradypodion pumilum* (Vulnerable) would be found in reed thatches, the Large-scaled Girdled Lizard *Cordylus macropholis* (Near Threatened) and the Black Girdled Lizard *Cordylus niger* (Near Threatened) would likely be found on rocky outcrops. However, listed species such as the Cape Sand Snake *Psammophis leightoni* (Vulnerable), Gronovi's Dwarf Burrowing Skink *Scelotes gronovii* (Near Threatened), Kasner's Dwarf Burrowing Skink *Scelotes kasneri* (Near Threatened) and the Bloubergstrand Dwarf Burrowing Skink *Scelotes montispectus* (Near Threatened) are more likely to be located in extensive sandy soils. The loss of vegetation cover associated with roads and other cleared areas can generate significant impact on reptiles as they may be vulnerable to predation while crossing such cleared areas, and the loss of key habitats can cause impacts on reptile persistence in the landscape.

Amphibians

There are eight amphibians known from the area based on the ADU database. The only listed species which may occur in the area is the Cape Caco *Cacosternum capense* (Vulnerable). This species breeds in pans which occur in undulating low-lying areas with poorly drained loamy to clay soils, although it is known from some shallow sandy habitats (IUCN 2017) and therefore it could occur in an inland pan habitat.

vi. Bats

Bats play a critical role in many ecosystems and are important indicators of biodiversity and ecosystem health. They provide many essential ecosystem services which increase human well-being such as pollination, seed dispersal and the consumption of important agricultural pests.

The Boulders Wind Farm falls within the possible modelled distributional range of 15 species of bat, representing 7 families (Monadjem et al. 2010). Four of these species have a low probability of occurrence on site and will most likely *not* occur at the Boulders Wind Farm. Three species have a medium probability of occurrence, while eight species (representing 5 families) have a high likelihood of occurrence and are expected to be present on site. Four species/ species groups (*Tadarida aegyptiaca*, *Neoromicia capensis*, *Laephotis namibensis* and *Neoromicia capensis / Eptesicus hottentotus*) were recorded within the project site during the September 2017 site visit.

Although fruit bats were not encountered during the site visits the possibility that they make use of the project site cannot be excluded. The project site falls within the distribution rage of *Rousettus aegyptiacus*, which is known to occur in the Western Cape. The presence of this species is tied to caves (known to roost in the De Hel Cave located ~150km south-west of the project site), therefore it may be uncommon at the project site which does not support cave habitats. These bats are known to commute long distances to feed on fruit trees (Richter & Cumming, 2008). In addition, the Boulders Wind Farm project site falls within the modelled possible distribution rage of *Ephomophorus wahlbergi*, although this species is less common in the region.

Table 5.3 below provides the details of the bats species which may be present within the Boulders Wind Farm project site.

Four bat species / species groups were documented on site on 19 September 2017. The most common species recorded were *Tadarida aegyptiaca* and *Neoromicia capensis*, which may make use of a building roof as a roost. The presence of *Laephotis namibensis* on site was confirmed, although this species is likely foraging in the area, as it is not known to roost in buildings.

Several calls could not be distinguished between *N. capensis* and *Eptesicus hottentotus* due to overlap in the frequency and shape of both species' echolocation call and the plasticity of the echolocation call structure of *N. capensis*. *Eptesicus hottentotus* has been confirmed on site, however, it roosts in caves and rock crevices and therefore this species (if the calls can be attributed to this species) may be foraging in the area.

Important Bat Habitats

Water bodies: Water bodies are important habitat features for bats (Siramia et al., 2013). They are often observed drinking shortly after emergence from their roost in the early evening. There are numerous water troughs scattered around the site, as well as a few permanent water bodies and water courses which intermittently contain water. These features may attract bats into the area. Therefore, any permanent water sources within the project site will be particularly important for bats, although many of the farm dams were at low levels in September 2017 (the end of the rainy season), and therefore may be dry by mid-summer. Any permanently stocked water troughs for livestock at the site may attract bats when most other water sources are dry (particularly in late summer - autumn). Furthermore, there are two large permanent water bodies (one of which is a water treatment plant) less than 2km to the west of the project site. These may draw bats into the area to drink and therefore increase their risk of flying over the site. Alternatively, the presence of these water bodies may reduce the importance of the small farm troughs on site for bats as drinking sites. It is clear that there are great seasonal differences in the amount of water at the project site and during the 2014 site visit numerous dry farm dams were identified. These features will become important areas for bats when filled with water.

Vegetated Watercourses: Vegetated watercourses provide bats not only with drinking opportunity, but also provides good foraging habitats due to insect abundances associated with the riparian vegetation. Furthermore, structurally complex watercourses also form linear corridors, along which bats may forage and commute, as well as migrate. The Berg River and its estuary are located approximately 12km east of the project site. This habitat is likely to provide good foraging for bats in the form of natural and riparian vegetation. In addition, it may provide a prominent landscape feature for long-distance navigation (during migration). This may draw bats into the vicinity of the proposed Boulders Wind Farm.

Roosting Sites: Roost sites are very important features for bats, often limiting species distributions (Monadjem et al., 2010), depending on the roosting requirements of the species.

Table 5.3: Bats species which may be present within the Boulders Wind Farm project site.

Family	Species	Common Name	Probability of Occurrence	Roosting Requirements	Likelihood of Risk	Relative Status	Conservation Status	
							RSA	Global
Pteropodidae	*Epomophorus wahlbergi*	Wahlberg's epauletted fruit bat	Medium	Trees	**Medium - High**		Least Concern	Least Concern
	Rousettus aegyptiacus	Egyptian rousette	Medium	Caves	**Medium - High**		Least Concern	Least Concern
Rhinolophus	*Rhinolophus capensis*	Cape horseshoe bat	**High**	Caves and mines	Low	Restricted distributions	Near Threatened	Near Threatened
	Rhinolophus clivosus	Geoffroy's horseshoe bat	**High**	Caves and mines. Buildings & trees as night roosts	Low	Restricted distributions	Near Threatened	Least Concern
Emballonuridae	*Taphozous mauritianus*	Mauritian tomb bat	Low	Rock faces, crevices, tree cavities, walls & buildings	**High**	Common - restricted distributions	Least Concern	Least Concern
Nycteridae	*Nycteris thebaica*	Egyptian slit-faced bat	**High**	Caves, aardvark burrows, culverts & tree cavities. Day and night roosts.	Low	Common – widespread and restricted distributions	Least Concern	Least Concern
Molossidae	*Tadarida aegyptiaca*	Egyptian free-tailed bat	**Confirmed***	Caves, crevices, trees & buildings	**High**	Common – widespread	Least Concern	Least Concern
	Sauromys petrophilus	Robert's flat-headed bat	Medium	Crevices & under rocks	**High**	Common – widespread	Least Concern	Least Concern
Vespertilionidae	*Neoromicia capensis*	Cape Serotine	**Confirmed***	Trees & buildings	**Medium - High**		Least Concern	Least Concern
	Eptesicus hottentotus	Long-tailed serotine	**Confirmed***	Caves & crevices	Medium	Wide but sparse distribution	Least Concern	Least Concern
	Cistugo lesueuri	Lesueur's wing-gland bat	Low	Rock crevices	Low	Restricted distributions	Least Concern	Near-Threatened
	Myotis tricolor	Temminck's myotis	Low	Caves	**Medium - High**		Least Concern	Near-Threatened

	Laephotis namibensis	Namibian long-eared bat	**Confirmed***	Rock crevices	Low	Restricted distributions	Least Concern	NE?
	Scotophilus dinganii	Yellow-bellied house bat	Low	Tree cavities & buildings	**Medium - High**		Least Concern	Least Concern
Miniopteridae	*Miniopterus natalensis*	Natal long-fingered bat	**High**	Caves. Has day and night roosts.	**Medium - High**	Common – widespread and restricted distributions	Near Threatened	Near Threatened

» No caves or mines were found at the project site, which reduces the likelihood of cave-dependent species (such as *M. natalensis*, *R. capensis* and *R. aegyptiacus*) being recorded at the site.
» The project site is scattered with many rocky outcrops and therefore there are many potential roosts for crevice roosting bats (such as S. petrophilus, *E. hottentotus*, *T. mauritianus*, *T. aegyptiaca* and *C. pumilus*). *Sauromys petrophilus* is rare in the area but shows a particular association with rocky habitats (Monadjem et al., 2010) and therefore may be present on site as rocky outcrops are very prevalent.
» Clumps of tall trees are found at multiple locations around the site and many of these are associated with farm buildings. These are additional possible roost sites for species that roost in foliage, in tree cavities and under bark, such as N. thebaica, E. wahlbergi, *T. mauritianus*, *T. aegyptiaca*, *C. pumilus*, *N. capensis* and *S. dinganii*.
» There are many farm buildings within and around the project site and many of these provide potential roost sites for species which may roost in roofs, such as *T. mauritianus*, *T. aegyptiaca*, *C. pumilus*, *N. capensis* and *S. dinganii*.

Figure 5.8 below provides a map which indicates the important habitat features for bats present within the Boulders Wind Farm project site.

Figure 5.8: Important bat habitat features within the Boulders Wind Farm project site. Rocky outcrops are designated by a white triangle (△); trees are indicated by tree icons (🌲) and dark green areas; Farm water troughs are indicated by (〰); fruit trees are indicated by (◎); blue lines indicate water courses; red

areas: buildings; dark blue areas: dry farm dams; turquoise areas: permanent water bodies; and light green areas: patches of natural vegetation.

vii. Avifauna

Important Bird and Biodiversity Areas (IBA)

The Important Bird and Biodiversity Areas (IBA) is a conservation programme which speaks to all four focal areas including species, sites, habitat and people. The IBA Programme aims to conserve a network of sites considered to be critical for the long-term survival of bird species that are globally threatened, have a restricted range and are restricted in terms of specific biomes or vegetation types.

The closest Important Bird Areas (IBA) to the project site is the Lower Berg River Wetlands, focussed around the Velddrif area (located ±17 km east of the project site. A second IBA is located approximately 30 km south, within the West Coast National Park, however this IBA is not expected to have great influence on the bird community. **Figure 5.9** below provides an indication of the project site in relation to the identified Important Bird and Biodiversity Areas (IBA).

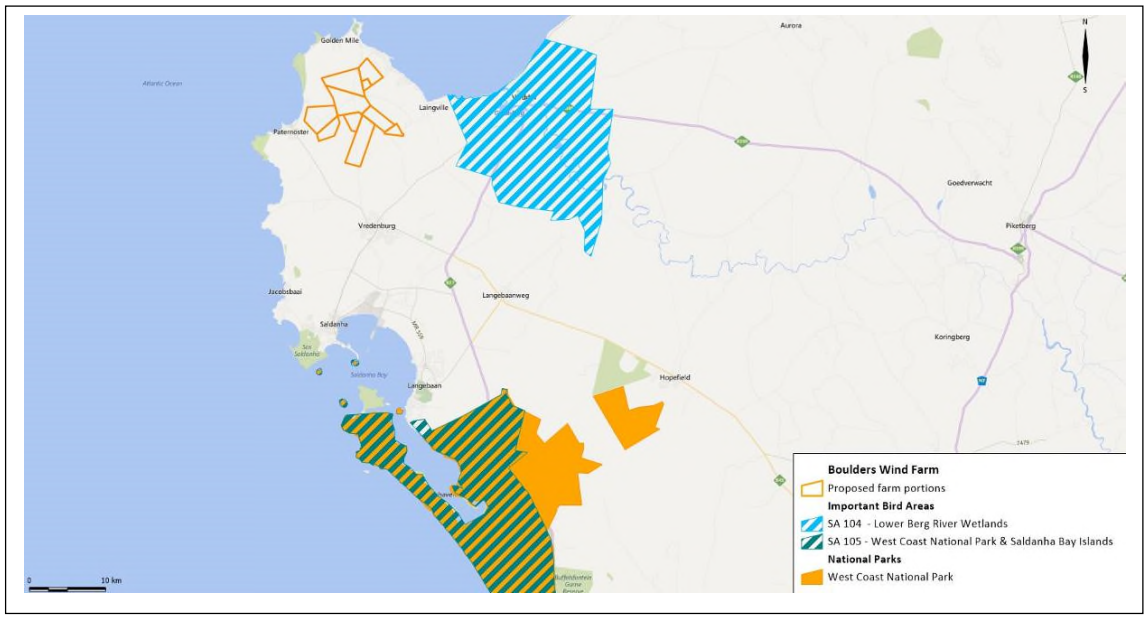


Figure 5.9: The Boulders Wind Farm in relation to the IBAs located within the surrounding area.

Avifauna Micro-habitats

When considering the project site proposed for the development of the Boulders Wind Farm main habitat types within the site are of relevance when considering the avifauna within the area. The main habitat types present within the project site considered as important features for avifauna include:

Pasture: Pasture areas may be attractive to some bird species since food and water supplements given to cattle and sheep may also attract large number of birds, such as Egyptian and Spur-winged Goose and also Blue Cranes, storks, egrets or herons. On the other hand, cattle presence can possibly attract insects and small rodents which provide food sources for raptors and falcons which can hunt over these areas.

Cereal cropland: Highly seasonal, these transformed habitats, dominated by wheat crops in the project site, may attract seed eaters such as Blue Cranes and also foraging raptors. Croplands in the area occur in various stages, meaning that within the project site at a given time some sections were ploughed, others were harvested and others presented grown cereal. These different stages attracts different bird species to the area depending on their biotope preferences.

Drainage line: The project site contains limited small farm dams and pans which, depending on their intrinsic characteristics, can be important for some bird species. Additionally, several drainage lines likely to carry water during the winter season traverse the project site in the central and southern portions. Natural dams with shallow sloping sides and well-developed surrounding vegetation are suitable for a wider range of species.

Farm Buildings: Considering the transformation of the project site for agriculture and pasture purposes, some buildings are present for human use. These include farm houses and smaller storage buildings. These locations may be important for several bird species which use them for roosting and/or nesting, including the Western Barn Owl (*Tyto alba*) and the Barn Swallow (Hirundo rustica).

Natural vegetation: The natural vegetation present within the project site is dominated by fynbos vegetation, which is considered as a relatively low bird diversity biotope compared to other vegetation types. The low coverage provided by fynbos vegetation, with its small shrubs and scrubs, is not very attractive for most bird species, especially passerines. It is however relevant for some endemic bird species such as the Cape Long-billed Lark, the Southern Black Korhaan, or the Black Harrier.

Coastline and oceanic waters: The proximity of the project site to the coastline in west, north and west, increases the likelihood that the site is used by maritime species. These species can fly at considerable altitudes while crossing the project site from the ocean to roosting places. Species with these characteristics include species such as the Kelp Gull (*Larus dominicanus*) and the Caspian Tern (*Sterna caspia*), among others.

Roads: Raptors and other aerial species can be found in areas where existing roads are located possibly due to the perching locations available near roads including the electric or telephone lines running alongside the road or due to prey availability (i.e. road kill). Some bird species may even use roads as landscape marks to travel through the area.

Water bodies: The project site contains several small farm dams which, depending on its characteristics, may be important for some bird species. These features may condition the general composition of the communities of large birds, which are likely to use them as stepping stones during their movements or as feeding or roosting areas, depending on water levels, availability of food, etc. These points may also attract predatory birds trying to feed on the waterbirds. Considering the proximity of the coastline to the project site and the known large roosts at the Berg River Mouth it is very likely that some birds use the area (including the project site) to commute and will therefore probably make use of the existing waterbodies located within the project site.

Trees: Other micro-habitats present within the project site and in the area immediately adjacent to the site, which are considered to be important for a number of priority raptor and falcon species, are stands of trees. In the project site such trees are usually associated with homesteads and farm buildings. These

locations provide perching and roosting and/or nesting locations for raptor species as well as refuge for smaller passerine species (e.g. Secretarybird, African Sacred Ibis (*Threskiornis aethiopicus*), Sickle-winged Chat (*Cercomela sinuate*), Cloud Cisticola (*Cisticola textrix*), among others).

Bird Community within the Surrounding Area and the Project Site

Approximately 252 bird species are considered likely to be present within the Boulders Wind Farm project site and/or its surrounding area. The bird community present may include up to 21 species of special conservation concern. From the species considered to be potentially present 6 are regarded as endemic to South Africa, 17 are near endemic to South Africa and 2 are breeding endemic to South Africa, Lesotho and Swaziland.

A short list of species, considered to present a higher sensitivity to the impacts caused by wind energy facility developments, such as collision with the operational turbine blades, collision and electrocution on the associated infrastructure as well as loss of habitat and displacement is presented in **Table 5.4** below. It includes 48 bird species, 19 of which are raptors, 13 waterbirds, 6 small passerines, 5 falcons, 2 bustards, 2 ciconids and 1 crane.

Table 5.4: Sensitive bird species which need to be considered for the development of the Boulders Wind Farm. *RLCS (Red List Conservation Status) (IUCN 2016) and South Africa RLCS (Taylor, Peacock & Wanless 2015): EN – Endangered; VU – Vulnerable; NT – Near threatened; LC – Least Concern; NA – Not Assessed; Endemism in South Africa (BLSA 2016): * – endemic; (*) – near-endemic; SLS – endemic to South Africa, Lesotho and Swaziland.*

Group	Common Name	Scientific Name	Global RLCS	South Africa RLCS	CMS Appendix	Endemic South Africa
Waterbirds	Sooty Shearwater	*Puffinus griseus*	NT	NT		
Waterbirds	Great White Pelican	*Pelecanus onocrotalus*	LC	VU	I	
Waterbirds	Cape Gannet	*Morus capensis*	VU	VU		
Waterbirds	Cape Cormorant	*Phalacrocorax capensis*	EN	EN		
Waterbirds	Bank Cormorant	*Phalacrocorax neglectus*	EN	EN		
Waterbirds	Greater Flamingo	*Phoenicopterus roseus*	LC	NT	II	
Waterbirds	Lesser Flamingo	*Phoeniconaias minor*	NT	NT	II	
Waterbirds	Maccoa Duck	*Oxyura maccoa*+	NT	NT	II	
Waterbirds	Greater Painted-snipe	*Rostratula benghalensi*	LC	VU		
Waterbirds	African Black Oystercatcher	*Haematopus moquini*	NT	LC		
Waterbirds	Chestnut-banded Plover	*Charadrius pallidus*	NT	NT	II	
Waterbirds	Eurasian Curlew	*Numenius arquata*	NT	NT	II	
Waterbirds	Caspian Tern	*Sterna caspia*	LC	CU	II	
Ciconids	White Stork	*Ciconia ciconia*+	LC		II	
Ciconids	African Sacred Ibis	*Threskiornis aethiopicus*	LC		II (subsp. *aethiopicus*)	
Raptors	Secretarybird	*Sagittarius serpentariu*	VU	VU		
Raptors	Cape Vulture	*Gyps coprotheres*	VU	EN	II	

Raptors	Yellow-billed Kite	*Milvus aegyptius*	NA		II	
Raptors	Black-shouldered Kite	*Elanus caeruleus*	LC		II	
Raptors	Verreauxs' Eagle	*Aquila verreauxii*	LC	VU	II	
Raptors	Booted Eagle	*Hieraaetus pennatus*	LC		II	
Raptors	Martial Eagle	*Polemaetus bellicosus*	VU	EN	II	
Raptors	African Fish Eagle	*Haliaeetus vocifer*	LC		II	
Raptors	Common (Steppe) Buzzard	*Buteo buteo*	LC		II	
Raptors	Jackal Buzzard	*Buteo rufofuscus*+	LC		II	(*)
Raptors	African Goshawk	*Accipiter tachiro*	LC		II	
Raptors	Pale Chanting Goshawk	*Melierax canorus*	LC		II	
Raptors	African Marsh Harrier	*Circus ranivorus*	LC	EN	II	
Raptors	Black Harrier	*Circus maurus*	VU	EN	II	(*)
Raptors	Western Osprey	*Pandion haliaetus*	LC		II	
Raptors	Western Barn Owl	*Tyto alba*	LC			
Raptors	Marsh Owl	*Asio capensis*	LC			
Raptors	Cape Eagle-Owl	*Bubo capensis*	LC			
Raptors	Spotted Eagle-Owl	*Bubo africanus*	LC			
Falcons	Peregrine Falcon	*Falco peregrinus*	LC		II	
Falcons	Lanner Falcon	*Falco biarmicus*	LC	VU	II	
Falcons	Rock Kestrel	*Falco rupicolus*	NA		II	
Falcons	Greater Kestrel	*Falco rupicoloides*	LC		II	
Falcons	Lesser Kestrel	*Falco naumanni*	LC		I, II	
Cranes	Blue Crane	*Anthropoides paradiseus*	VU	NT		
Bustards	Ludwig's Bustard	*Neotis ludwigii*	EN	EN		
Bustards	Southern Black Korhaan	*Afrotis afra*	VU	VU		*
Passerines	Grey-winged Francolin	*Scleroptila africana*	LC			SLS
Passerines	Cape Clapper Lark	*Mirafra apiata*	LC			(*)
Passerines	Cape Long-billed Lark	*Certhilauda curvirostris*	LC			*
Passerines	Karoo Lark	*Calendulauda albescens*	LC			(*)
Passerines	Large-billed Lark	*Galerida magnirostris*	LC			(*)
Passerines	African Pipit	*Anthus cinnamomeus*	NA			

Raptor and falcon species: Among the sensitive raptor and falcon species potentially present in the project site six species stand out: Cape Vulture, Martial Eagle, African Marsh Harrier and Black Harrier, classified as Endangered species in South Africa, and also the Secretarybird, Verreauxs' Eagle and Lanner Falcon, considered as Vulnerable in South Africa (Taylor, Peacock & Wanless 2015).

Waterbird species: The most relevant occurrences of this group in the project site would be the potential presence of Cape Cormorant and Bank Cormorant, classified as Endangered species in South Africa, and the Great White Pelican, Cape Gannet and Greater Painted-Snipe considered as Vulnerable in South Africa (Taylor, Peacock & Wanless 2015).

Bustard species: Ludwig's Bustard, classified as an Endangered species in South Africa, and Southern Black Korhaan, considered as Vulnerable in South Africa (Taylor, Peacock & Wanless 2015), are the sensitive species of bustard that can potentially be present in the project site.

Crane species: Blue Crane is a species of conservation concern in South Africa (Near Threatened).

Ciconid species: None of the sensitive ciconid species potentially present at the project site is of conservation concern.

Passerines and small bird species: The community of sensitive passerines and small birds potentially present on site is quite varied and include one species endemic to South Africa, the Cape-Long-Billed Lark; and several species regarded as near-endemic to South Africa. There are no species of conservation concern included in this group.

Confirmed Bird Community within the Surrounding Area and the Project Site[18]

A total of 119 bird species were confirmed in the project site across all the survey methodologies implemented from the beginning of the pre-construction monitoring, 32 of which are considered to be potentially sensitive to impacts from the development of the Boulders Wind Farm. Out of these species 13 are of special concern for having an unfavourable conservation status: Cape Cormorant (*Phalacrocorax capensis*), Martial Eagle (*Polemaetus bellicosus*), Black Harrier (Circus maurus), Ludwig's Bustard (*Neotis ludwigii*) – Endangered –, Great White Pelican (Pelecanus onocrotalus), Verreauxs' Eagle (*Aquila verreauxii*), Secretarybird (*Sagittarius serpentarius*), Lanner Falcon (*Falco biarmicus*), Southern Black Korhaan (Afrotis afra), Caspian Tern (Sterna caspia) – Vulnerable –, Greater Flamingo (*Phoenicopterus roseus*), Lesser Flamingo (*Phoeniconaias minor*) and Blue Crane (*Anthropoides paradiseus*) – Near Threatened (Taylor, 2014).

Most of the species with an unfavourable conservation status were detected within the project site and the surrounding area, with the exception of the Great White Pelican, Caspian Tern, Martial Eagle, Verreauxs' Eagle and Ludwig's Bustard detected exclusively outside of the project site area.

A total of 24 species of raptors and large terrestrial birds were observed in the project site and its surroundings, 14 of which are considered sensitive species. Blue Crane (*Anthropoides paradiseus*), Yellow-billed Kite (*Milvus aegyptius*), African Sacred Ibis (*Threskiornis aethiopicus*) and Jackal Buzzard (*Buteo rufofuscus*) were the most common large sensitive species recorded in the project sire from the commencement of the monitoring, and especially during summer season.

Fourteen species detected are considered to be endemic or near endemic to South Africa. Out of these the Jackal Buzzard (*Buteo rufofuscus*), Black Harrier, Southern Black Korhaan, Cape Clapper Lark (*Mirafra apiata*), Cape Long-billed Lark (*Certhilauda curvirostris*), Karoo Lark (*Calendulauda albescens*) and Large-

[18] The confirmed bird community is based on the Boulders Wind Farm pre-construction monitoring programme undertaken within the project site from June 2014 to May 2015, as well as field work undertaken in October 2017.

billed Lark (*Galerida magnirostris*) are especially important in terms of the sensitive species associated with the project site.

An active Secretarybird nest was found within the project site. This nest was monitored on the site visit undertaken in October 2017 and still appears to be in good condition (and highly likely to be in use, although no Secretarybirds were observed around it).

5.5. Heritage and Palaeontology

5.5.1 Heritage and the cultural setting

Historical records reveal that the Vredenburg peninsula was extensively utilised by Khoekhoen pastoralists for grazing in the eighteenth century, possibly as part of a seasonal movement of stock between the coast and interior. The arrival of European settlers in this area not only disrupted these indigenous lifeways, but led to conflict between European factions looking to exploit the local marine resources. Not all of this interaction was peaceful, and the outposts were the site of frequent clashes between the Khoekhoen and the soldiers.

Historical records also reveal much about the historic fishing, sealing and whaling industries, particularly near Marcus Island (Outer Bay) and at Salamander Point near Saldanha. More recent remains relate to the significance of the military installations at Saldanha and the surrounding areas during World War II. Remains in the form of structures, runways and gun and radar installations are still present.

Rampant recent development on the Vredenburg Peninsula has reduced the prevalence and significance of extant/remaining cultural landscapes. Natural landscapes, predominantly occurring along the western coast of the Peninsula, remain as reminders of the past beauty of the region, and where these contain high frequencies of Late Stone Age sites, they can be considered Stone Age cultural landscapes. The predominant agricultural landscape of rolling wheat fields, punctuated by granite koppies and interspersed with farmsteads located within groves of mature trees reflects the long history of farming in the vicinity. To a degree, there also remains a maritime cultural landscape, centred on the Saldanha Bay area, which reflects the area's long record of exploitation of marine resources. The existing turbines of the West Coast One wind energy facility constitute a further layering in the cultural landscape.

5.5.2. Archaeology

The West Coast of South Africa has been "settled" for at least 100 000 years. There are shell middens dating to the Middle Stone Age (MSA) both on, and to the north and south of the Vredenburg peninsula. Associated with these middens are Middle Stone Age stone artefacts and occasionally, fragments of anatomically modern human remains e.g. a tooth from the Sea Harvest site, and other anatomically modern post-cranial remains from Hoedjiespunt, all clearly older than 50 000 years. The presence of the so-called Saldanha skull fragment, and the not infrequent regionally widespread finds of distinctive ESA artefacts such as handaxes, attests to a much more ancient use of the area, although, climate and coastline might have been very different at that time.

The most important pastoralist site on the Vredenburg peninsula (and arguably in South Africa) found to date is that of Kasteelberg, located on the farm Rooiheuwel (located directly adjacent to the project site). The prominent hill is part of a granite batholith standing 187m above sea level, today surrounded by

agricultural lands. A site survey by Sadr et al. (1992) identified at least 36 discrete occupation areas around the hill ranging from Middle Stone Age scatters to Later Stone Age sites with pottery and domesticated stock remains. It would appear that Kasteelberg was the focus of settlement for over the last 2000 years. At least 10 sites have been excavated around the hill and there are more than 100 grinding grooves on bedrock in the vicinity.

Kasteelberg was identified in the late 1990's as a site worthy of declaration as a National Monument under the old National Monuments Act (of 1969, as amended). Heritage Western Cape has attempted to have the Kasteelberg Archaeological site complex declared as a provincial heritage site (PHS), but the process remains unfinalised.

Other important archaeological sites in the broader study area outside of the development area include Witklip, a small shelter below a granite boulder situated on the western outskirts of Vredenburg. Excavations suggest that this was a hunter-gather settlement dating to between 3000 and 500 BP. The site of Heuningklip, an open shell midden site on a granite hill to the east of Vredenburg, also contains a number of bedrock grooves similar to Kasteelberg. An archaeological site in Paternoster is a declared PHS.

Numerous granite extrusions of the underlying Vredenburg pluton is present within the project site and the surrounding areas. The granite extrusions are a very distinct feature amongst the rolling hilly landscape and are often impediments to ploughing. The outcrops functioned as foci for the pre-colonial and early colonial inhabitants of the area providing shelter from the south easterly winds and occasionally pools of water trapped in rock depressions (waterbakke) or in crevasses between the rocks.

Figure 5.10 provides an indication of the known archaeological sites and occurrences within the Boulders Wind Farm project site and the surrounding areas.

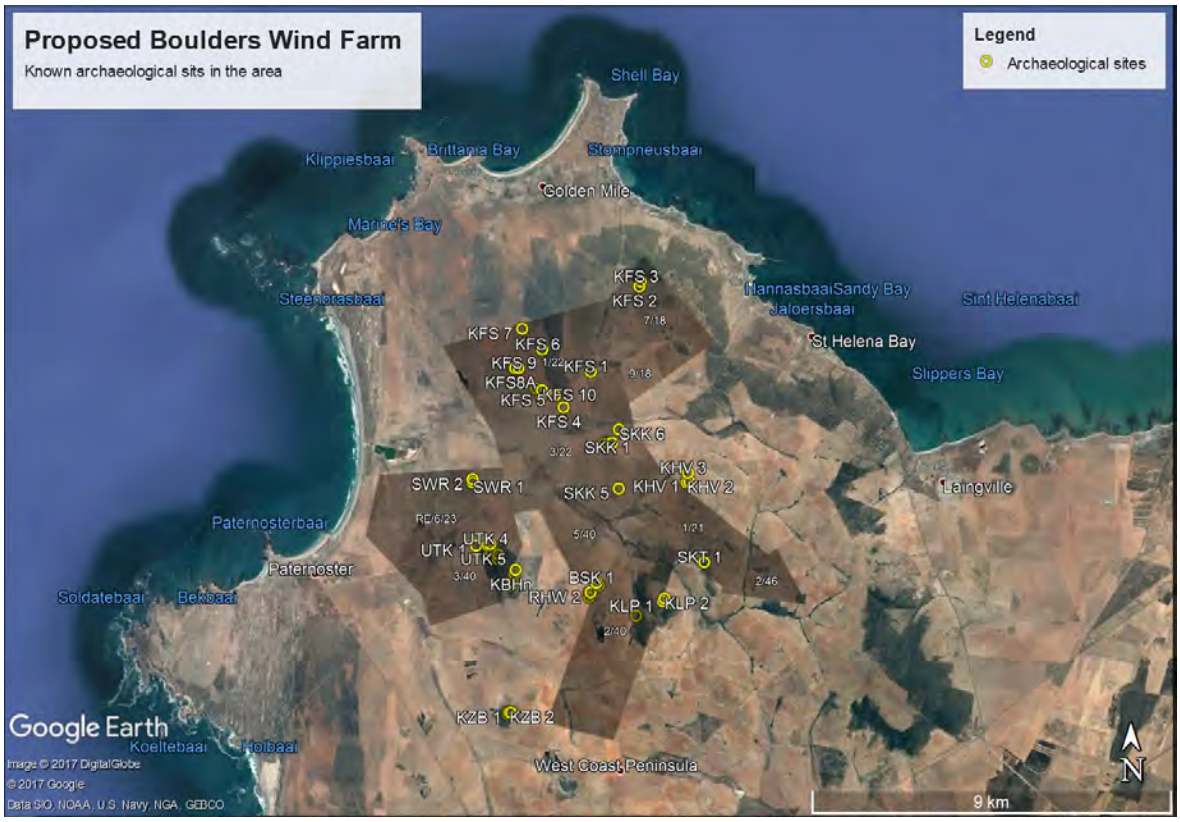


Figure 5.10: Known archaeological sites located within the Boulders Wind Farm project site and the surrounding areas

5.5.3. Palaeontology

Significant palaeontological deposits within the project site have been recorded at Soetlandskop, on Schuitjies Klip 1/22 in the north of the site, and are known to include the late-Miocene Prospect Hill Formation, but may also include Saldanha Formation mid-Miocene phosphatic deposits. The early Pliocene Varswater Formation may also be present on Schuitjies Klip 3/22, together with the mid-Pliocene Uyekraal Formation, and the Pliocene to Quaternary Langebaan Formation. Further to this, the Quaternary Velddrif Formation is mapped on the geological maps on Farm Uitkomst RE/6/23, although its presence here has not yet been confirmed. These deposits comprise the Coastal Formations Terrain.

According to the SAHRIS Palaeosensitivity map, the area is underlain by geological deposits varying in degrees of sensitivity from zero to very high (SAHRIS 2014). The geology comprises two distinct rock types, the unfossiliferous granitic deposits found across the Peninsula, and the potentially fossiliferous deposits that constitute the Coastal Formations Terrain, and are present at Soetlandskop in the north of the project site and the Uitkomst Embayment at the west.

The oldest bedrock of the region consists of Malmesbury Group shales, which were laid down over 560 million years ago (Ma), at the base of the Adamastor Ocean. These deposits were intruded into between 550 and 515 Ma, by molten magmas that cooled and solidified to form the "Cape Granite Suite". The Sandveld sediments of later Cenozoic age, deposited during the Neogene and Quaternary periods, i.e. during the last 20 million years overly these sediments, but have also been subject to erosion. The Malmesbury Group shales and Sandveld sediments have eroded from this area, exposing the granites in

the form of koppies found across the Vredenburg Peninsula. These granites are unfossiliferous, except where they act as traps that accumulate more recent fossils in crevasses or hollows.

The oldest potentially fossiliferous marine deposits preserved on the coastal plain are of mid-Miocene age, ~16-14 Ma, and are is represented by mineralised phosphate deposits of the Saldanha Formation. Outcrops of this formation are known at Soetlandskop in the northern extent of the project site, on Farm Schuitjes Klip 1/22 and 3/22.

Subsequent palaeoshoreline deposits have been deposited in the Uitkomst Embayment on Uitkomst RE/6/23 in the western extent of the project site, and consist of Pliocene, Miocene and Recent deposits. The early Pliocene (5-4 Ma) Varswater Formation, and the mid-Pliocene (3 Ma) Uyekraal Formation can contain marine fossils and shells. These are overlain by further shallow marine deposits in the Quaternary Period, collectively referred to as the Velddrif Formation, which were probably laid down in the last 400 000 years, which, although generally of low fossil sensitivity, can contain extinct shell fossil fauna that are of some significance.

Aeolian deposits, which correlate with periods of low sea levels, are represented across the Peninsula in the form of calcareous dunes with calcrete crusts. Prospect Hill Formation is the oldest of these deposits, and dates to some 12-9 Ma. This formation is known to contain later Miocene fossils including eggshell fragments of the extinct ostrich Diamantornis wardi and bones the extinct three-toed horse Hipparion, as well as indeterminate antelope bones, and also occurs on Soetlandskop. The Langebaan Formation is approximately 4 Ma, and is the most significant of the aeolian deposits in this area. Excavations into these deposits have yielded substantial data on the Quaternary faunas and archaeology of the Western Cape that are of profound scientific value, and have resulted in the extensive fossil beds at nearby Langebaanweg being declared a Provincial Heritage Site.

The most recent formation in the project site is the non-calcareous, quartz-sand-rich Springfontyn Formation (Ibid.). These are of low fossil sensitivity as the coversands can protect underlying fossils that are located on palaeosurfaces.

5.6. Visual Quality

The visual quality of the project site and the broader study area is defined by the following characteristics:

» The broader study area is located on land that ranges in elevation from sea level at the coast to approximately 270m above sea level at the top of the hills. The dominant topographical unit or terrain type of the broader study area is moderately undulating plains to the west and plains to the east. A number of rolling hills occur within the area, with the Patrysberg, adjacent to the R399 being the largest of these. Other smaller hills include the Klipheuwel and the Kasteelberg.
» Land cover within the broader study area and project site is dominated by low shrubland and fynbos and cultivated land / agricultural fields. Wheat and maize farming dominate the general land-use character of this relatively arid region.
» The project site has a rural character with very few built structures outside of the existing town boundaries. Exceptions occur at the West Coast One wind energy facility (located directly south of the Boulders Wind Farm project site), where 47 wind turbines are operational and clearly noticeable in the landscape.
» The region has a population density of approximately 65 people per km^2 with the highest concentrations occurring in the towns of Vredenburg and Port Owen. A number of smaller towns

occur along the Atlantic seaboard. These towns (Paternoster, Britannia Bay, Stompneus Bay, St. Helena Bay, etc.) are considered to be tourist destinations due to their close proximity to the ocean and their distinct West Coast character.

» Formal conservation areas in the region include the Cape Columbine Nature Reserve to the west of Paternoster and the Paternoster Rock Island Reserve to the north. Both reserves are located at distances exceeding 10km from the project site.
» A secondary gravel road traverses the length of the project site and leads to St. Helena Bay from the south. Residents and visitors to the area utilise this road to gain access to the area from Vredenburg. The R399 is a regional road located to the south of the project site which provides access to Paternoster from Vredenburg.
» Homesteads are located within the project site and within the surrounding area, with a concentration of these homesteads located along the outer boundary of the project site near St Helena Bay.
» Low voltage power lines are located within the northern section of the project site.

5.7. Ambient noise levels

Excluding the coastline (surf sound) there are little other noise sources of significance in the area (i.e. existing ambient sound levels). Noise from the West Coast One wind energy facility (located directly adjacent to the Boulders Wind Farm project site) is considered to be insignificant due to the design of the facility. The project site will have a rural character in terms of the ambient sound levels.

There are no major roads located in close proximity to the project site. There are a number of small gravel roads traversing the project site but traffic associated with these roads is considered to be insignificant. The land-use of the project site is mainly agricultural with small farming communities living on the farms within the area. In terms of the night-time noise environment, the current land-use activities are not expected to impact on the current ambient sound level.

There are a number of formal housing developments to the north-east of the project site with dwellings in close proximity to each other. A number of these developments are marketed as holiday homes but there are also permanent residents living in these developments. The town of Paternoster is located ±7km west from the Boulders Wind Farm project site.

Noise-Sensitive Developments

There are a number of noise-sensitive developments that occur in the surrounding area and the project site. Noise-sensitive developments are existing developments which considered to be sensitive to the generation of noise related to the proposed wind farm. Noise-sensitive developments as identified are highlighted in **Figure 5.11** below.

Figure 5.11: Noise-sensitive developments located within the surrounding area and the project site of the Boulders Wind Farm

5.8. Social Characteristics of the Study Area and Surrounds

5.8.1. Social context and characteristics

The Boulders Wind Farm project site is located within the Saldanha Bay Local Municipality, a Category-B municipality, which is one of five Local Municipalities that make up the West Coast District Municipality, a Category-C municipality. The administrative seat of the Saldanha Bay Local Municipality is Vredenburg (**Figure 5.12**).

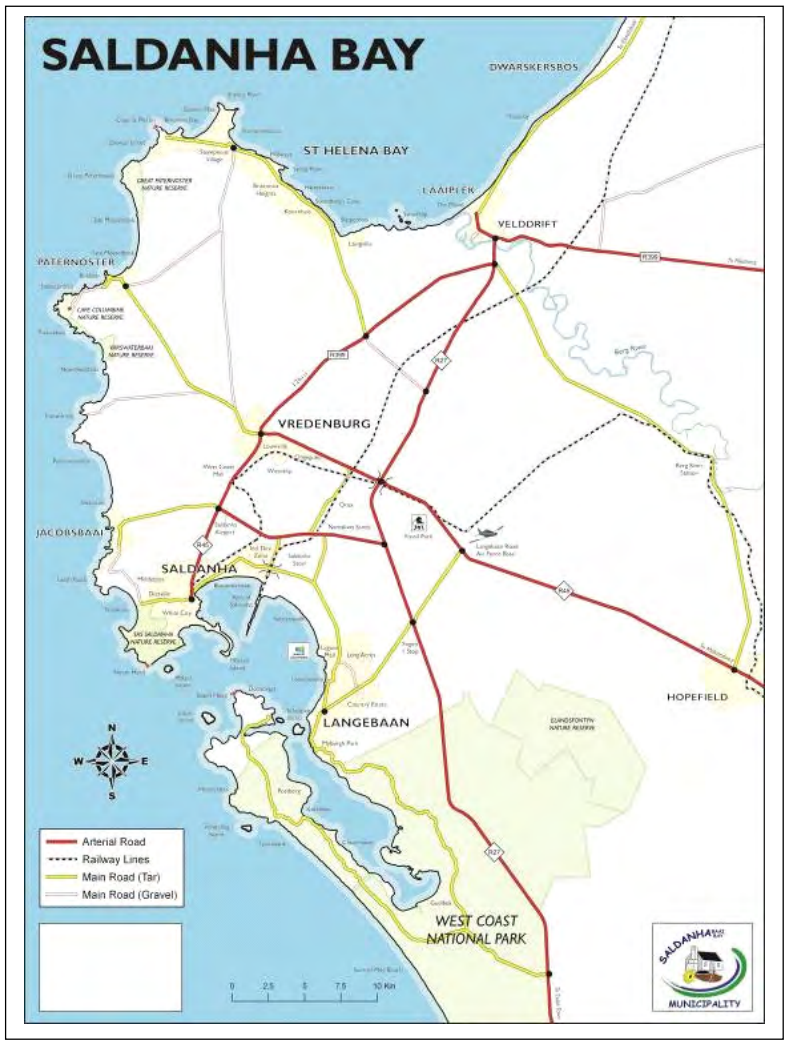


Figure 5.12: Settlements, infrastructure and national parks located within the Saldanha Bay Local Municipality

The most prominent settlements in the Saldanha Bay Local Municipality are Vredenburg, Saldanha, Langebaan, St. Helena Bay and Hopefield. Saldanha Harbour, is the largest harbour on the west coast of the African continent and is of regional and national importance. A number of large manufacturing plants (e.g. Saldanha Steel) are located in the Saldanha area. The bulk of the Saldanha Bay Local Municipality population is concentrated in urban areas, mainly Vredenburg and Saldanha. Other, smaller settlements include Paternoster and Jacobsbaai.

Saldanha serves as an important fishing and industrial port. Vredenburg is located approximately 130km north of Cape Town. Both Saldanha and Vredenburg are easily accessible from the R27 coastal road, which links Cape Town in the south with Velddrif (Bergrivier Local Municipality) in the north.

In terms of natural assets, the Saldanha Bay local municipal area boasts a broad range of natural assets that contribute to the area's attraction as a tourist destination. These assets include the Langebaan Lagoon, a Ramsar site and popular recreational areas, as well as the major portion of the West Coast National Park, the Cape Columbine Nature Reserve (Paternoster) and the West Coast Fossil Park (Langebaanweg). Other major tourism attractions include the region's famed wild flower displays (late August to mid-October), as well as whale, dolphin and bird watching opportunities. The coastline is also extensively used for recreational uses such as angling, crayfishing and various water sports. The areas tourism potential is enhanced by its proximity to Cape Town and other large towns in the Boland, including Stellenbosch, Paarl, Wellington.

Commercial fishing and fish processing have played an important historic role within the local economies of coastal towns such as Saldanha and St Helena Bay. However, a decline in fish stock and other factors has, over the past two to three decades, resulted in a shift towards tourism. As part of this change a large number of holiday and retirement homes have been established in the area, specifically in towns such as Langebaan, Paternoster, Jakobsbaai, and the Britannica Bay / St Helena Bay area. As a result the traditional fishing village sense of place associated with these small, coastal towns has largely been lost.

The operational West Coast One wind energy facility is also located within the Saldanha Bay Local Municipality and is located directly adjacent to the south-east of the Boulders Wind Farm project site. The development of this wind energy facility has set a precedent for the development of wind energy facilities within the broader area.

Based on information from the West Coast Socio-Economic Profile (2006), Agriculture, Forestry and Fishing was the biggest employer in Saldanha in 2001, contributing 23.6% to employment while its contribution to the GDPR (gross domestic product per region) was only 11.9%. The Manufacturing Sector contributed 17.8% to total local employment, followed by CSP services (14.4%) and the Wholesale and Retail Trade; Catering and Accommodation (13.3%). The major employers in the fishing industry include companies such as Sea Harvest, which employs approximately 2 400 employees, Oceana, Southern Seas and West Point Processors (565 employees). In terms of the metals and mineral-processing companies (Manufacturing Sector), Saldanha Steel (Mittal SA) accounts for 790 permanent jobs, Namakwa Sands 950 and Duferco 325.

5.8.2. Socio-demographic profile of the study area

The population of any geographical area is the cornerstone of the development process, as it affects the economic growth through the provision of labour and entrepreneurial skills and determines the demand for the production output. Examining population dynamics is essential in gaining an accurate perspective of those who are likely to be affected by any prospective development or project.

i. Population

The Saldanha Bay Local Municipality has a population of approximately 110 476, with a total of 31 664 households (Quantec, 2017). It constitutes just over a quarter of the population of the West Coast District

Municipality. Furthermore, similar to the population size, 28% of the total households in the West Coast District Municipality are located in the Saldanha Bay Local Municipality.

A large portion (97%) of the population resides in urban areas, followed by 3% located on farm land, with none residing on tribal land. A slightly greater proportion of the population is comprised of females.

Over two-thirds of the population are of working age (15-64), whereas a quarter are aged below 15. Just over 5% of the population in the Saldanha Bay Local Municipality are aged over 65. Evidently, the majority of the population is of working age and the minority are senior citizens.

ii. Education

From the adult population (+20 years), a minority of 2% do not have schooling. In the Saldanha Bay Local Municipality, over 36% have obtained a Matric certificate of which 8% have also attained a higher qualification.

iii. Labour Force Composition

According to Census 2011 data, the working age population of the Saldanha Bay Local Municipality was about 74 104. Amongst these, 45 152 were economically active. Not economically active (NEA) persons are those who do not contribute to production of goods and services either due to age (i.e. students or pensioners), personal circumstances, or lack of desire to seek employment (i.e. discouraged job seekers). The Saldanha Bay Local Municipality had 26 665 NEA persons in 2011. The employed labour in the municipality was estimated at 34 926, whilst the unemployed labour was about 10 587. This results in an unemployment rate of 23%.

In the town of Vredenburg, 13 414 of the working age population are employed, whereas 4 709 are unemployed. This indicates a 26% unemployment rate. In the case of Paternoster, the unemployment rate (10%) is significantly lower than that of the municipality and is the closest town in terms of the small population size. Conversely, St Helena Bay has the highest unemployment rate of 30%.

A majority (80%) of the employed labour work within the formal sector, whereas a minority (20%) work within the informal sector. Within the formal sector, 41% are semi-skilled, closely followed by 40% low-skilled and the minority remainder are highly skilled.

5.8.3. Economic profile of the study area

The economic sectors with the greatest contribution to the GDPR (gross domestic product per region) of the Western Cape are the finance and business services sector and the trade sector. At a local scale of the Saldanha Bay Local Municipality, the key GDPR contributing sectors are manufacturing and finance and business services, and wholesale and retail trade, catering and accommodation. Key tourism attractions include the beach fronts hosting numerous species, the nature reserves and the natural visual aesthetic of the region. Golf estates, beauty spas and fun parks additionally drive the attraction of tourists into the area and contributes to the local tourism economy. In 2016, The Saldanha Bay Local Municipality's economy was valued at R5 783 million in constant prices. The Saldanha Bay Local Municipality contributes close to a third of the economy of the West Coast District Municipality and 1% to the economy of the Western Cape. Over a period of ten years (2006-2016), the municipality's economy grew at a positive compounded annual growth rate (CAGR) of 1.5% per year. The economic sectors with

the least contribution to the overall GDPR of Western Cape and the Saldanha Bay Local Municipality are the mining and utilities sectors.

The area includes a Port of Saldanha Bay, which hosts an iron ore terminal from where iron ore mined at Kumba Iron Ore is exported and ArcelorMittal, among other manufacturing companies. The area also hosts Saldanha Bay Industrial Development Zone (IDZ) or, as later designated, a Special Economic zone (SEZ), which is aimed to serve as the primary oil, gas and marine repair engineering and logistics services complex in Africa.

As a result, the transport sector and iron and steel manufacturing are among the key economic drivers in the Saldanha Bay Local Municipality. Over the years, the manufacturing industry has declined by 0.2% from 2012 to 2017; however, it remains the largest contributing economic sector to the Saldanha Bay Local Municipality GDP. This negative impact was possible to offset by the above-average growth rate observed among the tertiary industries with exception of the trade sector which experienced a decline from 2015 to 2016.

According to Census 2011 data, the working age population of the Saldanha Bay Municipality was about 74 104. Amongst these, 45 152 were economically active. Not economically active (NEA) persons are those who do not contribute to production of goods and services either due to age (i.e. students or pensioners), personal circumstances, or lack of desire to seek employment (i.e. discouraged job seekers). The Saldanha Bay Municipality had 26 665 NEA persons in 2011. The employed labour in the municipality was estimated at 34 926, whilst the unemployed labour was about 10 587. This results in an unemployment rate of 23%.

Tourism has been identified as one of the key focus points with regard to the greater encompassing Vredenburg area. Historically, tourism has been a great driving force behind the economic development in this region of the Western Cape. In truth, the local tourism sector has deep roots in this area and has engrossed itself in almost every aspect of the local population

Visitor trends for 2016 show that the majority of visitors to St Helena Bay were overnight visitors (91%) with an average stay of two nights. Visitors were led by the domestic market which contributed 94% of the total number of visitors to the bay. The majority of the visitors were from Western Cape followed by Gauteng. International tourists were predominantly from Germany and Namibia.

According to the Cape West Coast visitor trends as published by WESGRO, in 2016 Paternoster was one of the busiest towns in the region with an increase in tourist flow recorded by the tourism offices. The main tourism activities include whale watching and a visit to the Cape Columbine Nature Reserve. As per the 2016 visitor trends, the majority of the visitors to Paternoster were domestic visitors (66%), of which most (52%) came from within the Western Cape, while 24% were from Gauteng. The international market was made up of mostly Germans (46%) and tourists from the United Kingdom (21%).

In terms of the property values experienced within the area, the following has been identified (**Appendix J(a)**):

As per **Figure 5.13** below, it is evident that the property prices for sectional titles in Vredenburg have fluctuated between R140 000 to R435 000 in the past ten years. With regard to Freehold property, the prices have been gradually increasing since 2010 and have nearly doubled in 2018.

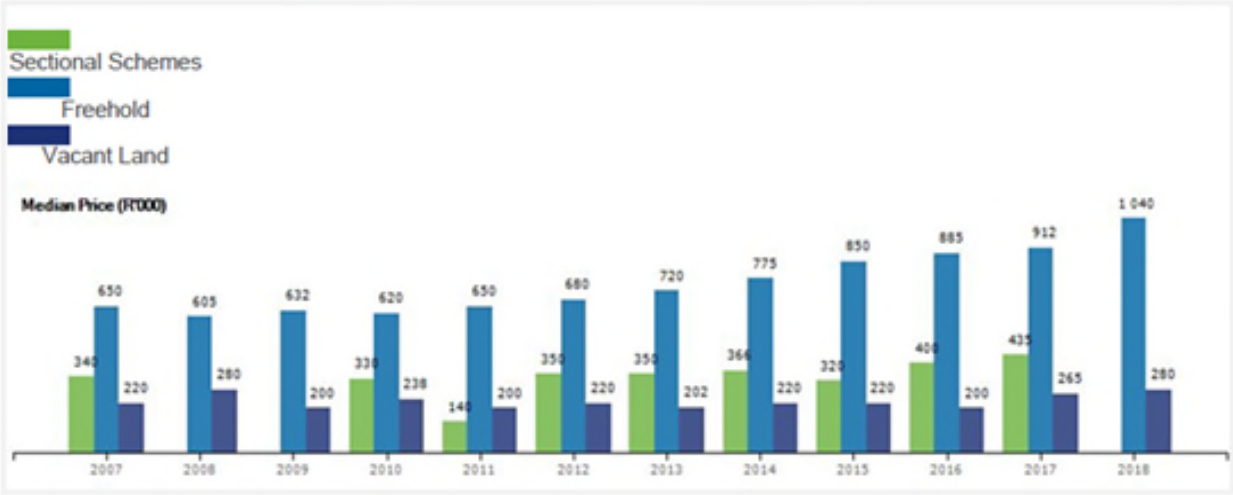


Figure 5.13: Property values over a ten-year period in Vredenburg

In Paternoster, properties with the highest values are sectional schemes, followed by freehold property, whilst vacant land has the lowest market activity and relatively lower prices. The highest property values were recorded in 2011 and lowest in 2010. Refer to **Figure 5.14** below.

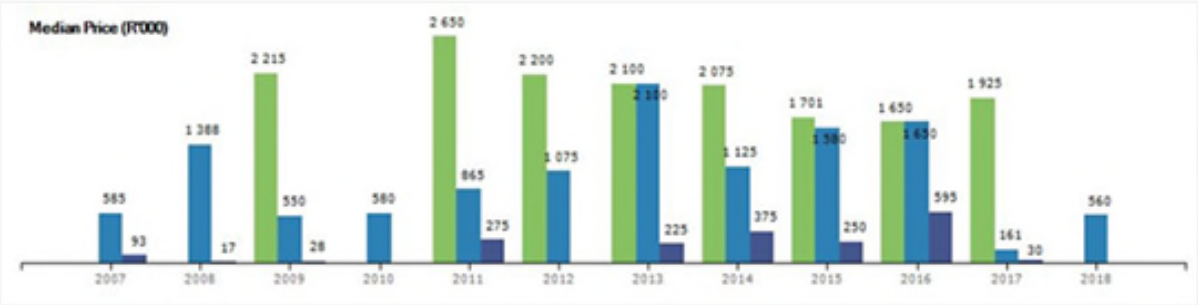


Figure 5.14: Property values over a ten-year period in Paternoster

Saint Helena Bay has had an active property market skewed to freehold property, and no sales in sectional schemes in the last ten years. The highest property values were recorded in 2017. Refer to **Figure 5.15** below.

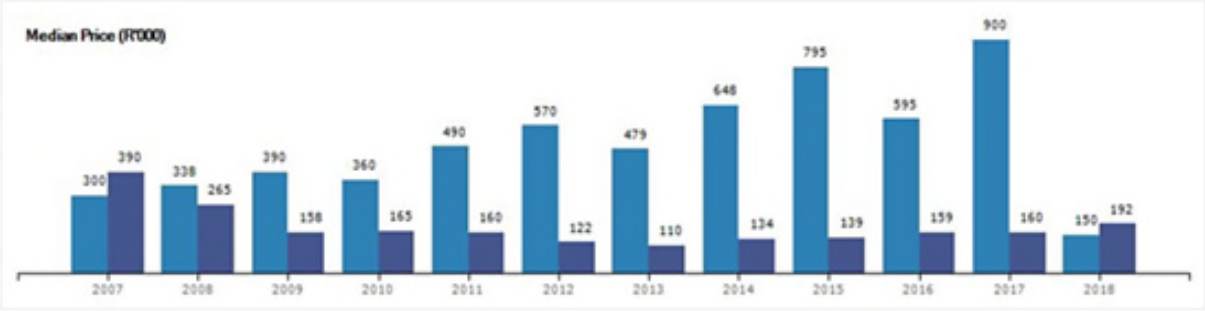


Figure 5.15: Property values over a ten-year period in Saint Helena Bay

CHAPTER 6: SCOPING OF POTENTIAL ISSUES

This chapter serves to describe environmental issues and potential impacts (direct, indirect and cumulative impacts) that have been identified to be associated with the development of the Boulders Wind Farm and associated infrastructure, and to make recommendations for further studies required to be undertaken in the EIA phase. The scoping process has involved the review of existing information (including previous detailed studies undertaken), limited field work, input from the project proponent, stakeholders, and the public.

Environmental issues associated with construction and decommissioning activities may include, among others, impacts on biodiversity (fauna, flora and ecological integrity), loss of habitat, soil erosion, and impacts on, and/or benefits to the social environment and current land use. Environmental issues specific to the operation of a wind farm could include visual impact; change to ambient noise levels; avian mortality resulting from collisions with blades, and mortality, injury, and disturbance to faunal species (e.g. bat mortality due to barotrauma). Benefits include increased production and GDP-R, temporary employment, permanent employment (for maintenance and operation activities), skills development due to the creation of new employment opportunities, increased household income, improved standard of living for households, spin-off income due to the development (i.e. increased use of the local accommodation within the area) and the reduction of CO_2 through the development of renewable energy which in turn assists with climate change impacts within society.

The significance of impacts associated with the development of a wind farm and its associated infrastructure is dependent on site-specific factors, and therefore impacts can be expected to vary significantly from site to site. Sections 6.3 and 6.4 provide a summary of the findings of the scoping study undertaken for the construction and operation phases of the Boulders Wind Farm. Identified impacts and benefits are described and evaluated, and recommendations are made regarding further studies required within the EIA Phase of the process (in line with the requirements of Appendix 2 of the EIA Regulations).

During construction, a development footprint within the project site of approximately 5084ha will experience some level of disturbance and impact as a result of the required construction activities on site. However, once construction is complete, it is expected that less than 1% (~55ha) of this area will be permanently impacted by infrastructure associated with the wind farm. In identifying and evaluating impacts associated with the project, it is acknowledged that during the operation phase the area affected, or development footprint, will be limited to a smaller area located within the 5084ha project site, and that the location of this development footprint will be informed by environmental sensitivities and the application of the mitigation hierarchy (that is, avoid, minimise, mitigate).

The Boulders Wind Farm will have a contracted capacity of up to 140MW and will include:

» Up to 45 wind turbines with a maximum hub height of up to 120m. The tip height of the turbines will be up to 165m;
» Concrete foundations to support the turbines;
» Cabling between the turbines, to be laid underground where practical;
» An on-site substation of up to 200m x 200m in extent to facilitate the connection between the wind farm and the electricity grid;

» An overhead 132kV power line, with a 32m servitude, to connect the facility to the electricity grid[19] ;
» A transformer station for each wind turbine;
» Access roads to the site and between project components with a width of approximately 6m;
» Laydown areas, crane hardstand pads, administrative buildings and offices.

The potential for cumulative impacts associated with the Boulders Wind Farm is associated with the nature and the extent of the facility, as well as the consideration of more than one facility located within the area. Due consideration is to be given to impacts and/or benefits associated with the potential for visual impact, potential impacts on ecology, avifauna (birds), bats and heritage resources in the surrounding area, and impacts and benefits on land use and the social environment within the surrounding areas of the project.

Specialist scoping reports are included within **Appendix D to L** wherein the potential issues relating to the development of the Boulders Wind Farm are identified. A discussion of the potential cumulative impacts associated with the project at this stage of the process is presented in Section 6.5.

6.1. Legal Requirements as per the EIA Regulations, 2014 (as amended)

This chapter serves to identify the potential environmental impacts associated with the development of the Boulders Wind Farm from a desktop level. This chapter includes the following information required in terms of the EIA Regulations, 2014 - Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(g)(v) the impacts and risks which have informed the identification of each alternative, including the nature, significance, consequence, extent, duration and probability of such identified impacts, including the degree to which these impacts (aa) can be reversed (bb) may cause irreplaceable loss of resources and (cc) can be avoided, managed or mitigated.	The impacts and risks identified to be associated with the construction and operation phase of the Boulders Wind Farm have been included in sections 6.3 and 6.4. Impact tables have been included for each field of study which considers the nature, significance, consequence, extent duration and probability of the impacts, as well the reversibility of the impacts, the loss of resources and avoidance or mitigation.
(g)(vi) the methodology used in identifying and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives	The methodology used for the assessment of the impacts has been included in section 6.2
(g)(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	The positive and negative impacts associated with the Boulders Wind Farm has been included in sections 6.3 and 6.4.
(g)(viii) the possible mitigation measures that could be applied and level of residual risk	Possible mitigation (i.e. avoidance of sensitive areas) has been included in sections 6.3 and 6.4.

[19] The construction of the 132kV overhead power line will be assessed as part of a separate Basic Assessment process which will consider feasible alternatives for the power line route. A 200m corridor will be assessed for the power line.

6.2. Methodology for Impact and Risk Assessment during the Scoping Phase

The following methodology was used to describe and evaluate the main issues and potential risks and impacts associated with the Boulders Wind Farm during the scoping phase:

» The identification of potential sensitive environments and receptors that may be impacted on by the development and the types of impacts (i.e. direct, indirect and cumulative[20]) that are most likely to occur. This was achieved through a review of existing baseline information, desk-top investigations as well as limited field work, as was considered to be required.
» Description of the nature, significance, consequence, extent, duration and probability of potential impacts (refer to Section 4.4.3 where these criteria are defined), as well as the degree to which these impacts are reversible, may cause irreplaceable loss of resources and can be avoided, managed or mitigated during the construction and operation phases.
» The identification of potential risks to the development and the environment, and identification of 'No-Go' areas within the broader site, where applicable.
» The compilation of a summary of the potential impacts that will be considered further in the EIA Phase through specialist assessments.

[20] A cumulative impact refers to the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities (Environmental Impact Assessment Regulations, 2014).

6.3. Evaluation of potential impacts associated with the Construction Phase

6.3.1. Potential impact on ecology[28]

The majority of the extent of the project site is transformed and considered to be of low ecological sensitivity. Development in these areas would result in very low ecological impacts. There are, however, many remnant vegetation patches of various size at the site which are considered as being of a higher sensitivity. The smaller fragments are generally degraded as a result of overgrazing and other impacts related to their small size, and are considered as medium sensitivity. Although degraded, there may be listed species present in these areas and any development in these areas would need to ensure that no species of high conservation concern are affected. The larger intact areas are the only areas which retain a resemblance of the original ecological functioning and are considered to be of a Very High sensitivity and should be considered no-go areas. No-go areas have been identified within the extent of the project site. Existing roads may only be upgraded within the no-go areas that relates to the placement of turbines, and not the no-go areas relating to all infrastructure (**Figure 6.1**).

Where the development footprint can be restricted to the low sensitivity areas, the impact of the development on fauna and flora would be low. Significant impact on the larger intact fragments would be considered a fatal flaw and therefore the facility layout must avoid all intact fragments.

Figure 6.1 provides an illustration of the ecological sensitivity of the Boulders Wind Farm project site.

The impacts associated with the development of the Boulders Wind Farm may include impacts associated with the disturbance, loss and transformation of intact vegetation and faunal habitat to hard infrastructure such as turbine foundations and service areas, roads, operations buildings and other associated infrastructure. The following ecological impacts would be associated with the construction phase:

» Impacts on vegetation due to construction activities - further loss and transformation of intact vegetation where such vegetation is disturbed
» Impacts on fauna due to construction activities - increased levels of noise, pollution disturbance and human presence within the project site
» Degradation of ecosystems - the development may contribute to a decreased ability for the area to meet future conservation targets

[28] The ecological scoping study is based on data verified in the field.

Impacts on vegetation due to construction activities

Impact:
Impacts on vegetation could occur due to disturbance and vegetation clearing associated with construction activities. This impact would be minimised where development within natural intact vegetation is avoided. The majority of the project site is already transformed and considered to be low sensitivity, but there are still some intact areas remaining which are considered as higher sensitivity, with the larger better condition fragments considered to be of a high sensitivity.

Issue	Nature of Impact	Extent	No-Go Areas
Disturbance and loss of intact vegetation due to construction activities	There are several listed vegetation types at the site and further loss and fragmentation of intact vegetation at the project site is highly undesirable. In addition, the intact fragments are likely to contain plant species of conservation concern.	Local and the development footprint	No-go areas associated with the intact fragments have been delineated.

Description of expected significance of impact
When physical impact on the larger intact fragments (that have been identified as being High or Very High sensitivity) can be avoided, then this impact would be of low significance.
Further habitat loss within the intact areas would, however, be considered to constitute a high impact and would compromise the viability of the development from an ecological perspective.

Gaps in knowledge and recommendations for further study
The larger intact areas are clearly delineated and there is little uncertainty with regards to either their distribution or sensitivity. The only area of some uncertainty is the condition of some of the smaller intact fragments which are generally very degraded and retain little ecological value, but in some instances could retain some species of concern. There are no significant gaps in knowledge with regards to likely ecological impacts at the project site.

Faunal impacts due to construction activities

Impact:
There are no faunal species of high sensitivity that are likely to occur within the transformed areas and the overall abundance of fauna within the project site is likely to be relatively low and represent those species more tolerant of transformation and habitat fragmentation. Disturbance, transformation and loss of intact habitat will have a negative effect on resident fauna during and after construction. Faunal disturbance will likely extend beyond the direct footprint and extend into adjacent intact areas, even though there may be no direct habitat loss in these areas. Although disturbance will be transient and restricted to the construction phase, any loss of intact habitat would be long-term. Most of the project site is transformed and considered to be low sensitivity for fauna, but there are still some intact areas remaining which are considered as higher sensitivity, with the larger better condition fragments considered to be of a high sensitivity.

Issue	Nature of Impact	Extent	No-Go Areas
Faunal disturbance and loss of intact faunal habitat due to construction activities	Fauna would be deterred from the area as a result of construction activities. The project site is already fragmented, and the further loss or fragmentation of the intact areas will have negative impacts	Local and the development footprint	No-go areas associated with the intact fragments have been delineated

	on fauna.		
Description of expected significance of impact When physical impact on the larger intact fragments (that have been identified as being High or Very High sensitivity) can be avoided, then this impact would be of low significance.			
Gaps in knowledge and recommendations for further study The larger intact areas are clearly delineated and there is little uncertainty with regards to either their distribution or sensitivity. There are no faunal species of high sensitivity that are likely to occur within the transformed areas and the overall abundance of fauna within the project site is likely to be relatively low and represent those species more tolerant of transformation and habitat fragmentation. There are no significant gaps in knowledge with regards to likely faunal impacts at the project site.			

Degradation of ecosystems

Impact: Disturbance created during construction would potentially result in ecosystem degradation as a result of erosion and alien plant invasion. Most of the project site is transformed and considered to be low sensitivity with little risk of degradation. Disturbance of the intact areas should however be avoided as much as possible.			
Issue	**Nature of Impact**	**Extent**	**No-Go Areas**
Ecosystem degradation as a result of alien plant invasion and erosion.	Alien invasion and erosion may occur following construction and lead to degradation of drainage systems or remaining intact areas.	Local and the development footprint and associated adjacent areas	No-go areas associated with the intact fragments have been delineated
Description of expected significance of impact Provided that erosion control measures are implemented during construction then this impact would be of low significance.			
Gaps in knowledge and recommendations for further study As the project site is largely transformed, there is little uncertainty with regards to the nature and extent of this impact.			

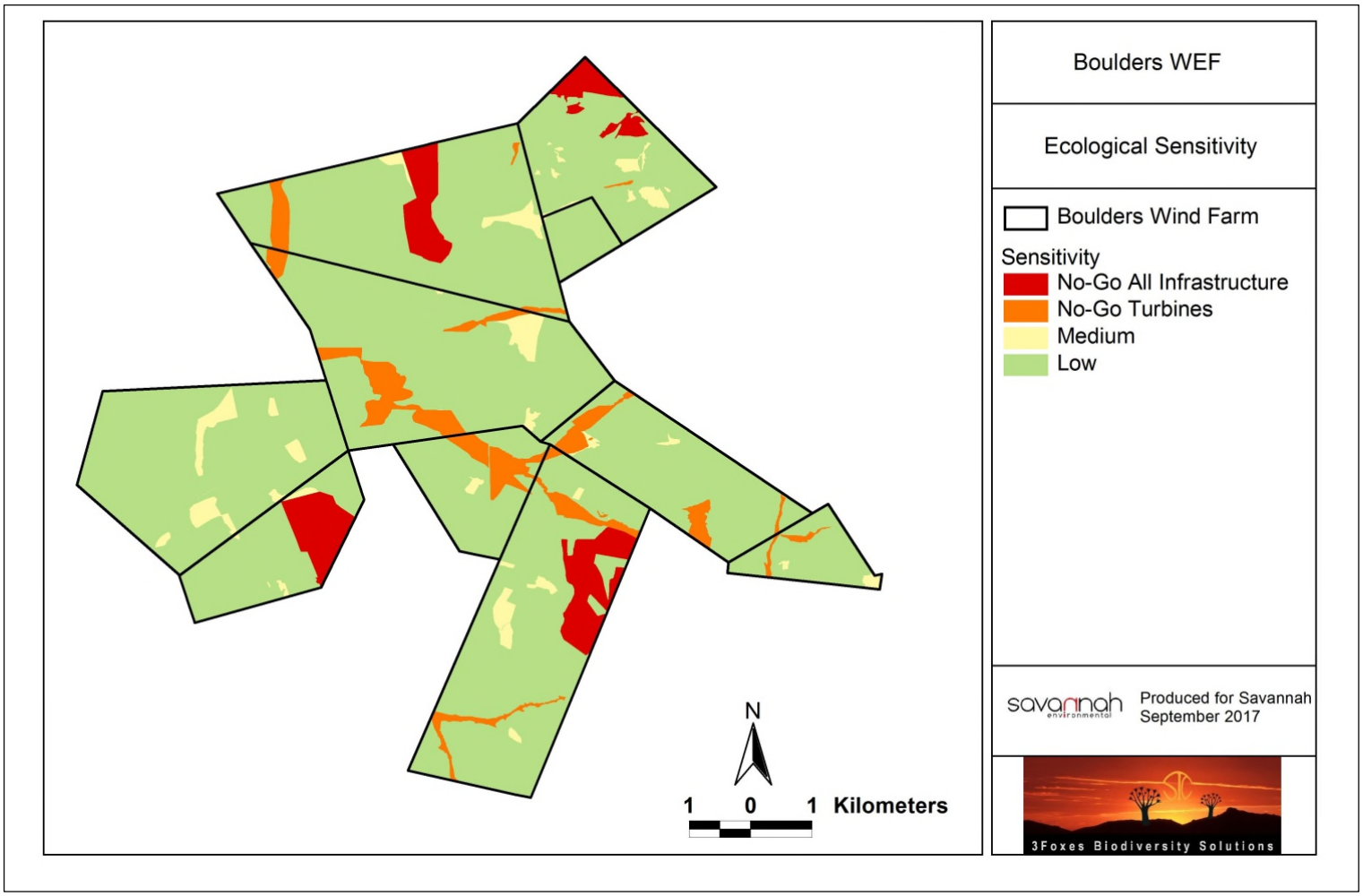


Figure 6.1: Ecological Sensitivity map of the Boulders Wind Farm project site

6.3.2. Potential impact on freshwater features

All freshwater features identified have been impacted on by surrounding agricultural activities and issues. Most of the areas adjacent to the freshwater features have been ploughed, increasing the likelihood of sediment run-off and proliferation of alien and invasive species since there is a limited ecological buffer present. The freshwater features within the sub-quaternary catchment are likely to be in a largely to severely modified state, however, the wind farm should remain outside of all delineated features and associated 32m buffer zones of regulation, which was deemed sufficient for the protection of the features. If existing roads are to be upgraded, the roads should be upgraded as far as possible without increasing the width of the road. Where widening is required, this must be kept to an absolute minimum.

Following the consideration of the site conditions, as well as relevant and existing datasets the following sensitive features were identified:

» All freshwater features have been identified and are considered to be of a high sensitivity and as no-go areas for development.
» A 32m buffer has been applied to the identified freshwater features. The 32m buffer area should ideally be avoided by the development of the Boulders Wind Farm as far as possible for the protection of the features. However, development can be allowed within the area should the appropriate authorisations be obtained, or where intervention may contribute to the protection of the resource (for example, where an existing road is formalised to reduce erosion risk).
» All the remaining areas within the project site are considered to be of a low sensitivity.

Figure 6.2 provides an illustration of the freshwater sensitive features located within the Boulders Wind Farm project site and the associated environmental sensitivity.

Impacts association with the construction phase for the development of the Boulders Wind Farm include:

» Direct disturbance of the freshwater habitats
» Decrease of freshwater habitat integrity
» Alteration of runoff patterns
» Altered hydrology of freshwater features
» Altered stream and base flow patterns

Direct disturbance and decrease of the freshwater habitats

Impact:
A direct impact or disturbance can occur on the freshwater habitats located within the project site should construction of infrastructure take place within the feature itself. Indirect or direct impacts on the freshwater features, such as the contamination of the freshwater features which will decrease the integrity of the habitat and alter the hydrology of the identified systems

Issue	Nature of Impact	Extent	No-Go Areas
Direct disturbance of freshwater habitat	Potential loss of biodiversity as a result of construction related activities within the freshwater features, including construction or upgrading of roads and placement of cables within freshwater features. Decrease in the provision of wetland eco-services due to the potential degradation of the watercourses.	Local	All delineated freshwater features should be considered as no-go areas. The 32m buffer considered suitable for the protection of the freshwater features should also be avoided. As far as possible, all linear infrastructure (roads and cables) should avoid traversing these areas or utilise existing crossings, however, if unavoidable, crossings must be planned at a 90-degree angle to the watercourse in order to reduce the extent of the impact and the relevant authorisations obtained.
Decrease of freshwater habitat integrity.	Encroachment of infrastructure and construction activities may result in contamination of the freshwater features.	Local	

Description of expected significance of impact
When physical impact on the large intact delineated freshwater system (that have been identified as being High sensitivity) can be avoided, then this impact would be of low significance. Provided that pollution control measures are implemented during construction, then this impact would be of low significance. Where turbines and linear infrastructure (roads and cables) avoid traversing these areas or utilise existing crossings, the impact would be of low significance. The significance of impact cannot be stated until the layout has been finalised, which will be done so as part of the EIA Phase.

Gaps in knowledge and recommendations for further study
The intact freshwater systems are clearly delineated and there is little uncertainty with regards to either their distribution or sensitivity. There are no significant gaps in knowledge with regards to freshwater systems within the project site. The positioning of the wind farm infrastructure must however be determined. Infrastructure located within100m from the watercourses must be considered by the developer as potentially requiring water use licensing, in line with the requirements of the National Water Act.

Alteration of runoff patterns

Impact:
The development of infrastructure will result in alterations to stormwater runoff patterns within the project site.

Issue	Nature of Impact	Extent	No-Go Areas
Alteration of runoff patterns	Potential for increased erosion as a result of earthworks in the	Local	All delineated freshwater features should be

	vicinity of freshwater resources.		considered as no-go areas. The 32m buffer considered suitable for the protection of the freshwater features should also be avoided. As far as possible, all linear infrastructure (roads and cables) should avoid traversing these areas or utilise existing crossings, however, if unavoidable, crossings must be planned at a 90-degree angle to the watercourse in order to reduce the extent of the impact and the relevant authorisations obtained.

Description of expected significance of impact

Provided that erosion control measures are implemented during construction, then this impact would be of low significance. Where turbines and linear infrastructure (roads and cables) avoid these areas or utilise existing crossings, the impact would be of low significance. The significance of impact cannot be stated until the layout has been finalised, which will be done so as part of the EIA Phase.

Gaps in knowledge and recommendations for further study

The intact freshwater systems are clearly delineated and there is little uncertainty with regards to either their distribution or sensitivity. There are no significant gaps in knowledge with regards to freshwater systems within the project site. The positioning of the wind farm infrastructure must however be determined. Infrastructure located within100m from the watercourses must be considered by the developer as potentially requiring water use licensing, in line with the requirements of the National Water Act.

Altered hydrology, stream and base flow patterns of freshwater features

Impact:

Construction activities may lead to altered hydrological systems of the freshwater features due to direct disturbance. The construction of stream crossings for new infrastructure may lead to an altered stream and base flow of the freshwater features due to direct disturbance or infringement on the features.

Issue	Nature of Impact	Extent	No-Go Areas
Altered hydrology of freshwater features	Potential inappropriate placement of infrastructure within freshwater resources or buffer zones.	Local	All construction footprints should remain as small as possible. Appropriately designed and well managed and monitored rehabilitation must take place in order to ensure that post construction areas are free draining while not allowing the development of concentrated flow, to ensure that the recharge of the watercourses in the area
Altered stream and baseflow patterns	Potential that the construction of stream crossings may impact on the hydrology and sedimentation of systems.	Local	

			remains as natural as possible.

Description of expected significance of impact

When physical impact on the large intact delineated freshwater system (that have been identified as being High sensitivity) can be avoided, then this impact would be of low significance. Where linear infrastructure (roads and cables) avoid traversing these areas or utilise existing crossings, the impact would be of low significance. The significance of impact cannot be stated until the layout has been finalised, which will be done so as part of the EIA Phase.

Gaps in knowledge and recommendations for further study

The intact freshwater systems are clearly delineated and there is little uncertainty with regards to either their distribution or sensitivity. There are no significant gaps in knowledge with regards to freshwater systems within the project site. The positioning of the wind farm infrastructure must however be determined. Infrastructure located within100m from the watercourses must be considered by the developer as potentially requiring water use licensing, in line with the requirements of the National Water Act.

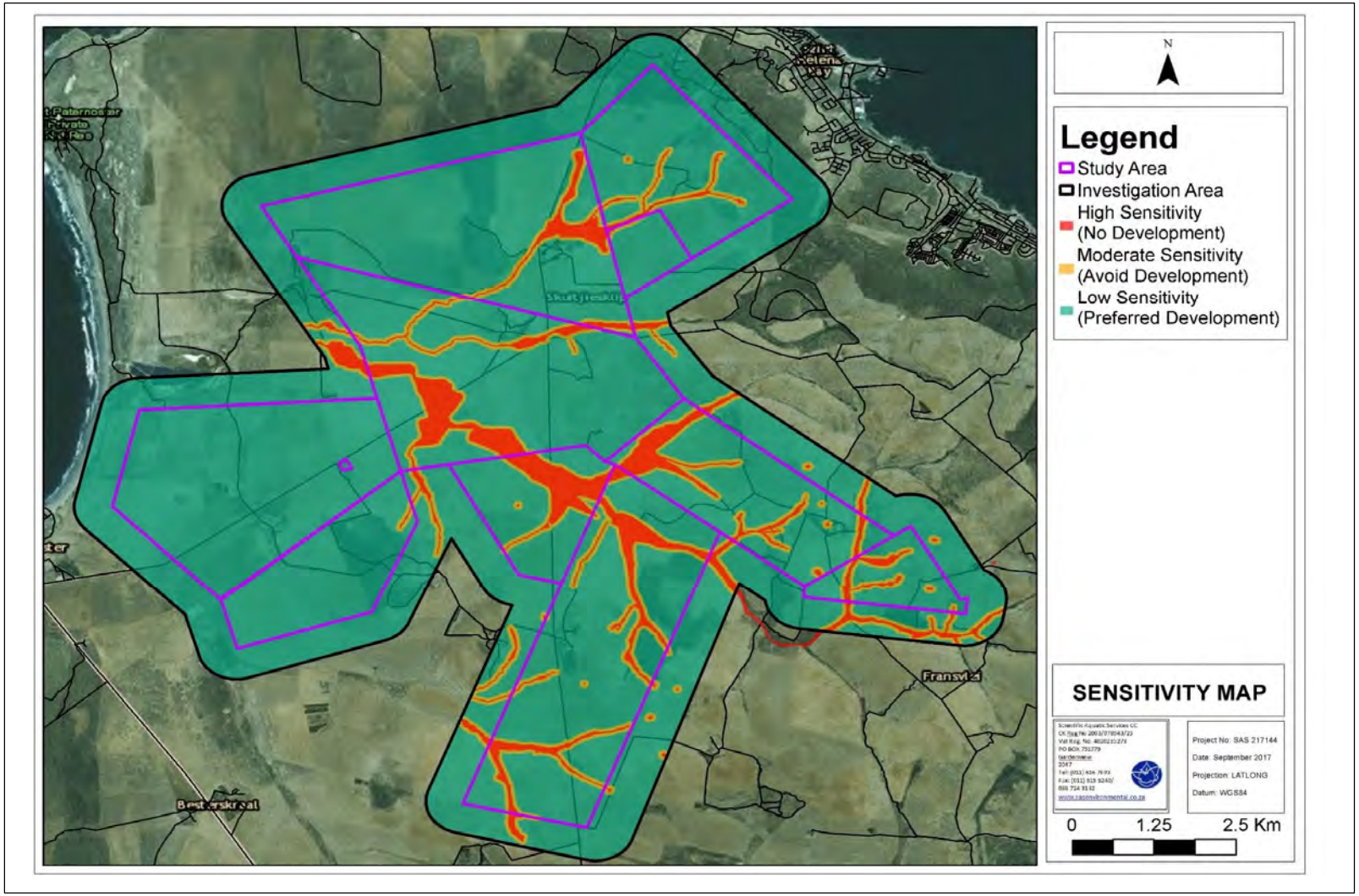


Figure 6.2: Sensitivity map of the freshwater features located within the Boulders Wind Farm project site

6.3.3. Potential impact on birds[29]

The project site and surroundings has been subject to 12 months pre-construction monitoring and radar monitoring. The monitoring was undertaken between June 2014 and May 2015. Considering that the bird monitoring programme ended in May 2015, this study is still valid, according to the Best Practice Guidelines. It can be conclude that the bird pre-construction monitoring studies conducted at the Boulders Wind Farm project site are still valid and accurately represent the bird community trends expected to occur. This has also been verified by the specialist through the undertaking of a site visit in October 2017. The conclusion of the site visit was that the general characteristics of the project site have not changed since the bird pre-construction monitoring was undertaken. The potential avifaunal impacts has been informed by the site visit undertaken in October 2017 and the results thereof. A radar – based assessment of airborne species for the Boulders Wind Farm project site was also undertaken between July 2014 and May 2015 (Millikin, 2015).

Areas and features of sensitivity from an avifaunal perspective have been identified. The majority of the extent of the project site is transformed and natural habitats degraded. There are, however, many remnant vegetation patches of various sizes at the site which are considered as being of a higher ecological sensitivity, and presenting important habitat for bird species. The avifaunal sensitivity of the site has been divided into two major categories which include a) no-go areas which must be avoided by the wind farm in order to reduce impacts on sensitive bird species to a minimum; and b) sensitive areas requiring management actions in terms of the project's implementation process.

The identified no-go areas/habitats include:

» Drainage lines and areas with remnants of natural vegetation used by raptors and other sensitive or priority species and are associated to a high probability of collision consistently throughout the year. The natural vegetation remnants represent an important habitat for sensitive, endangered species, such as the Black Harrier;
» A 200m buffer around water bodies, as these features may attract birds under certain conditions and are the only places where certain sensitive species (such as Greater and Lesser Flamingos) were observed during pre-construction monitoring;
» A 500m around the Secretarybird nest identified during the pre-construction monitoring period;

It must be noted, that the upgrade of existing roads within the high sensitivity or no-go areas is considered to be acceptable.

[29] The avifaunal scoping study is based on data verified in the field.

Figure 6.3 provides an illustration of the identified no-go areas within the boundaries of the Boulders Wind Farm project site.

The identified sensitive areas include:

» Cereal cropland and pasture areas, which are not natural areas, but were observed to be used moderately by Blue Cranes, and occasionally by Black Harrier, Lanner Falcon, Secretarybird and Southern Black Koohran.

Should the sensitive avifaunal areas and features located within the project site be avoided by the development footprint of the Boulders Wind Farm the expected impacts are likely to be of a low significance.

Impacts on avifauna habitat and displacement due to construction activities

Impact:
Habitat destruction and disturbance and/or displacement impacts. Areas affected will include the location of the wind turbines, roads, substation and all infrastructures associated to the wind farm construction. Sensitive areas to be affected may include the surrounding drainage lines and water bodies, natural vegetation, the Secretarybird nest and, in a lower level of sensitivity, the cereal croplands and pasture areas. A large portion of the project site is transformed and considered to be low sensitivity with little risk of natural habitat loss. Disturbance of the intact habitat areas should however be avoided as much as possible.

Issue	Nature of Impact	Extent	No-Go Areas
Habitat destruction and disturbance and/or displacement impacts	Negative though possibly only relevant for species highly dependent of the natural vegetation present and range-restricted species.	Local	Surrounding drainage lines and water bodies, natural vegetation and the Secretarybird nest are no-go areas to the development.

Description of expected significance of impact
The impact will be of a short duration, highly probable if no-go areas are not avoided, and can be reversed. The impact is expected to have a low significance if the sensitivity map is considered and the no-go areas are avoided.

Gaps in knowledge and recommendations for further study
Within the avifaunal scoping study the specific analysis of the bird activity through the area was not assessed, i.e. in further steps of the EIA process, it will be important to analyse the occurrence of especially important areas for range-restricted species, likely to be negatively affected by this type of impact. This will be assessed in the EIA avifauna specialist report.

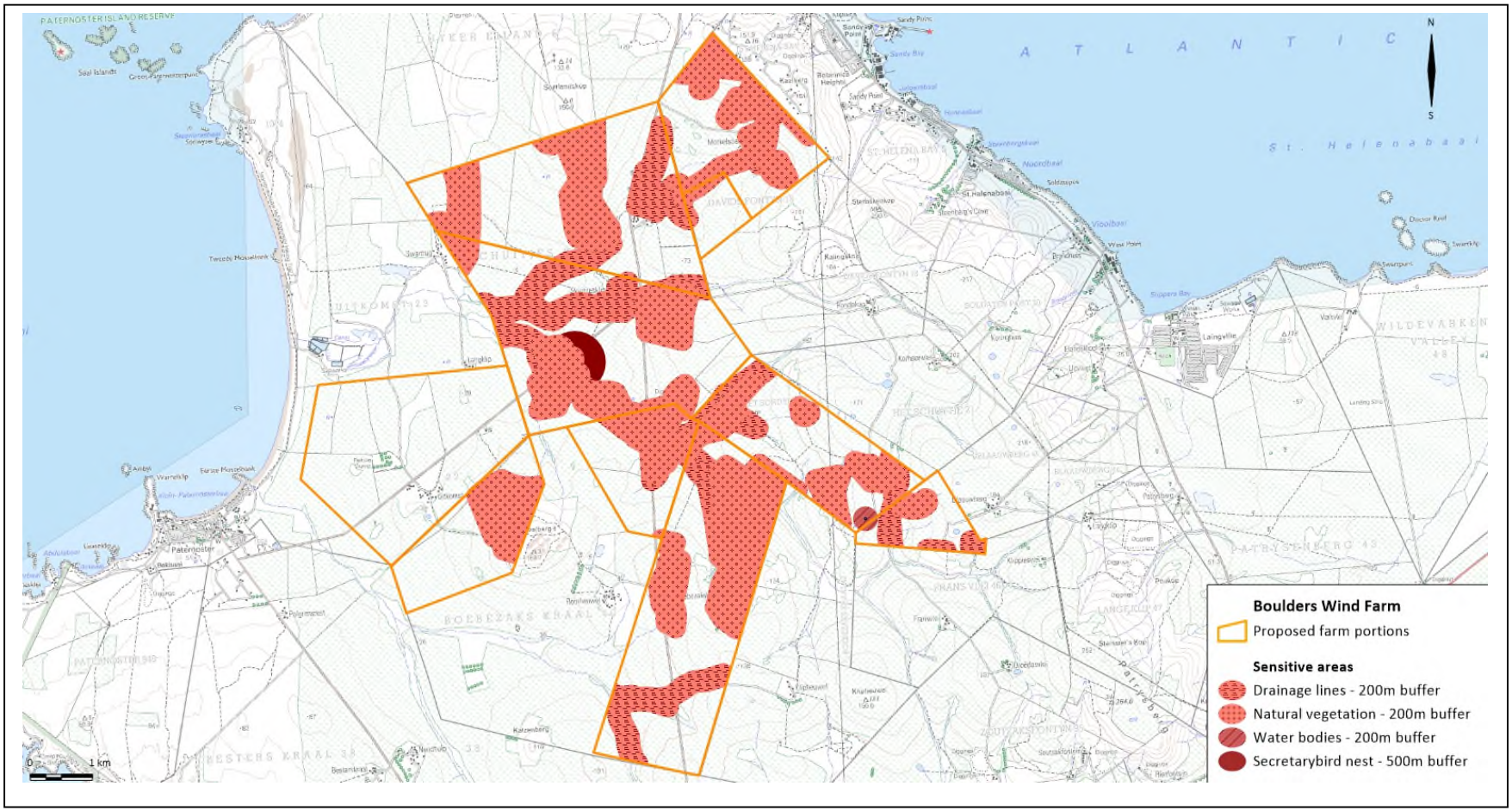


Figure 6.3: Avifauna sensitivity map illustrating the no-go areas which need to be considered by the Boulders Wind Farm

6.3.4 Potential impact on bats[30]

There are many habitat features at the project site which may support bat activity, as well as attract bats into the area. These are tree lines, remnants of natural vegetation, rocky outcrops, buildings, vegetated drainage lines, and other water bodies. In several instances, linear landscape corridors have been formed by these features, which may be used by bats to commute and/or migrate across the site. Wind turbines constructed close to these features would increase the likelihood that bats will be brought into contact with turbines and may, therefore, increase the potential impact on bats. This impact can be reduced by avoiding construction of turbines in the buffer zones around many of these identified features. Specific no-go areas has also been identified from a bats perspective and include:

» A 200m no-go area around prominent vegetated drainage lines, ephemeral water bodies and permanent water bodies within the project site;
» A 500m no-go area around confirmed bat roosts;
» A 200m no-go area around rocky outcrops and buildings;
» A 200m no-go areas around crevice roost sites; and
» A 200m no-go area around large trees.

It must be noted that the use and upgrade of existing roads within the no-go areas is considered to be acceptable from a bats perspective.

Figure 6.4 presents the bat sensitive areas located within the Boulders Wind Farm project site.

Bats are long-lived mammals and females often produce only one pup per year, resulting in a life-history strategy characterised by slow reproduction. Bat populations are therefore sensitive to increases in mortality rates and their populations recover slowly after declines, if at all. It is likely that bat activity at the project site is low, as much of the land has been altered and due to the low level of the structural complexity in vegetation. However, there are approximately seven roosts confirmed in the project site, as well as many habitat features on site which may promote bat activity in the area.

The following impacts are expected on bats during the construction phase of the Boulders Wind Farm:

» The creation of noise and dust will affect bats that roost in less protected structures, such as tree crevices.

[30] The bats scoping study is based on data verified in the field.

» A loss of foraging and roosting habitats through the removal of natural vegetation. The removal of natural vegetation will negatively impact insect abundance and diversity which will impact on the foraging sites for bats.
» Provision of new bat roost sites through the construction of new buildings (and possibly wind turbines).

The project site has been subjected to 12 months pre-construction monitoring for bats. These data were collected by Bioinsight and will be assessed in the EIA phase. The project site was also surveyed in September 2017 which involved the deployment of a bat detector to record bat activity. A radar –based assessment of airborne species for the Boulders Wind Farm project site was also undertaken between July 2014 and May 2015 (Millikin, 2015).

Loss of foraging habitat

Impact:
Removal of vegetation during the construction phase will alter the foraging habitat of bats. This impact is possible at all patches of natural vegetation, which are scattered across the site. Much of the site is used for crops and therefore this impact will be minimal, as insect abundances should be lower over arable land than over natural vegetation, although bats have been shown to forage over agricultural land.

Issue	Nature of Impact	Extent	No-Go Areas
Removal of vegetation during the construction phase.	This will alter the foraging habitat of local insectivorous bats as patches of natural vegetation between agricultural lands are important foraging areas for these bats.	Local	Remnants of natural vegetation and waterways with riparian vegetation.

Description of expected significance of impact
The duration of the impact will be medium-term with rehabilitation, with a high probability if natural vegetation is not avoided. There is a low potential that the impact might be reversed and the impact has a high potential for a loss of irreplaceable resources. Consequences of the impact will be a loss of foraging habitat and the impact will be of a negative low significance due to the biophysical and/or social functions and/or processes that may be slightly altered.

Gaps in knowledge and recommendations for further study
Bat activity above remnants of natural vegetation at the project site is not known. As a precautionary approach these areas have been indicated as no-go areas for development. The extent of the impact will be determined by analysis of the spatial variation in bat activity on site, based on 12 months of bat activity data captured at various locations around the site. This has the potential affect the magnitude of this impact.

Construction of new buildings or structures which provide new opportunities for roosts

Impact:
The construction of new buildings and possibly the turbine towers may provide additional roost sites for those species of bats that roost in man-made structures. This impact is possible at all locations of construction activity. There are many buildings within the project site in which bats may roost. Some night and day roosts have been identified within existing buildings located at the site.

Issue	Nature of Impact	Extent	No-Go Areas

The construction of new buildings and other structures.	This may provide additional roost sites for bat species which make use of man-made structures (e.g. roofs of buildings) as roosts, especially if such structures are not properly sealed against bat use. This may promote bat activity within the wind farm project site and in close proximity to wind turbines, which may, in turn, put bats at risk of turbine-induced mortality.	Local	None identified, however all new buildings and structures should be correctly bat-proofed.
Description of expected significance of impact The duration of the impact will be medium-term with a high probability should new buildings and structures not be correctly bat-proofed. There is a high probability that the impact can be reversed and the impact has a moderate potential for a loss of irreplaceable resources. Consequences of the impact will be an increase in bat activity within the area and the impact will be of a negative medium significance.			
Gaps in knowledge and recommendations for further study The abundance of bat species which may use roofs as roosts within the project site will be determined by analysis of the species composition of bat activity on site, based on 12 months of bat activity data captured at various locations around the project site.			

Disturbance during roosting

Impact: Construction activities may disturb bats during daytime roosting. There are many natural bat roost locations within the project site which do not provide extensive buffering against noise and dust, such as trees and rock crevices.			
Issue	**Nature of Impact**	**Extent**	**No-Go Areas**
Blasting and the production of dust and noise during construction may disturb bats during daytime roosting.	During construction, bats which use natural roost locations that are less buffered against noise and dust (such as in trees and rock crevices) may be disturbed, and abandon their roosts. This may affect the survival of these bats if suitable alternative roosts are not found quickly. This also exposes the bats to daytime predation. Furthermore, disturbance of bats when they are in torpor may adversely affect their energy reserves and therefore survival. This is particularly relevant during winter months.	Local	Construction should avoid rocky outcrop areas and stands of tall trees. Blasting should be avoided and/or minimised.
Description of expected significance of impact The duration of the impact will be short-term with a medium probability should the no-go areas not be avoided. There is a high potential that the impact may be reversed and the impact has a very low potential for a loss of irreplaceable resources. Consequences of the impact will be roost abandonment of the affected bats and the impact will be of a negative medium significance.			
Gaps in knowledge and recommendations for further study			

It is not known which rocky outcrops and trees within the project site are used by bats. Rocky outcrops are too abundant to survey all of them and it is not possible to fully survey bat roosting within very tall trees, as bats may not be visible. Therefore, it is unknown how prevalent bat roosting is within these structures on site. This cannot be determined, and a precautionary approach is recommended.

Destruction of bat roosts

Impact: There are many rocky outcrops scattered across the project site which provide potential roosts for crevice roosting bats.			
Issue	**Nature of Impact**	**Extent**	**No-Go Areas**
Impact on rocky outcrops.	Roosts used by crevice-roosting bats may be disturbed or destroyed and could directly result in the fatality of bats roosting within such an outcrop.	Local	Construction activities must avoid rocky outcrop areas. Blasting in the vicinity of these areas should be avoided and/or minimised.
Description of expected significance of impact The duration of the impact will be short-term with a medium probability should the no-go areas not be avoided. There is a moderate potential that the impact might be reversed and the impact has a very low potential for a loss of irreplaceable resources. Consequences of the impact will be roost abandonment and direct fatality of the affected bats and the impact will be of a negative low significance.			
Gaps in knowledge and recommendations for further study It is not known which rocky outcrops within the project site are used by bats. These features are too abundant to survey all of them therefore it is unknown how prevalent bat roosting is within these structures on site. This cannot be determined, and a precautionary approach is recommended.			

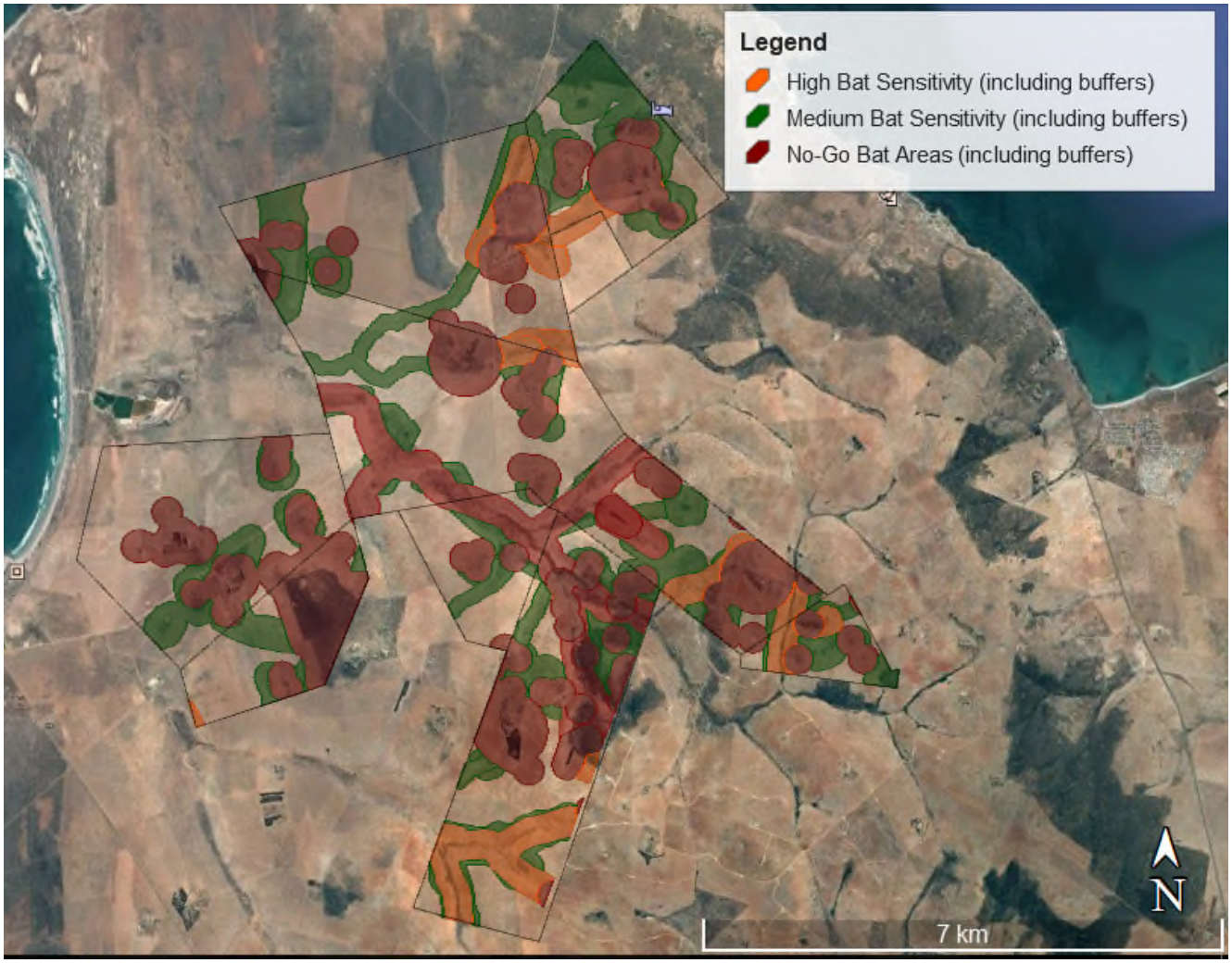


Figure 6.4: Bat sensitivity map of the Boulders Wind Farm project site.

6.3.5. Potential impact on agricultural potential and soils

Farming activities are practiced on a continuous basis on the affected properties which form part of the Boulders Wind Farm project site. Majority of the farms is currently under cultivation and/or pasture. 1% of this area would be impacted on a permanent basis through the construction of the facility (i.e. development footprint) – that is turbines and associated infrastructure.

Considering the nature of the soils and the extent of the site, from an agricultural perspective, only the active drainage lines and areas with slopes of more than 15% are considered sensitive and are considered to be no-go areas to the development of the project, except where existing roads are required to be upgraded (with the implementation of appropriate mitigation measures). All areas surrounding the no-go areas within the project site are considered acceptable for the development of the Boulders Wind Farm from a soils and agricultural perspective. This is despite infringement on the areas which are currently under cultivation and/or pasture, as the development of the Boulders Wind Farm will create a permanent substitution of a very small portion of available agricultural land and not alter the viability of this land use.

Figure 6.5 provides an indication of the no-go areas which needs to be avoided by the development, as well as the areas considered as suitable for the development from an agricultural perspective.

The following impacts are expected to occur with the development of Boulders Wind Farm:

» Localised and minor impact on the current potential farming activities - the development of the Boulders Wind Farm will create a permanent substitution of a very small portion of agricultural land.
» Minor loss of agricultural resources.
» Impact on the affected landowners, including profitability levels of the current farming activities, loss of farming income as well as possible gain in income due to the development of the Boulders Wind Farm on their properties.

Loss of agricultural land due to the construction of the Boulders Wind Farm

Impact: The development of the Boulders Wind Farm can be considered as a permanent substitution of a very small portion (only approximately 1%) of agricultural land for the construction of the wind turbines and associated infrastructure.			
Issue	**Nature of Impact**	**Extent**	**No-Go Areas**
Loss of cultivated agricultural land	Soil erosion may increase following construction and lead to degradation of areas used for cultivation. Permanent	Local	Drainage lines and very steep areas (> 15 % slopes)

	substitution of a very small portion (only approximately 1%) of agricultural land as a result of a decrease in available land that can be cultivated.		

Description of expected significance of impact

The significance of the negative impact associated with the Boulders Wind Farm is expected to be very small (i.e. negligible) with the avoidance of the no-go and sensitive areas.

Gaps in knowledge and recommendations for further study

The scoping study was based on sound information that was available and the findings can therefore be classified to have an acceptable level as far as plausibility is concerned (i.e. at least a medium level as far as the confidence criterion is concerned). It is doubtful whether further study will lead to other conclusions than presented.

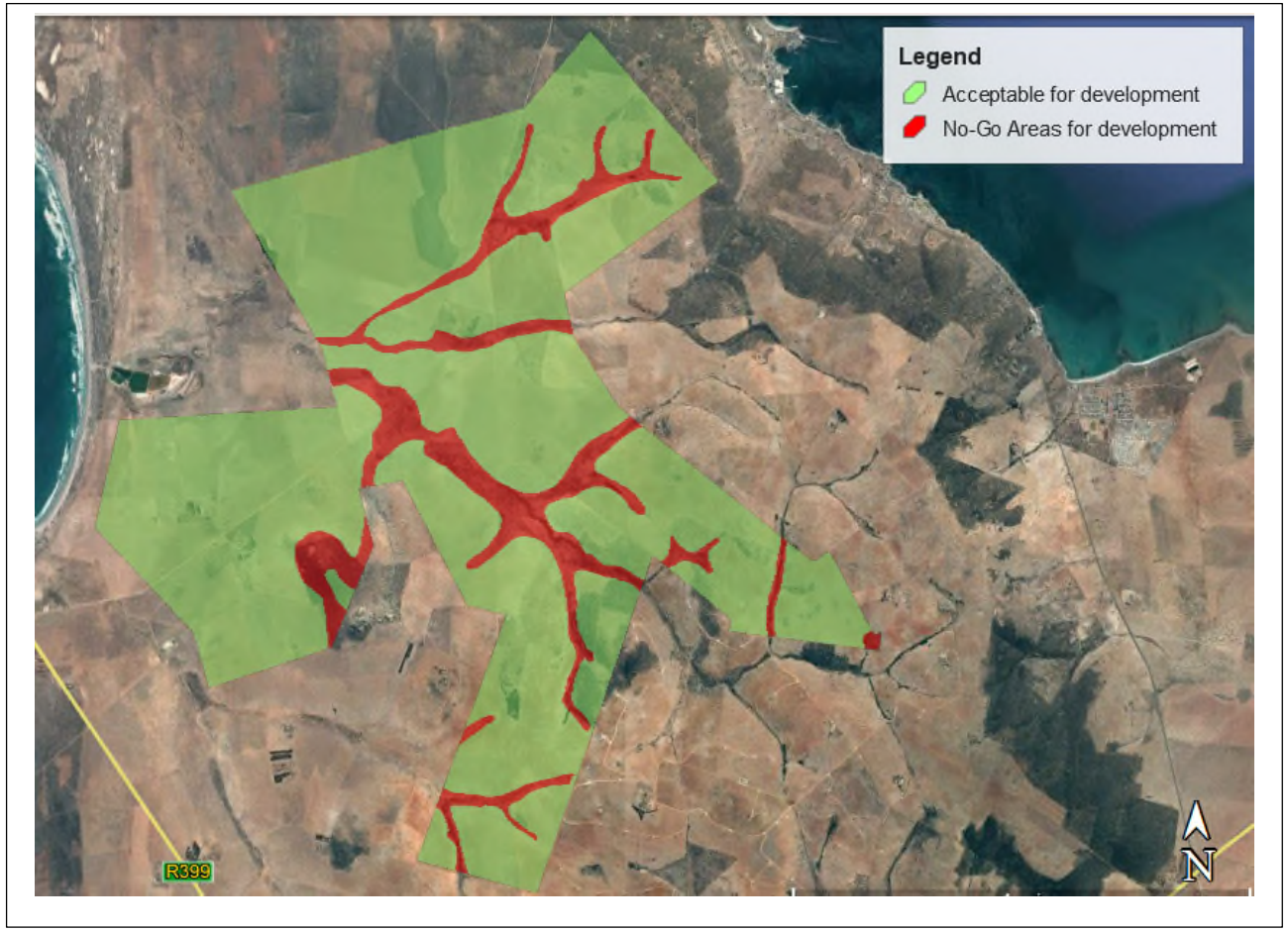


Figure 6.5: Agricultural sensitivity map of the Boulders Wind Farm project site

6.3.6. Potential impacts on heritage resources

The assessment of heritage resources includes the consideration of the cultural and heritage components of the landscape, including changes to the visual landscape, and the impact on the archaeological, palaeontological resources of the Boulders Wind Farm project site.

Impacts to heritage resources are expected during the construction phase, with different resource types vulnerable (i.e. construction may have a direct impact on archaeological and palaeontological resources due to excavation and groundworks). Due to the known heritage sensitivity of the area in which the Boulders Wind Farm is to be located, the development is likely to impact on significant archaeological and palaeontological heritage resources, and have visual impacts on the cultural landscape.

While there are some 550 heritage resources present within a 20km radius of the proposed development area, only 33 known sites exist within the Boulders Wind Farm project site. All of these are archaeological in nature and ungraded, with the exception of a single ruined nineteenth century structure of rough calcrete blocks and mud-brick at the base of Kasteelberg kopje that has been graded IIIb. The concentration of sites associated with Kasteelberg itself falls outside of the project site. Historical structures are known to occur at the farmsteads of Rooiheuwel and Klipheuwel, while those on Boesakskraal and Frans Vlei have been substantially altered. No “red flag” issues have been identified in terms of the known archaeological resources in the area.

The likely impact to archaeological material will only become apparent once the layout of the Boulders Wind Farm has been designed. Impacts will result from construction-related activities where archaeological resources found in the area are not avoided. The development will have a direct, negative impact on archaeological resources not avoided, through disturbance and destruction of sites during ground clearing and installation of infrastructure. Possible indirect impacts could arise through encroachment on sites and loss of sense of place, as well as environmental degradation that could damage sites, i.e. through dust accumulation, erosion, etc. The presence of additional people on site during the construction phase can also result in a loss of archaeological material through intentional or unintentional damage. It is likely, however, that the impacts to archaeology will be low if identified significant sites are avoided. Likely impacts on archaeological resources will be limited to the construction phase.

Figure 6.6 provides an indication of the recommended archaeological buffers and no-go areas which needs to be avoided by the development of the Boulders Wind Farm.

In terms of palaeontology, the project site is mostly comprised of the Granitic Hills Terrain of low sensitivity where the potential impact is low. The identified fossil-bearing deposits within the project site are located within the western Coastal Formations Terrain, which is of high palaeontological sensitivity and high

heritage significance. The Coastal Formations Terrain located in the western portion of the project site is of high sensitivity where the potential impact is high. Deposits within this terrain are found at Soetlandskop, on Schuitjies Klip 1/22 in the north of the project site, and are known to include the late-Miocene Prospect Hill Formation, but may also include Saldanha Formation mid-Miocene phosphatic deposits. The early Pliocene Varswater Formation may also be present on Schuitjies Klip 3/22, together with the mid-Pliocene Uyekraal Formation, and the Pliocene to Quaternary Langebaan Formation. Further to this, the Quaternary Velddrif Formation is mapped on the geological maps on Farm Uitkomst RE/6/23, although its presence here has not yet been confirmed. The construction of the Boulders Wind Farm (impacts will be limited to the construction phase) would entail excavation into bedrock, and result in a direct, negative impact on palaeontological/scientific heritage in the absence of effective mitigation. Mitigation would take the form of inspection of these excavations by a suitably qualified palaeontologist in order to further the knowledge base of the fossil potential within this stratigrapghy. With successful mitigation the impact is considered to be positive. Owing to the possible positive contributions of excavations into bedrock mean that there are no no-go areas.

Figure 6.7 provides an indication of extent of the palaeontological terrains (i.e. Granite Hills Terrain (low fossil potential) and Coastal Formations Terrain (high fossil potential)) associated with the Boulders Wind Farm project site.

Considering scenic routes and cultural landscapes within the study area, the R45 (which provides access from Vredenburg to Malmesbury located to the south east) is a recognised scenic route (Webley et al. 2010; Winter and Oberholzer 2013) while the entire area can be considered a cultural landscape of scenic rolling hills, agricultural fields and historic farmsteads, layered on top of a Stone Age landscape represented by the numerous archaeological sites found throughout the project site. This landscape has, however, been affected by rampant development, particularly in and around the coastal towns of Paternoster, Britannica Heights, and St Helena Bay, and also through the establishment and operation of the West Coast One wind energy facility, which comprises of 45 turbines that is located immediately to the south east of the Boulders Wind Farm project site.

The visual assessment identified that the facility and construction activities (depending on the facility layout) could likely be exposed to residents and tourists in the area travelling along the R399, the Paternoster to Stompneus Bay Road, the Vredenburg to Paternoster Road, and the Vredenburg to Stompneus Bay Road. In addition, the facility would be visible to towns and farmsteads in the region, including Paternoster and St Helena Bay. Impacts during the construction phase of this project will be short-term and temporary.

Impacts on heritage resources including archaeology, palaeontology and the cultural landscape during the construction of the Boulders Wind Farm

Impact:
Impact and disturbance on the physical archaeological and palaeontological resources located within the Boulders Wind Farm, as well as a change in the cultural landscape associated with the area located within and surroundings the project site during construction activities.

Issue	Nature of Impact	Extent	No-Go Areas
Archaeological sites that could be affected by the wind farm	Physical destruction of archaeological material during construction.	Local	As per the identified buffer areas (refer to **Figure 6.8**). At the Scoping Phase these are the farms Boebezaks Kraal 3/40 and Uikomst RE/6/23.
Excavation into fossiliferous deposits	Permanent loss of fossil heritage and allied geo-scientific data.	Cultural, heritage and scientific impacts are of regional to national extent	None identified. Excavations may provide useful exposures.
The viewing of the short-term construction activities	The potential negative experience of viewing the construction activities during the construction of the wind farm	Observers situated within a 0-5km radius of the wind turbine structures	No turbines must be located on or near Kasteelberg.

Description of expected significance of impact

There are potential impacts during construction that can result in the permanent disturbance or displacement of archaeological material. Mitigation is possible through avoiding archaeological sites as identified in the planning stages. Alternatively, where avoidance is not possible, resources can be scientifically removed from their context by archaeological sampling and the process documented. Usually the impact is considered irreversible as archaeological material can never be replaced once disturbed. Indications are that with suitable mitigation the cumulative impact will be insignificant.

From a palaeontological perspective the impact will result in an irreversible impact and an irreplaceable loss of fossil material. With successful mitigation the impact is considered to be positive, owing to the possible positive contributions of excavations into bedrock.

Considering the visual effect of the construction activities on the cultural landscape the impacts will be negative, local in extent, short-term, have a moderate magnitude and a high probability of occurrence. The significance is expected to be medium.

Gaps in knowledge and recommendations for further study

The area is quite well known from an archaeological perspective, however it is important that the Boulders Wind Farm facility layout is tested against known archaeological sensitivity, and any areas that have not been adequately surveyed be identified and be subjected to site inspection.

Through the consideration of the palaeontological scoping study it has identified several aspects of the stratigraphy and fossil heritage in the project site which require investigation and which would be informed by mitigation at sensitive locations. Excavations in the Coastal Formations Terrain should be inspected, especially if they may intersect the Saldanha, Prospect Hill & Varswater formations, and when turbine locations are chosen, the sites for likely inspection can be prioritised. With the implementation of appropriate mitigation measures it will be acceptable to undertake excavations within the high sensitivity areas. Therefore the impact on palaeontology is considered to be assessed on a sufficient level during the Scoping Phase and the specialist therefore recommends that no further study is required.

In order to further consider the impact of the construction activities on the cultural landscape a layout of the wind farm is required in order to understand which area within the project site will be affected during the construction phase.

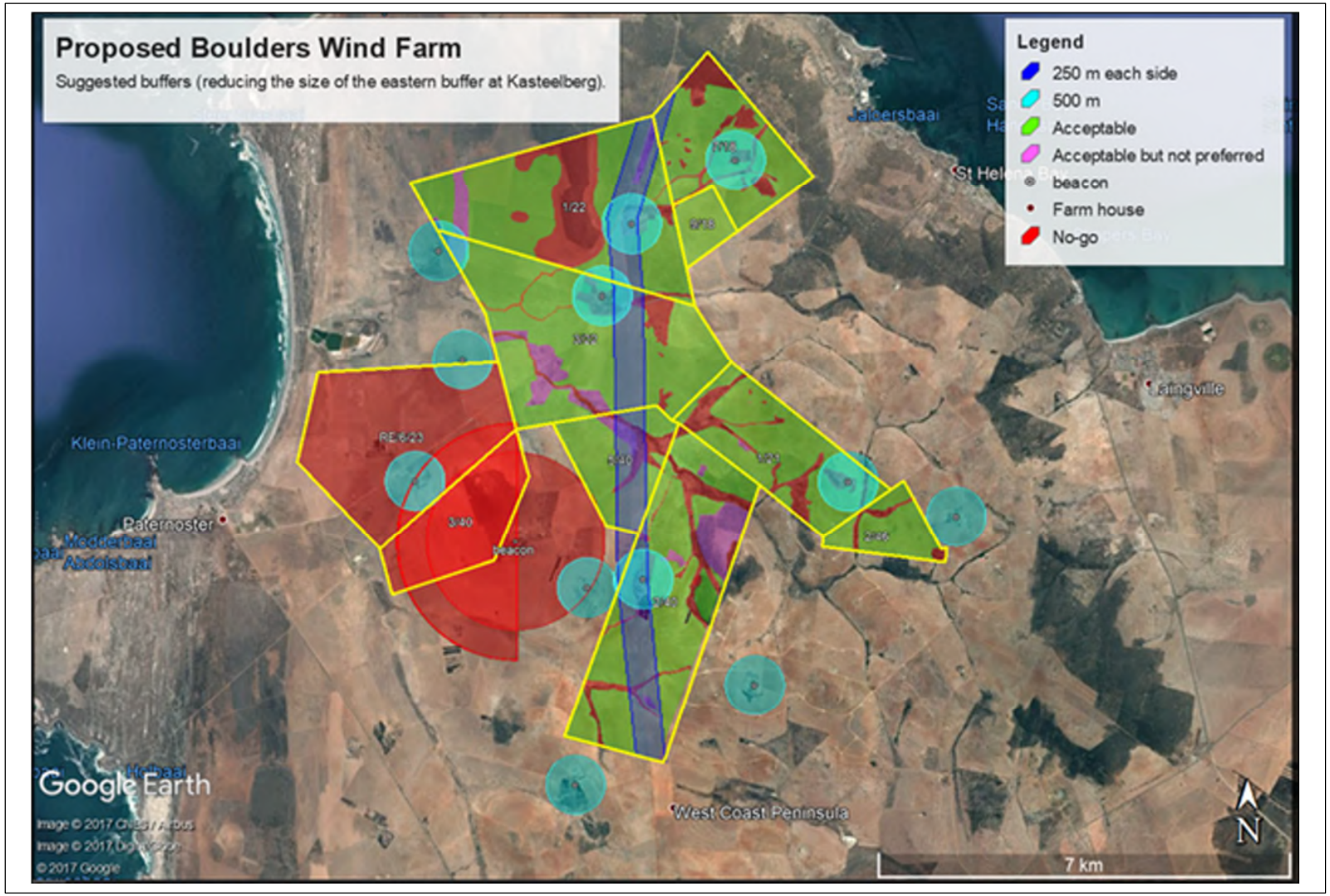


Figure 6.6: No-go areas and recommended archaeological buffers identified during the Scoping Phase for the Boulders Wind Farm project site

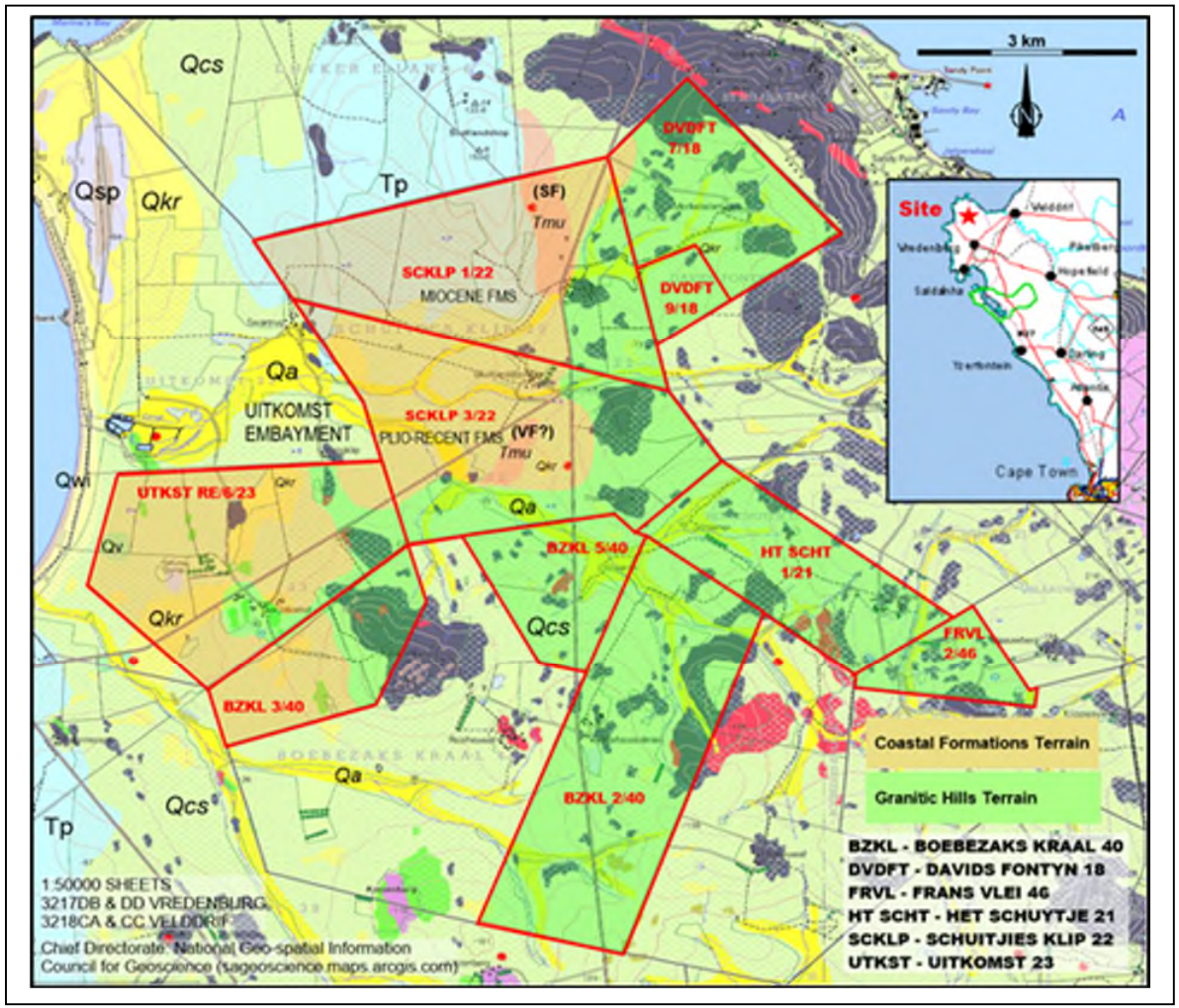


Figure 6.7: The palaeontological terrains (i.e. Granite Hills Terrain (low fossil potential) and Coastal Formations Terrain (high fossil potential)) associated with the Boulders Wind Farm project site

6.3.7. Potential impacts on the social environment

The Boulders Wind Farm project site is located within the Saldanha Bay Local Municipality, a Category-B municipality, which is one of five Local Municipalities that make up the West Coast District Municipality, a Category-C municipality. The administrative seat of the Saldanha Bay Local Municipality is Vredenburg. The most prominent settlements in the Saldanha Bay Local Municipality are Vredenburg, Saldanha, Langebaan, St. Helena Bay and Hopefield. Saldanha Harbour, is the largest harbour on the west coast of the African continent and is of regional and national importance. A number of large manufacturing plants (e.g. Saldanha Steel) are located in the Saldanha area. The bulk of the Saldanha Bay Local Municipality population is concentrated in urban areas, mainly Vredenburg and Saldanha. Other, smaller settlements include Paternoster and Jacobsbaai.

Commercial fishing and fish processing have played an important historic role within the local economies of coastal towns such as Saldanha and St Helena Bay. However, a decline in fish stock and other factors has, over the past two to three decades, resulted in a shift towards tourism. The economic sectors with the greatest contribution to the GDPR (gross domestic product per region) of the Western Cape are the finance and business services sector and the trade sector. At a local scale of the Saldanha Bay Local Municipality, the key GDPR contributing sectors are manufacturing and finance and business services, and wholesale and retail trade, catering and accommodation.

The positive opportunities and construction impacts include:

» Creation of employment (temporary) and business opportunities (including spin-off opportunities and income);
» Increase in production and GDP-R of the national and local economies due to capital expenditure;
» Household income will lead to the improved standard of living for households directly or indirectly benefitting from employment opportunities;
» The opportunity for skills development and on-site training due to the creation of employment opportunities; and
» Upliftment of individuals.

The negative construction impacts include:

» Impacts associated with the presence of construction workers on site and in the area;
» Influx of job seekers to the area;
» Increased security risk, risk of stock theft and damage to farm infrastructure associated with presence of construction workers on the site;
» Increased security risk;
» Impact of heavy vehicles, including damage to roads, safety and dust;
» Possible impact on tourism facilities;
» Impact in property values due to created perceptions concerning the impact of the project during operations;

» Impact on farming activities.

The creation of local employment, training and business opportunities

Impact:
Creation of employment and business opportunities (including spin-off opportunities from the development) during the construction phase. Opportunity to upgrade and improve the skill level within the area will be made available which will result in an improved pool of skills and experience in the local area.

Issue	Nature of Impact	Extent	No-Go Areas
Creation of employment and business opportunities	The creation of employment opportunities will result in growth and development within the local area	Local-Regional	None identified

Description of expected significance of impact
The duration of the impact will be positive, short-term and highly probable. The significance of the impact will be medium.

Gaps in knowledge and recommendations for further study
The confirmed number and nature of employment opportunities which will be available with the construction phase of the development will need to be confirmed. Information on the total and a breakdown of capital expenditure and local content is required. An economic modelling technique will be utilised in order to quantify the impact on employment and business opportunities (**Appendix J(a)**).

Impact of influx of jobseekers, construction workers on local communities

Impact:
Potential impacts on family structures and social networks associated with and influx of jobseekers and the presence of construction workers associated with the development of the Boulders Wind Farm.

Issue	Nature of Impact	Extent	No-Go Areas
Impact of the presence of construction workers on the local communities	Experience has shown that the presence of construction workers or an influx of jobseekers can pose a potential risk to family structures and social networks. Employing members from the local community to fill the low-skilled job categories will reduce the risk and mitigate the potential impact on the local communities.	Local	None identified

Description of expected significance of impact
The impact will be negative, short-term for the community as a whole and probable. The significance of the impact will be low.

Gaps in knowledge and recommendations for further study
A better understanding regarding the amount of employment requirements and available employment opportunities that will be associated with the construction of the Boulders Wind Farm.

Risk to safety, livestock, farm infrastructure and farming operations

Impact: Potential risk to safety of farmers and farm workers, livestock, damage to farm infrastructure and farming operations associated with the construction related activities and presence of workers on the Boulders Wind Farm site.			
Issue	**Nature of Impact**	**Extent**	**No-Go Areas**
Safety risk	The presence on and movement of construction workers on and off the site may pose a potential safety threat to local famer's and farm workers in the vicinity of the site	Local	None identified
Description of expected significance of impact The impact will be negative, short-term and probable. The significance of the impact will be low (subject to the implementation of mitigation measures)			
Gaps in knowledge and recommendations for further study Obtain a better understanding of the local farmer land-uses and risks posed by the project.			

Increased fire risk

Impact: Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of fires			
Issue	**Nature of Impact**	**Extent**	**No-Go Areas**
Fire risk	The presence of construction workers and construction-related activities on the site poses an increased security risk, which could, in turn, pose a threat to crops, livestock, infrastructure and farmsteads in the area.	Local	None identified
Description of expected significance of impact The impact will be negative, short-term and probable. The significance of the impact will be low (subject to the implementation of mitigation measures)			
Gaps in knowledge and recommendations for further study None			

Impacts associated with construction vehicles

Impact: Potential safety, dust etc. and damage to road surfaces associated with movement of construction related traffic to and from the site			
Issue	**Nature of Impact**	**Extent**	**No-Go Areas**
Safety risk due to construction vehicles	The movement of heavy construction vehicles during the construction phase has the potential to damage local farm	Local	None identified

	roads and create dust and safety impacts for other road users in the area and also impact on farming activities.		
Description of expected significance of impact The impact will be negative, short-term and probable. The significance of the impact will be low (subject to the implementation of mitigation measures)			
Gaps in knowledge and recommendations for further study A better understanding of the local existing road infrastructure and usage is required. A traffic impact assessment will be undertaken as part of the EIA phase to provide a better understanding.			

Impacts associated with a loss of farmland

Impact: The activities associated with the construction phase, such as establishment of access/haul roads, the movement of heavy vehicles, the establishment of laydown areas and foundations for the wind turbines, substations and power lines will potentially damage topsoils and vegetation and result in damage to productive soils.			
Issue	**Nature of Impact**	**Extent**	**No-Go Areas**
Loss of farmland	Compaction of soils associated with movement of heavy vehicles and other construction related activities does pose a potential threat to the productivity of the affected farms	Local	None identified
Description of expected significance of impact The impact will be negative, short-term (if damaged areas are rehabilitated) and highly probable. The significance of the impact will be low (subject to the implementation of mitigation measures.			
Gaps in knowledge and recommendations for further study A better understanding of the layout and extent of the development footprint of the wind farm is required. The soils and agricultural potential scoping study (**Appendix H**) has indicated that only 1% of the project site's cultivated land will be lost due to the development.			

6.3.8. Potential impacts on sensitive noise receptors

Noise sensitive developments (NSD) which are considered as sensitive to the development of a wind farm within and around the project site. A 500m buffer has been applied to the NSDs within which no wind turbines may be located.

Figure 6.8 provides an illustration of the NSDs and their associated buffers within the Boulders Wind Farm project site.

Projected impacts from the construction phase can only be modelled once more information regarding the duration of construction and equipment used are known. However, at this stage two potential impacts can be identified:

» Increase in the noise level at the closest receptors
» Noise levels exceeding the SANS 10103 rating level due to construction activities

Noise impacts during the construction phase of the Boulders Wind Farm

Impact:
An increase in the noise levels for the closest receptors and noise levels exceeding the SANS 10103 rating level. Sensitivities associated with the impacts include noise within the rural area where the daytime $L_{R,d}$ rating level is more than 45 dBA or noise within the rural area where the night-time $L_{R,d}$ rating level is more than 35 dBA.

Issue	Nature of Impact	Extent	No-Go Areas
Increase in noise level at receptors. Disturbing noises. Noises exceeding rating level.	Increased noises or disturbing noises may increase annoyance levels with project. Noise levels could reach 56 dBA during construction.	Multiple construction activities taking place simultaneously may impact an area within 2,000m from the activities	No wind turbines to be located within 500m from identified NSD and prevent the development of access roads within 250m from these NSD (the upgrade of existing roads is acceptable within 250m of an identified NSD subject to this being undertaken during the day time)

Description of expected significance of impact
Without noise propagation modelling it is difficult to assess the potential significance of the noise impact. However, if the developer only constructs wind turbines further than 500m from identified NSD, the potential significance could be medium (night-time construction activities mainly) to low, with the noise impact depending on the type and number of construction activities taking place simultaneously. These noise impacts are highly reversible, will not result in the irreplaceable loss of resources; and the potential noise impacts can be managed, mitigated or even avoided.

Gaps in knowledge and recommendations for further study
Accurate noise rating levels to be modelled during EIA phase once a layout is available.

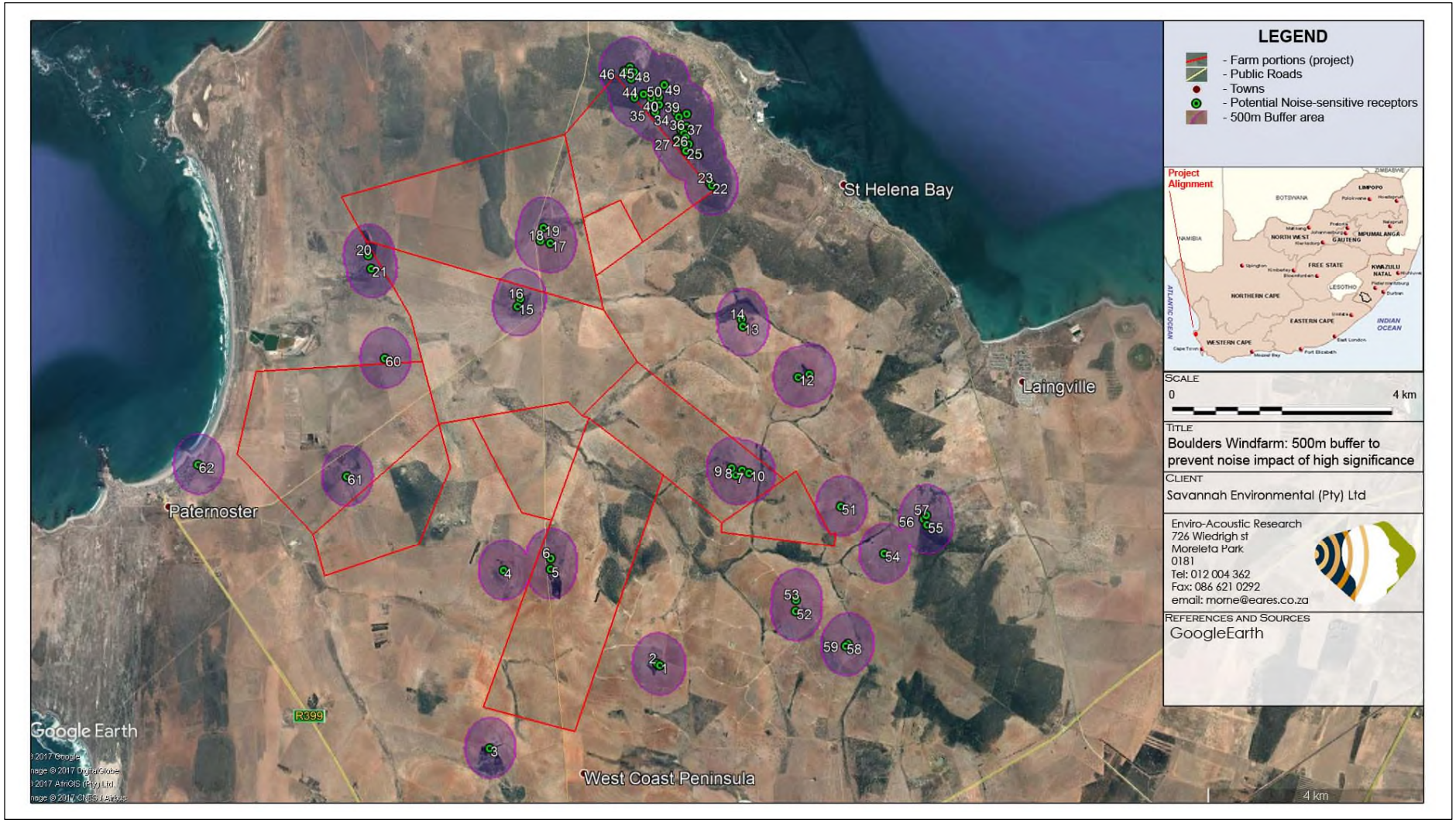


Figure 6.8: Noise sensitive developments (NSDs) and their associated 500m buffer to prevent a noise impact of high significance

6.3.9. Potential impacts on visual aesthetics and sense of place[31]

The construction of the Boulders Wind Farm may have a visual impact on a number of potentially sensitive visual receptors especially within (but not restricted to) a 5km radius of the site. Visual receptors include people travelling along roads and residing in towns and tourists visiting holiday destinations in the region.

The construction phase of the Boulders Wind Farm will result in visual impacts associated with the construction activities undertaken as part of the project. It is considered that the visual impacts of the construction phase will be at a local and/or regional scale.

Visual impact of the Boulders Wind Farm construction phase

Impact: Visual impact on observers in close proximity to the construction activities. Potential sensitive visual receptors include observers travelling along the road within the area, residents of towns and homesteads and visitors at holiday destinations.			
Issue	**Nature of Impact**	**Extent**	**No-Go Areas**
Viewing of the construction activities	The potential negative experience of viewing construction activities	Observers situated within a 0-5km radius of the activities	None identified
Description of expected significance of impact The impact will be local, short-term and probable. The significance of the impact can only be determined once the layout of the facility is available for consideration.			
Gaps in knowledge and recommendations for further study A layout of the Boulders Wind Farm is required for further analysis.			

[31] The visual scoping study is based on data verified in the field.

6.4. Evaluation of potential impacts associated with the Operation Phase

6.4.1. Potential impact on ecology

Ecological impacts are expected to occur during the operation phase of the Boulders Wind Farm. These impacts include:

» Impacts to fauna due to the operation of the wind farm
» Impact on broad-scale ecological processes and conservation targets

Faunal impacts due to operation

Impact:
The operation of the Boulders Wind Farm may lead to disturbance or persecution of fauna within or adjacent to the wind farm. Most of the project site is transformed and considered to be low sensitivity for fauna, with little scope for long-term impact. However, the operation of the turbines will generate noise which may have some impact on sensitive species who occupy habitats close to turbines.

Issue	Nature of Impact	Extent	No-Go Areas
Faunal disturbance due to operation of the wind farm.	Disturbance of fauna due to maintenance activities or the operation of the wind turbines.	Local	No-go areas associated with the intact fragments have been delineated.

Description of expected significance of impact
As the project site is highly transformed, long-term impacts on fauna can be reduced to a low significance through avoiding an impact on the larger intact fragments which are considered to be locally important for resident fauna.

Gaps in knowledge and recommendations for further study
The project site is heavily transformed with the result that the areas considered to be important for fauna are clearly delineated. In addition, it is not likely that the project site is important for any species of specific concern, with the result that uncertainties and issues with regards to long-term faunal impacts are low. There are no significant gaps in knowledge with regards to likely ecological impacts at the project site.

Negative impacts on CBAs and broad-scale ecological processes

Impact:
Development of the Boulders Wind Farm may impact CBAs and broad-scale ecological processes such as the ability of fauna to disperse and move about the landscape. Most of the project site is transformed and considered to be low sensitivity for fauna and flora, with little scope for long-term impact on CBAs or ecological processes. The remaining intact areas are however considered sensitive and should be avoided to reduce this impact. The project site is also located within the Cape West Coast Biosphere Reserve, however only in the buffer areas and the transitional zones with the core areas not affected. Through the avoidance of the intact vegetation located within the project site (which is considered to be no-go areas) no additional habitat loss from the development will occur and as such the impact on the Biosphere Reserve will be

minimal.			
Issue	**Nature of Impact**	**Extent**	**No-Go Areas**
Habitat fragmentation and reduced ability of fauna and flora to disperse.	Further fragmentation and habitat loss within the intact areas will impact on the ability of fauna and flora to disperse and move about the landscape.	Local	No-go areas associated with the intact fragments have been delineated.
Description of expected significance of impact As the project site is highly transformed, this impact would be largely restricted to the intact areas which are classified as CBAs and which can be avoided. Provided that the remaining intact areas are not significantly affected, then this impact is likely to remain of low significance.			
Gaps in knowledge and recommendations for further study The project site is heavily transformed with the result that the areas considered to be important for fauna and flora are clearly delineated. Provided that these areas can be avoided, then there would be very little uncertainty with regards to impacts on CBAs and broad scale ecological processes.			

6.4.2. Potential impact on freshwater features

Impacts on the freshwater features are expected to occur during the operation phase of the Boulders Wind Farm. These impacts include:

» Potential further degradation of the features due to mismanagement

Mismanagement and ineffective rehabilitation of the freshwater features

Impact: Should the rehabilitation of the freshwater features be ineffective or should mismanagement of the resources occur it could lead to further degradation.			
Issue	**Nature of Impact**	**Extent**	**No-Go Areas**
Mismanagement and ineffective rehabilitation of freshwater resources	Potential for siltation and changes in the hydrological functioning of these areas.	Local	Appropriately designed and well managed and monitored rehabilitation must take place in order to ensure that post construction areas are free draining while not allowing the development of concentrated flow, to ensure that the recharge of the watercourses in the area remains as natural as possible
Description of expected significance of impact When physical impact on the large intact delineated freshwater system (that have been identified as being High sensitivity) can be avoided, then this impact would be of low significance. Where linear infrastructure (roads and cables) avoid traversing these areas or utilise existing crossings, the impact would be of low significance. The significance			

of impact cannot be stated until the layout has been finalised, which will be done so as part of the EIA Phase.
Gaps in knowledge and recommendations for further study
The intact freshwater systems are clearly delineated and there is little uncertainty with regards to either their distribution or sensitivity. There are no significant gaps in knowledge with regards to freshwater systems within the project site. The positioning of the wind farm infrastructure must however be determined. Infrastructure located within100m from the watercourses must be considered by the developer for potentially requiring water use licensing, in line with the requirements of the National Water Act

6.4.3. Potential impact on birds

It is during the operation phase that the most significant negative potential impacts on bird communities may occur. These impacts include:

» Potential for bird fatality due to collision with turbine blades
» Disturbance due to maintenance activities

The most significant impact of a wind farm on bird communities using an area is related to bird fatality due to collision with turbine blades, and this impact is considered to be of a medium significance considering the data collected to date. The collision risk is not the same for all species and it varies according to the species' habits and ecology.

One Secretarybird nest was found within the project site, which is a good indicator that the species use the area and that disturbances caused by the Boulders Wind Farm operation phase may reflect in its reproductive success.

In addition to the fatality risk it must also be considered that the presence of the turbines itself, as well as human and vehicles movements through the project site and development footprint (associated with maintenance movements) has the potential to negatively affect the bird community, especially during sensitive seasons (i.e. breeding season), an impact considered at this stage to be of low significance.

Operation of the wind turbines and operational activities associated with the Boulders Wind Farm

Impact: Collision (and fatality) with turbine blades and disturbance due to maintenance activities. Sensitive areas to be affected may include the surrounding drainage lines and water bodies, natural vegetation, the Secretarybird nest and, at a lower level of sensitivity, the cereal croplands and pasture areas.			
Issue	**Nature of Impact**	**Extent**	**No-Go Areas**
Collision (and fatality) with turbine blades	Negative, especially for species with a conservation status of concern	Possibly Regional (for species with large scale movements)	Surrounding drainage lines and water bodies, natural vegetation and the Secretarybird nest.

Description of expected significance of impact The duration of the impact will be permanent, probable and can cause an irreplaceable loss of resources (but can also be managed or mitigated. The significance of the impact is expected to be medium at this stage.			
Disturbance due to maintenance activities	Negative, especially for breeding species	Local	Secretarybird nest
Description of expected significance of impact The duration of the impact will be permanent, probable and can cause an irreplaceable loss of resources (but can also be managed or mitigated. The significance of the impact is expected to be medium at this stage.			
Gaps in knowledge and recommendations for further study The occurrence of flights at the rotor swept area, their location both in the horizontal and vertical plane, time spent at rotor height and which species presented flights with a probable collision risk must be analysed. It will be very important to determine areas of collision risk in order to overlay them with the preliminary sensitivity mapping, allowing it to be confirmed and/or refined. No-Go areas identified are recommended to be excluded from the siting of wind turbines.			

6.4.4. Potential impact on bats

During the operation phase the direct impact would be mortality via collisions with rotating blades of wind turbines and barotrauma. Barotrauma refers to tissue damage to the lungs and is caused by rapid changes in pressure associated with the flow of air over the turning blades. Bats can also be killed by being directly struck by rotating turbine blades.

Operation of the wind turbines

Impact: Bat mortality at operating wind farms due to collisions and barotrauma.			
Issue	**Nature of Impact**	**Extent**	**No-Go Areas**
Operation of wind turbines	The turning blades of wind turbines may result in bat mortality. This has been attributed to direct collisions with the turbine blades and barotrauma (Baerwald et al. 2008).	Local / Regional / National *The extent of the impact cannot be determined without data on bat activity at the site.	Turbines should be sited away (a minimum of 200m) from habitat features which may encourage bat activity. These include, but are not limited to, natural vegetation, water bodies, linear landscape corridors, waterways, rocky outcrops and trees. Turbines should be sited a minimum of 500m

			from any confirmed bat roost.
Description of expected significance of impact The duration of the impact will be long-term with a high probability should bat activity be moderate to high at the project site. There is a low potential that the impact might be reversed and the impact has a high potential for a loss of irreplaceable resources. Consequences of the impact will be potential significant declines in the local bat populations of species which fly at rotor-sweep height and locally abundant bat species may become locally threatened.			
Gaps in knowledge and recommendations for further study This work has been undertaken and will be reported upon in the EIA phase. Data on bat activity at the site, with indications of temporal and spatial variation in this activity, as well as the species composition of this activity will be considered in the EIA phase to assess this impact. Therefore 12 months of acoustic monitoring for bats at various locations across the site, as well as at rotor-sweep height, has been completed			

6.4.5. Potential impact on agricultural potential and soils

Farming activities are practiced on a continuous basis on the affected properties which form part of the Boulders Wind Farm project site

The following impacts are expected to occur with the development of Boulders Wind Farm:

» An impact on the current potential farming activities - the development of the Boulders Wind Farm will create a permanent substitution of a very small portion of agricultural land.
» Loss of agricultural resources.
» Impact on the financial situation of the affected properties, including the profitability levels of the current farming activities, loss of farming income and possible gain in income for the farmers due to the development of the Boulders wind Farm on their properties.

Soil erosion may increase following construction and lead to degradation of areas used for cultivation. Permanent substitution of a very small portion (only approximatley1%) of agricultural land as a result of a decrease in available land that can be cultivated.

Loss of agricultural land due to the operation of the Boulders Wind Farm

Impact: The operation of the Boulders Wind Farm will reduce 1% of the land available for agricultural use within the total extent of the project site. This will be for the duration of the operation phase (i.e. 20-25 years).			
Issue	**Nature of Impact**	**Extent**	**No-Go Areas**
Loss of cultivated agricultural land	1% of the total extent of the project site will be lost due to the operation of the wind farm.	Local	Drainage lines and very steep areas (> 15 % slopes)
Description of expected significance of impact The significance of the negative impact associated with the Boulders Wind Farm is expected to be very small (i.e. negligible) with the avoidance of the no-go and sensitive			

areas.
Gaps in knowledge and recommendations for further study The scoping study was based on sound information that was available and the findings can therefore be classified to have an acceptable level as far as plausibility is concerned (i.e. at least a medium level as far as the confidence criterion is concerned). It is doubtful whether further study will lead to other conclusions than presented.

6.4.6 Potential impacts on heritage resources

The assessment of heritage resources includes the consideration of the cultural and heritage components of the landscape, including changes to the cultural landscape, and the impact on the archaeological, palaeontological resources of the Boulders Wind Farm project site. During the operation phase of the Boulders Wind Farm the impact on the heritage resources will mainly relate the cultural landscape.

Considering scenic routes and cultural landscapes within the study area, the R45 (which provides access from Vredenburg to Malmesbury located to the south east) is a recognised scenic route (Webley et al. 2010; Winter and Oberholzer 2013) while the entire area can be considered a cultural landscape of scenic rolling hills, agricultural fields and historic farmsteads, layered on top of a Stone Age landscape represented by the numerous archaeological sites found throughout the project site. This landscape has, however, been affected by rampant development, particularly in and around the coastal towns of Paternoster, Britannica Heights, and St Helena Bay, and also through the establishment and operation of the West Coast One wind energy facility, which comprises of 47 turbines that is located immediately to the south east of the Boulders Wind Farm project site.

The visibility of the Boulders Wind Farm will have the greatest impact within 5km of the Boulders Wind Farm, with lesser impact experienced beyond this radius. Specific direct visual impacts associated within the project site relate mainly to road users, local residents including farmsteads and homesteads, a change in the visual character and sense of place (i.e. the pastoral landscape and the small coastal towns). These impacts are of a high significance within close proximity (within 5km) to the Boulders Wind Farm project site, and are direct impacts arising from the visual impact of the turbines on the landscape. The existing turbines of West Coast One set a precedent for this type of development in this area, and have already had an impact on the cultural landscape, defining a part of the status quo. Impacts during the operation phase of this project will be long-term.

Impact on heritage resources during the operation of the Boulders Wind Farm

Impact: Change in the cultural landscape associated with the area located within and surrounding the project site during the operation phase.			
Issue	**Nature of Impact**	**Extent**	**No-Go Areas**
The viewing of the wind turbine structures	The potential negative experience of viewing wind turbine structures	Observers situated within a 0-5km radius of the wind	No turbines must be located on or near Kasteelberg.

		turbine structures	
Description Considering the visual effect of the Boulders Wind Farm on the cultural landscape the impacts will be negative, local in extent, long-term, have a very high magnitude and a high probability of occurrence. The significance is expected to be high.			
Gaps in knowledge and recommendations for further study In order to further consider the impact on the cultural landscape a layout of the wind turbine positions and turbine dimensions are required for further analysis. Additional spatial analyses are required in order to create a visual impact index that will include visual exposure, visual distance/observer proximity to the structures viewer incidence/viewer perception (sensitive visual receptors) and visual absorption capacity of the environment surrounding the proposed structures. Additional activities include the identification of potential cumulative visual impacts, the undertaking of a site visit, the creation of photo-simulations of the proposed structures, identify recommendations in terms of mitigation measures/ infrastructure placement and the consideration of alternatives.			

6.4.7. Potential impacts on the social environment

During the operation phase of the Boulders Wind Farm positive and negative impacts from a social perspective will occur. The positive impacts include:

- The establishment of renewable energy infrastructure and the generation of clean, renewable energy.
- Creation of employment and business opportunities. The operation phase will also create opportunities for skills development and training.
- Benefits associated with the establishment of a Community Trust.
- Long-term employment creation in local communities and elsewhere in the country
- Household income will improve the standard of living for households directly or indirectly benefitting from employment opportunities
- Increase in government revenue stream due to payroll taxes and income taxes
- Improved energy security and opportunities for local economy development due to increased supply of electricity
- Impact on tourist repeat visitation to the area
- Sustainable increase in production and GDP-R of the national and local economies due to operation expenditure

- The negative impacts include:
  - The visual impacts and associated impact on sense of place;
  - Impact on property values due to the change in the landscape; and
  - Perceived impact on tourism.

In terms of social impacts it must be taken into account that there is already an existing wind energy facility (i.e. the West Coast One Wind Energy Facility) located within the area.

Development of renewable energy infrastructure

Impact: The development of the Boulders Wind Farm will result in the development of infrastructure to generate clean, renewable energy.			
Issue	**Nature of Impact**	**Extent**	**No-Go Areas**
Development of infrastructure to generate clean, renewable energy	Benefit to society as a whole through the development of a renewable energy facility which will supply clean energy to the national grid	Local / Regional / National	None identified
Description of expected significance of impact The impact will be positive, long-term and definite. The significance of the impact will be high.			
Gaps in knowledge and recommendations for further study None			

Creation of employment and business opportunities and support for local economic development

Impact: Creation of employment and business opportunities during the operation phase.			
Issue	**Nature of Impact**	**Extent**	**No-Go Areas**
Employment and business opportunities	Creation of permanent employment and skills and development opportunities for members from the local community and creation of additional business and economic opportunities	Local / Regional / National	None identified
Description of expected significance of impact The impact will be positive, long-term and highly probable. The significance of the impact will be medium.			
Gaps in knowledge and recommendations for further study A better understanding of the number and nature of employment opportunities during the operation phase is required. An economic modelling technique will be utilised in order to quantify the impact on employment and business opportunities. This will be undertaken as a separate economic assessment in the EIA phase.			

Benefits associated with the establishment of a community trust

Impact: Establishment of a community trust funded by revenue generated from the sale of energy. The revenue can be used to fund local community development.			
Issue	**Nature of Impact**	**Extent**	**No-Go Areas**
Local community	Promotion of social and economic development and	Local and Regional	None identified

development	improvement in the overall well-being of the community		
Description of expected significance of impact The impact will be positive, long-term and definite. The significance of the impact will be high.			
Gaps in knowledge and recommendations for further study The needs within the local communities need to be identified in order to ensure that the revenue is spent wisely.			

Impact on the sense of place and rural character of the landscape

Impact: The development of the Boulders Wind Farm will result in a potential impact on the area's rural sense of place and character. However, the presence of the existing operational West Coast One wind energy Facility must be taken into consideration.			
Issue	**Nature of Impact**	**Extent**	**No-Go Areas**
Impact on the sense of place	The sense of place may change with the development of the Boulders Wind Farm	Local	None identified at this point
Description of expected significance of impact The impact will be negative to sensitive receptors and long-term. The impact can be reversed and no loss of irreplaceable resources are expected.			
Gaps in knowledge and recommendations for further study The significance of the impact can only be assessed once the visual impact assessment and facility layout is available.			

Potential impact on property values

Impact: The development of the Boulders Wind Farm may be perceived to have an impact on the property values due to the potential visual impact. However, trends in the area in terms of property values need to be considered in order to support the impact.			
Issue	**Nature of Impact**	**Extent**	**No-Go Areas**
Impact on property values	Visual change due to the development may impact on the property values located within the area	Local	None identified
Description of expected significance of impact The impact will be long-term and reversible once the wind farm has reached the end of its lifecycle. No loss of irreplaceable resources are expected to occur.			
Gaps in knowledge and recommendations for further study The significance of the impact can only be determined during the EIA Phase and will be informed by the visual impact assessment and the location of the wind turbines in relation to the affected properties. The significance rating will be undertaken as part of the Assessment Phase and will be informed by the visual impact assessment and the location of wind turbines relative to the affected properties. In order to quantify the impact on the Boulders Wind Farm on the property values a separate study will be undertaken within the area that will include a review and analysis of case studies and trends in property prices, specifically the trend experienced prior to and after completion of the existing operational West Coast One Wind Energy Facility (current status quo of the area).			

Potential impact on tourism

Impact: Potential impact of the Boulders Wind Farm on local tourism activities undertaken within the area.			
Issue	**Nature of Impact**	**Extent**	**No-Go Areas**
Impact on local tourism activities	Potential benefit for tourism in the area or a potential for a reduced number of tourist visits to the area, which in turn would impact on local tourism sector.	Local	None identified
Description of expected significance of impact The impact could be negative or positive (distract or attract tourism), long-term and probable. The significance of the impact will be low (even if impact is considered as positive or negative).			
Gaps in knowledge and recommendations for further study A better understanding of the current tourism activities within the local area is required. A trend analysis of the tourist activities will be considered as part of a separate study undertaken during the EIA phase, specifically the trend experienced prior to and after completion of the existing operational West Coast One Wind Energy Facility (current status quo of the area) (**Appendix J(a)**).			

6.4.8. Potential impacts on sensitive noise receptors

The wind turbines will generate noise while in operation. Noise-sensitive activities such as sleeping, or areas used for relaxation or other activities (places of worship, school, etc.) should determine appropriate Zone Sound Levels. However, for the Scoping phase the $L_{Req,N}$ of 35dBA as proposed by SANS 10103 is used.

Considering the location of the project site in relation to the closest potential NSDs, there is a potential for a noise impact, noise rating levels could be higher than 35 dBA (using the sound power emission data of the Vestas V117 3.3MW). This is higher than the SANS 10103 night-time rating level of 35dBA. However, considering the potential noise level of 42 dBA (based on the potential noise rating level at 500m from a Vestas V117 3.3MW wind turbine), no wind turbines should be developed within 500m from any NSD.

Only the night-time scenario was assessed in the table below as this is the most critical time period when a quiet environment is desired due to the location of the project site and the area within which the site is located.

Impact: Increases in noise levels at closest receptors and noise levels exceeding the SANS 10103 rating level. The noise sensitivity of the operation phase of the Boulders Wind Farm is the generation of noise within a rural area with a night-time $L_{R,n}$ rating level of 35 dBA. It is expected that noise levels will increase as the wind speeds increase.			
Issue	**Nature of Impact**	**Extent**	**No-Go Areas**
Increase in noise level at receptors. Noises exceeding rating level.	Increased noises may increase annoyance levels with the Boulders Wind Farm. Noise levels could reach 42 dBA during the operation phase.	Multiple wind turbines operating at night could impact on an area up to 2,000m from the turbines.	No wind turbines to be developed within 500m from identified NSDs.
Description of expected significance of impact Without noise propagation modelling it is difficult to assess the potential significance of the noise impact. However, if the developer only develops wind turbines further than 500m from identified NSDs, the potential significance could be medium to low, with the noise impact depending on the specific sound power emission characteristics of the wind turbine as well as the number of wind turbines located within 2,000m from these NSD (cumulative effects). These noise impacts will be reversible at the end of the project lifecycle, will not result in an irreplaceable loss of resources and the potential noise impacts can be managed, mitigated and avoided.			
Gaps in knowledge and recommendations for further study Accurate noise rating levels to be modelled during EIA phase once a layout and the details of the selected wind turbine are available. The Scoping study is not considered to be sufficient and therefore a Noise Impact Assessment is required.			

6.4.9. Potential impacts on visual aesthetics and sense of place

The main visual impacts associated with the Boulders Wind Farm will occur during the operation phase of the facility. It is envisaged that the issues may constitute a visual impact on a local and/or regional scale. The following impacts have been identified:

- The visibility of the facility from, and potential visual impact on observers travelling along the arterial (R27, R45 and R399) and secondary (local) roads within the project site and surrounding areas.
- The visibility of the facility from, and potential visual impact on built-up centres and populated places (i.e. the towns of Vredenburg, Paternoster, Britannia Bay, Stompneus Bay, St Helena Bay, Laingville and Velddrif) surrounding the project site.
- The visibility of the facility from, and potential visual impact on farmsteads and homesteads (rural residences like Britannica Heights) within the project site and the surrounding areas.
- The potential visual impact of the facility on the visual character and sense of place of the region, with specific reference to the pastoral landscape and small coastal towns (tourist attractions).
- The potential visual impact of ancillary infrastructure (i.e. the substation, internal access roads etc.) on observers in close proximity to the project site.

» The potential visual impact of lighting of the facility in terms of light glare, light trespass and sky glow.
» The potential visual impact of shadow flicker.

Visual impacts during the operation phase of the Boulders Wind Farm

Impact:
Visual impact of the wind farm on observers in close proximity to the wind turbine structures that will be associated with the Boulders Wind Farm. Potential sensitive visual receptors include:
» Observers travelling along roads
» Residents of towns and homesteads
» Visitors at holiday destinations

Issue	Nature of Impact	Extent	No-Go Areas
The viewing of the wind turbine structures	The potential negative experience of viewing wind turbine structures	Observers situated within a 0-5km radius of the wind turbine structures	No turbines must be located on or near Kasteelberg.

Description of expected significance of impact
The impact will be local, long-term and probable. The significance of the impact can only be determined once the layout of the facility is available for consideration.

Gaps in knowledge and recommendations for further study
A layout of the wind turbine positions and turbine dimensions is required for further analysis.

Additional spatial analyses are required in order to create a visual impact index that will include the following criteria:
» Visual exposure
» Visual distance/observer proximity to the structures
» Viewer incidence/viewer perception (sensitive visual receptors)
» Visual absorption capacity of the environment surrounding the structures

Additional activities:
» Identify potential cumulative visual impacts
» Undertake a site visit
» Create photo-simulations of the proposed structures
» Recommend mitigation measures and/or infrastructure placement alternatives

6.5 Evaluation of Potential Cumulative Impacts Associated with the Boulders Wind Farm and Other Approved Wind Energy Developments

Cumulative impacts, in relation to an activity, refer to the impact of an activity that in-itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area. For cumulative effects analysis to help the decision-maker and inform interested parties, it must be limited to effects that can be evaluated meaningfully (DEAT, 2004).

Cumulative effects are commonly understood as the impacts which combine from different projects and which result in significant change, which is larger than the sum of all the impacts (DEAT, 2004). The complicating factor is that the projects that need to be considered are from past, present and reasonably foreseeable future development. Cumulative effects can be characterised according to the pathway they follow. One pathway could be the persistent additions from one process. Another pathway could be the compounding effect from one or more processes. Cumulative effects can therefore occur when impacts are:

- additive (incremental);
- interactive; or
- sequential.

Canter and Sadler (1997) describe a three step process for addressing cumulative effects in an EIA process:

- delineating potential sources of cumulative change (i.e. using GIS to map the relevant wind energy facilities in close proximity to one another).
- identifying the pathways of possible change (i.e. direct impacts)
- indirect, non-linear processes (i.e. indirect impacts); and
- classification of resultant cumulative changes (i.e. residual impacts)

Table 6.1 below provides the details of the known wind energy facilities within 30km from the Boulders Wind Farm project site (which includes 4 other facilities, 1 of which is operating constructed and fully operational facility). **Figure 6.9** provides an indication of the location of the Boulders Wind Farm project site in relation to the other facilities (excluding the St. Helena Community Wind Energy Facility and the Wind and Solar Energy Facility at Nooitgedacht)**.** It is clear from **Table 6.1** that there are limited wind energy facilities proposed and considered to be viable in the surrounding area of the Boulders Wind Farm project site.

Table 6.1: Other wind energy facilities within 30km of the Boulders Wind Farm project site

Project Name	DEA Ref. No	Approximate distance from the Boulders Wind Farm project site (measured from the centre)	Project Status
West Coast One Wind Energy Facility	12/12/201581	Directly adjacent and ~5km south-east	Approved (operational)
St. Helena Community Wind Energy Facility	12/12/20/2157	~8km south-east	Approved, however located within the Langebaanweg AFB restricted area
Wind and Solar Energy Facility at Nooitgedacht	12/12/201781	~12km south-east	Approved, however located within the Langebaanweg AFB restricted area

Project Name	DEA Ref. No	Approximate distance from the Boulders Wind Farm project site (measured from the centre)	Project Status
Isivunguvungu Wind Energy Facility	12/12/20/2339	~21km south	Approved, however located within the Langebaanweg AFB restricted area

*Department of Environmental Affairs Geographic Information System digital data (http://egis.environment.gov.za/frontpage.aspx?m=27)

Even though all three of the other wind energy facilities listed above within the area have been approved, consideration must be given to the requirements of the Langebaanweg Air force Base (AFB), which is located approximately 28km south of the Boulders Wind Farm project site. The AFB requires a buffer of 18.5km around the air force which is required to ensure that wind turbines do not interfere with their radar system used as part of their air force base and training operations. Therefore, it is considered that any wind turbines located within the buffer area will experience constraints in terms of development. Due to the constraining factor associated with the Langebaanweg AFB radar, and from subsequent confirmation from the developers, the St. Helena Community Wind Energy Facility and the wind and solar energy facility at Nooitgedacht are no longer being considered as viable projects for future development. Therefore, only the operational West Coast One Wind Energy Facility and the Isivunguvungu Wind Energy Facility are included in cumulative assessments regarding the development of the Boulders Wind Farm.

Figure 6.10 below provides an indication of the Langebaanweg AFB 18.5km restricted area in relation to the other projects in the greater area (that is the constructed west Coast 1, as well as the 12.5 MW Isivunguvungu project located within the AFB buffer). The Boulders Wind Farm project site is does not infringe on the buffer.

The cumulative impacts associated with the Boulders Wind Farm and associated infrastructure primarily refer to the contribution of the project to impacts associated with ecology, water resources, soil, avifauna, bats, noise, visual, heritage, and social impacts resulting or expected to result from other similar developments in the area. Potential cumulative impacts associated with numerous wind farm developments within the surrounding area of the project site are expected to be associated with:

» *Ecology* – The Saldanha-Vredenburg area has lost much of the original vegetation due to agricultural activities being undertaken over an extended period of time as well as the construction and operation of the existing West Coast One Wind Energy Facility. The project site of the Boulders Wind Farm is located within cultivated agricultural land where there is limited remaining natural vegetation present. With the implementation of the proposed site-specific mitigation measures recommended for each facility, impacts to the local ecology will be avoided or minimised, and therefore the cumulative impact will be considered acceptable.

» *Freshwater systems* – The development of the Boulders Wind Farm will be required to avoid the sensitive water features located within the project site as these are considered to be no-go areas for the development of the wind farm. With the implementation of the site-specific mitigation measures recommended for each facility, impacts to freshwater systems will be avoided or minimised, and therefore the cumulative impact will be considered acceptable.

» *Avifauna* – Cumulative impacts may arise if the bird species using the Boulders Wind Farm project site also use the other approved wind energy facility sites which will result in an increased reduction in

available habitat and increased collision risk with the wind turbines and associated infrastructure. For migratory species and/or species with wide home ranges those impacts can translate into consequences at population level, being particularly relevant for long-lived low rate preproduction species, generally also with a conservation status of concern. This is particularly relevant for some sensitive species, which have a conservation status of concern and may further reduce their populations. However, with the implementation of the proposed site-specific mitigation measures recommended for each facility, impacts to avifauna will be minimised to acceptable levels, and therefore the cumulative impact will be considered acceptable.

» *Bats* – Cumulative impacts of wind energy on bats are likely to increase as new facilities are constructed. Cumulative effects could result in declines in populations of even those species of bats currently listed as "least concern", if they happen to be more susceptible to mortality from wind turbines e.g. high-flying open air foragers such as bats in the family Molossidae and Emballonuridae. Migrating bats may also experience significant effects on their populations if wind energy facilities are constructed within migration routes. While the resident *Neoromicia capensis* is common and widespread, the multiple wind energy facilities in the West Coast Peninsula and their proximity to one another raises the possibility that the populations of this species may be affected, especially since fatalities of this species have been reported at South African wind energy facilities. However due to the Langebaanweg AFB restricted area the development of all proposed facilities will not be possible and as such the impact on the species will be reduced. Significant mortality of bats present on site may preclude the ability of these local populations to recover. However, with the implementation of the proposed site-specific mitigation measures recommended for each facility, impacts to bat populations will be minimised to acceptable levels, and therefore the cumulative impact will be considered acceptable.

» *Agricultural and soil potential* –With the development of more than one wind energy facility there will be a loss of available cultivated agricultural land due to the construction and presence of wind energy facilities. There might also be an increase in soil and wind erosion due to the developments which will disturb the soil located within the development footprints. However, with the implementation of the proposed site-specific mitigation measures recommended for each facility, impacts to lost agricultural potential will be minimised to acceptable levels, and therefore the cumulative impact will be considered acceptable.

» *Heritage* (considering archaeology, palaeontology and cultural) - In terms of the palaeontological resources in the area, the cumulative result of coastal developments is the inevitable permanent loss of fossils, however, with adequate and appropriate mitigation, the successful recovery of fossil material, can add to the body of scientific evidence and knowledge of past palaeoenvironments, faunal evolution in southern African and the environmental contexts of our prehistoric ancestors. The cumulative impact to archaeological resources is difficult to measure accurately, however, it is noteworthy that the destruction of archaeological material was largely avoided during the construction of the West Coast One wind energy facility and other similar local wind energy facility initiatives. Indications are that the accumulative impacts of wind energy facilities to archaeology to date are insignificant in this area. The most likely cumulative impacts on heritage resources will result from the visual impact of the associated turbines on the landscape, and the cumulative presence of other similar developments in the area. These impacts will impact on the cultural landscape and sense of place in this area, as well as on people living and travelling through the region. Of particular significance at this location is the operational West Coast One wind energy facility, which is directly

adjacent to the Boulders Wind Farm project site. The construction of the Boulders Wind Farm adjacent to the existing West Coast One wind energy facility will result in a collective increase in the density and extent of wind turbines in the immediate area and the landscape. However, the established West Coast One wind energy facility also sets precedent for the presence of the turbines in the affected environment and serves to soften the impact by virtue of its established presence. With the consideration of the specialist recommendations and the implementation of the proposed site-specific mitigation/enhancement measures recommended for each facility the cumulative impact will be considered acceptable.

» *Social* – From a social perspective cumulative impacts will result due to combined visibility of the facilities or sequential visibility. Cumulative impacts on the local services of an area may also arise that will place pressure on the supply of services in terms of education, medical aid and accommodation. The pressure is associated with an influx of job seekers to an area. Positive cumulative social impacts, may also arise which includes the creation of socio-economic opportunities for the area which will result in a positive social benefit. The community trust associated with each development will also create significant socio-economic benefits. With the implementation of the proposed site-specific mitigation/enhancement measures recommended for each facility the cumulative impact will be considered acceptable.

» *Noise* – Through the development of wind energy facilities within an area noise from the various developments may impact on the ambient sound levels of the area as well as the location of specific NSDs. However, with the consideration of the specialist recommendations and the implementation of the proposed site-specific mitigation/enhancement measures recommended for each facility the cumulative impact will be considered acceptable.

» *Visual* – With the development of various wind energy facilities within an area the visual cumulative impact will increase. However, due to the location of the project site in relation to the existing West Coast One Wind Energy Facility, the development of the Boulders Wind Farm will result in a cumulative visual impact that will extend the visual impact of the existing facility resulting in a concentrated area within which the visual impact is located, rather than dispersed visual impacts within different locations. With the consideration of the specialist recommendations and the implementation of the proposed site-specific mitigation/enhancement measures recommended for each facility the cumulative impact will be considered acceptable.

Potential cumulative impacts associated with more than one wind farm developments within the area are also positive and these too need to be considered, for instance:

» The development of renewable energy facilities will have a positive impact at a national and international level through the generation of “green energy” which would lessen South Africa’s dependency on coal generated energy and the impact of such energy sources on the bio-physical environment.
» The development of the Boulders Wind Farm would fit in with the government’s aim to implement renewable energy projects as part of the country’s energy generation mix over the next 20 years as committed to by government and as detailed in the Integrated Resource Plan (IRP), *inter alia*.
» The development of renewable energy facilities will have a positive impact at a regional and local level through increased work and skills development opportunities and the associated reduced poverty levels.

- More projects within a single area will enhance the shareholding benefits that flow to the local community and will create cumulative positive impacts via the increased socio-economic and enterprise obligations that benefit the local community.
- Renewable energy, specifically wind energy, is the cheapest form of energy available to the country and hence the exploitation of high wind resource areas so as to reduce electricity tariffs is of direct benefit to the national economy and all South Africa's citizens.

Cumulative impacts will be fully assessed in the EIA phase. Each specialist studies will consider and assess the cumulative impacts of proposed, approved and authorised renewable projects in the area. The role of the cumulative assessment will be to test if such impacts are relevant to the project (preferred activity) in the proposed location (preferred site) when considered together with other similar developments:

- Unacceptable loss of threatened or protected vegetation types or species through clearing, resulting in an impact on the conservation status of such flora or ecological functioning;
- Unacceptable risk to aquatic habitat resulting due to the increase in the extent of hard or impermeable surfaces in the greater area;
- Unacceptable risk to avifauna and bats through loss of habitat, infringement on breeding areas, or risk to collision-prone species;
- Unacceptable loss of heritage resources;
- Unacceptable impact on ambient noise levels;
- Complete or whole-scale change in the sense of place and character of an area and unacceptable visual intrusion;
- Positive and negative contribution from a socio-economic perspective; and
- Contribution to climate change mitigation.

The scale at which the cumulative impacts are assessed is important. For example, the significance of the cumulative impact on the regional or national economy will be influenced by wind developments throughout South Africa, while the significance of the cumulative impact at a local scale may only be influenced by wind developments that are in closer proximity to each other, and in this instance, directly adjacent. For practical purposes a local scale will be adopted for this cumulative evaluation.

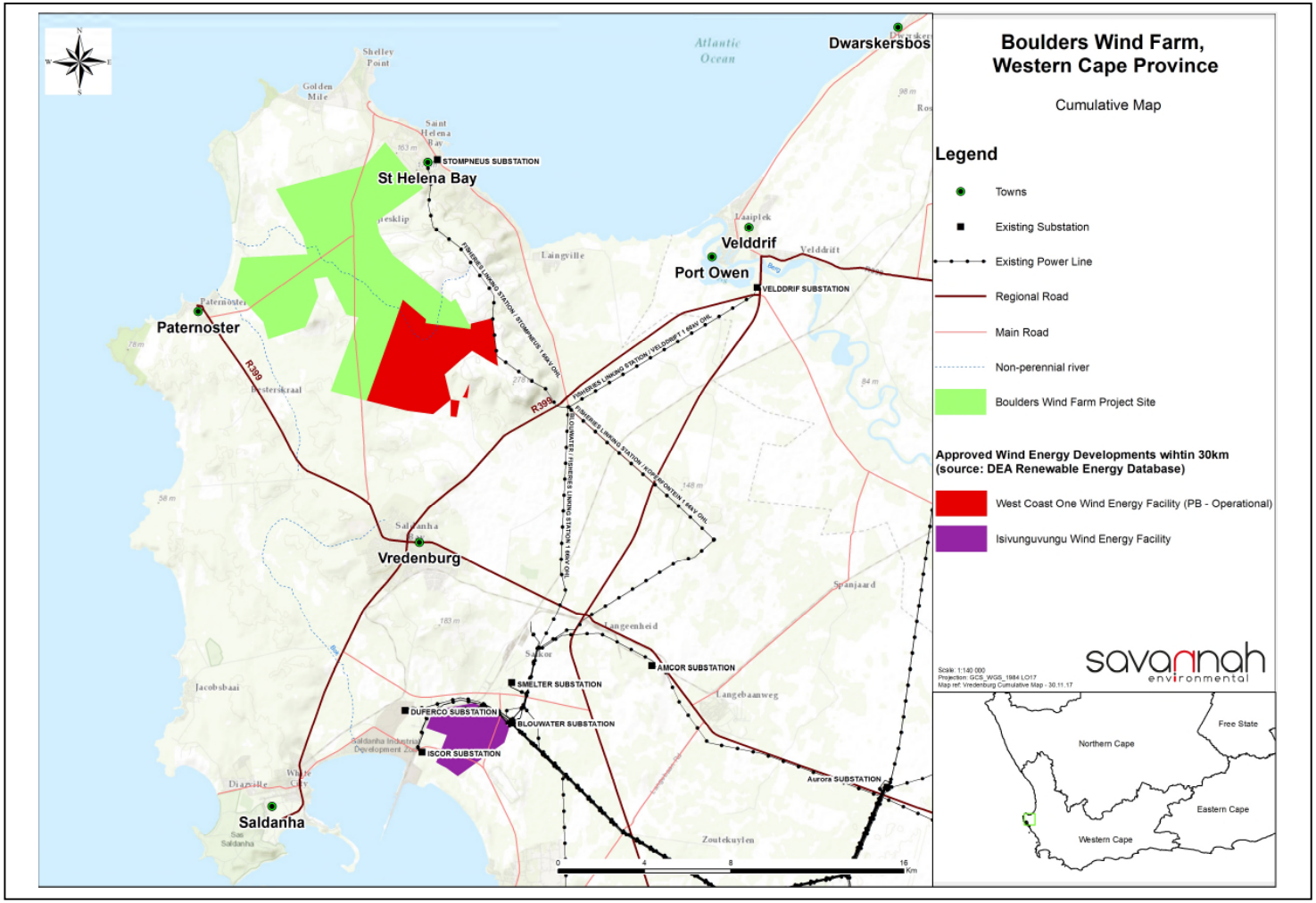


Figure 6.9: Map illustrating the affected farm portions of known and approved wind energy projects within 30km radius of the Boulders Wind Farm project site. These projects were identified using the Department of Environmental Affairs Geographic Information System digital data (http://egis.environment.gov.za/frontpage.aspx?m=27).

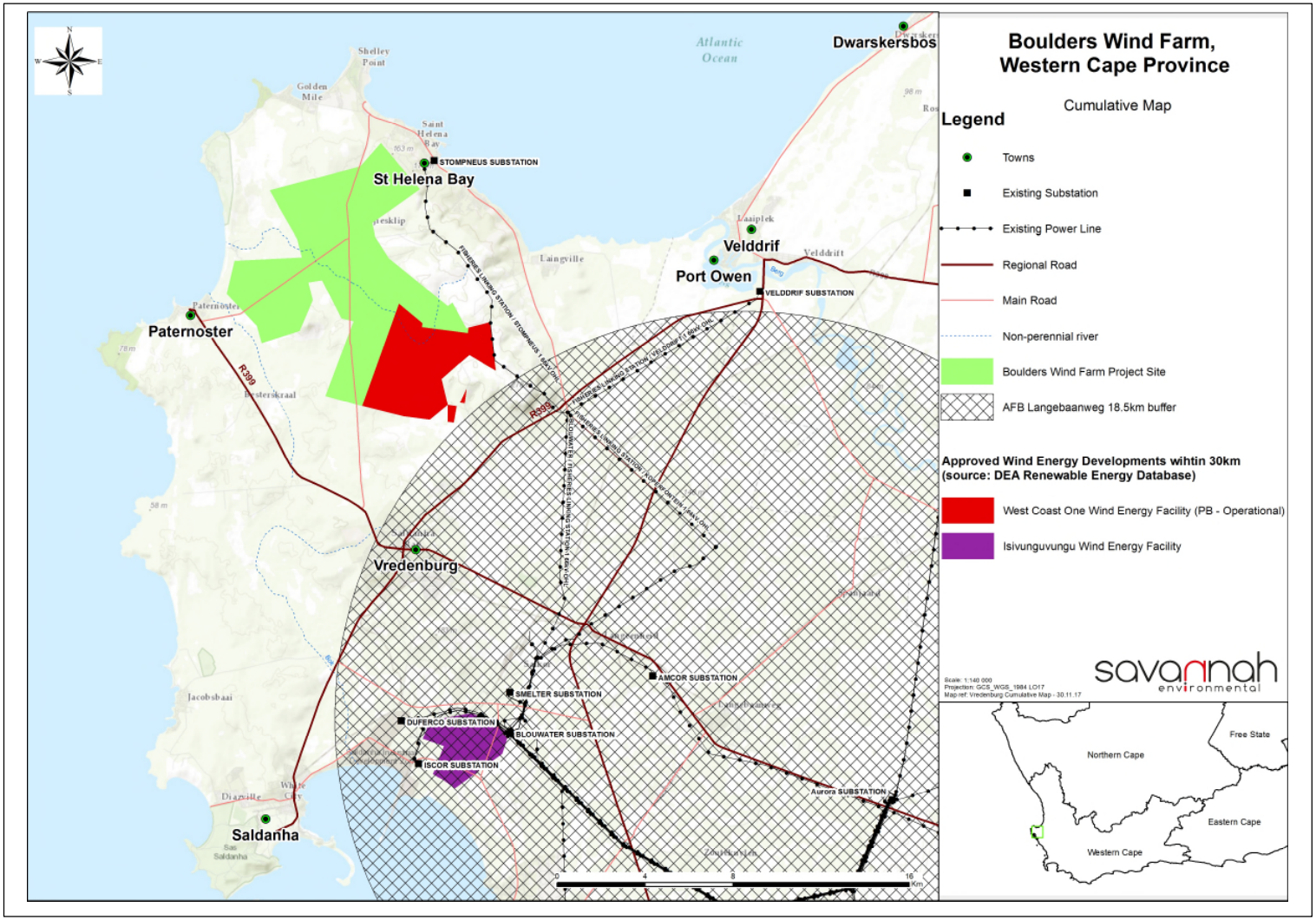


Figure 6.10: Map illustrating the approved wind energy projects located within the Langebaanweg AFB 18.5km buffer area (hatched area).

CHAPTER 7: CONCLUSION AND RECOMMENDATIONS

Vredenburg Windfarm (Pty) Ltd is proposing the development a commercial wind farm and associated infrastructure on a site located north of Vredenburg in the Saldanha Bay Local Municipality and the greater West Coast District Municipality of the Western Cape.

The project site which has been evaluated includes the following ten privately owned farm portions:

» Boebezaks Kraal 2/40
» Boebezaks Kraal 3/40
» Boebezaks Kraal 5/40
» Frans Vlei 2/46
» Schuitjes Klip 3/22
» Schuitjes Klip 1/22
» Davids Fontyn 9/18
» Davids Fontyn 7/18
» Het Schuytje 1/21
» Uitkomst RE/6/23

The ten affected properties were identified as the preferred site alternative (i.e. project site) for investigation after consideration of a number of sites within the broader region (refer to Chapter 2). This Scoping Study identifies environmental sensitivities within this proposed project site which will be used to inform the layout footprint alternatives to be assessed in detail by specialist studies in the EIA phase of the process. There is, therefore, no facility layout available at this point of the EIA process.

The Scoping Study for the Boulders Wind Farm has been undertaken in accordance with the EIA Regulations, as amended, published in Government Notice 40772 of 07 April 2017, in terms of Section 24(5) of the National Environmental Management Act (NEMA; Act No 107 of 1998).

This Scoping report is aimed at detailing the nature and extent of the proposed wind farm, identifying and evaluating potential issues associated with the project, and defining the extent of studies required within the EIA phase. This was achieved through an evaluation of the proposed project, involving the project proponent, specialist consultants, and a consultation process with key stakeholders (including relevant government authorities) and interested and affected parties (I&APs). The public consultation process is on-going and every effort is being made to include representatives of all relevant stakeholder groupings in the project site and the broader study area. This chapter concludes the Scoping report and provides an evaluation of the identified potential environmental risks and impacts associated with the construction and operation of the Boulders Wind Farm based on the findings of the specialist studies undertaken. Recommendations regarding investigations required to be undertaken within the EIA are provided within the Plan of Study for EIA, contained within Chapter 8 of this Scoping report.

7.1 Legal Requirements as per the EIA Regulations, 2014 (as amended)

This chapter of the final scoping report includes the following information required in terms of Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(g)(xi) a concluding statement indicating the preferred alternatives, including the preferred location of the activity.	A concluding statement regarding the Boulders Wind Farm is included within this chapter as a whole.

7.2. Overview of the Boulders Wind Farm

This final Scoping Report documents the procedure for determining the extent of, and approach to, the Environmental Impact Assessment (EIA) Phase. The Scoping included the following key tasks:

- Involvement of relevant authorities and Interested and Affected Parties (I&APs) through the Public Involvement Process;
- Consideration of feasible alternatives to be assessed during the EIA Phase;
- Identification of potential impacts (positive and negative) associated with feasible project alternatives to be assessed during the EIA Phase; and
- Defining Terms of Reference for any specialist studies required to inform the EIA Phase (Plan of Study (PoS) for the Environmental Impact Assessment Report.

The Boulders Wind Farm project site is proposed to accommodate the following infrastructure which will enable the wind farm to supply a contracted capacity of up to 140MW:

- Up to 45 wind turbines with a maximum hub height of up to 120m. The tip height of the turbines will be up to 165m;
- Concrete foundations to support the turbines;
- Cabling between the turbines, to be laid underground where practical;
- An on-site substation of up to 200m x 200m in extent to facilitate the connection between the wind farm and the electricity grid;
- An overhead 132kV power line, with a 32m servitude, to connect the facility to the electricity grid[25] ;
- A transformer station for each wind turbine;
- Access roads to the site and between project components with a width of approximately 6m;
- Laydown areas, crane hardstand pads, administrative buildings and offices.

The proposed site for the establishment of the wind farm is located directly adjacent to the operational West Coast One Wind Energy Facility on transformed land which is currently used predominantly for dryland cultivation (including small-scale grain, cattle and sheep farming). In identifying and evaluating impacts associated with the wind farm and associated infrastructure, it is understood that during

[25] The construction of the 132kV overhead power line will be assessed as part of a separate Basic Assessment process which will consider feasible alternatives for the power line route.

construction areas within the project site could suffer some level of disturbance. However, once construction is complete, only a small portion (up to 1% / 55ha) of the approximately 5084 ha larger project site will be permanently impacted by infrastructure associated with the wind farm. During the operation phase it is expected that the noise and visual impacts will extend beyond the site boundaries.

Currently most of the development constraints within the study area are associated with the presence of intact natural vegetation, water bodies, residences and sensitive bird and bat habitat. Environmental pull factors to the location of the site included the high degree of transformation on the site, as well as the site being a natural extension to the existing operational adjacent wind farm. The location of the Laangebaanweg AFB 28km away, as well as towns including Paternoster, St Helena Bay and Vredenburg have been considered as external constraints (push factors) to the location of the site.

Specific environmental impacts have been identified for the construction and operation phases of the Boulders Wind Farm, as well as the site-specific environmental features located within the project site which need to be avoided and considered by the development of the Boulders Wind Farm. The wind farm could result in various potential issues as a result of the construction and/or operation, and include:

» Visual impact on the landscape.
» Noise impacts on surrounding land inhabitants.
» Ecological sensitivity (flora, fauna and aquatic).
» Agricultural potential and utilisation.
» Avifaunal and bat sensitivity.
» Heritage resources.
» Social impacts and benefits.

Section 7.3 below considers the environmental impacts and sensitive features located within the project site, as identified by the independent specialists within each respective field, and also indicates the locations of the sensitive features within the project site and the sensitivity rating relating to the development of the Boulders Wind Farm for the sensitive feature. The key issues are to be comprehensively addressed and assessed in the EIA Phase according to the Plan of Study for EIA (refer to Chapter 8) and the terms of reference for each specialist study.

7.3. Site Sensitivity Analysis for the Boulders Wind Farm

The sensitive areas which have been identified through the scoping study are discussed below and illustrated as sensitivity maps in **Figures 7.1 to 7.18**. The following maps are provided:

1. A *Features* sensitivity map for every specialist field indicating the sensitive environmental features identified within the project site.
2. An *overall* sensitivity map for every specialist field indicating the areas within the site development area which are required to be avoided by development.
3. A consolidated map of the no-go areas which will need to be avoided during the design of the Boulders Wind Farm development footprint (refer to **Figure 7.17**).
4. A consolidated map of the high environmental sensitivity areas located within the project site, where infringement must be limited (refer to **Figure 7.18**)

The mapped detail is based on the desktop review of the available baseline information for the project site and the broader surrounding areas as well as limited field surveys. The overall environmental sensitivity maps (refer to **Figure 7.17 and 7.18**) are intended to inform the location and layout (i.e. development footprint) of the wind farm and its associated infrastructure within the project site, and must be used as a tool by the developer to avoid those areas flagged to be no-go areas and to limit infringement on those areas of high sensitivity.

The potentially sensitive areas identified to date will be further investigated and assessed through detailed specialist studies (including field surveys and footprint-specific impact assessments) during the EIA phase of the process (refer to Chapter 8 for further details) and the overall environmental sensitivity map will be further refined on the basis of these specialist studies and results, in order to provide an assessment of environmental acceptability and suitability of the facility layout of the Boulders Wind Farm.

7.3.1 Ecological sensitive features and associated impacts

The following sensitive features have been identified and mapped in **Figure 7.1**:

Medium ecological sensitivity:

» Degraded areas within the project site are considered to be of a medium ecological sensitivity. The degraded areas are dispersed throughout the project site and are mainly located within the western portion.

No-go areas:

» Drainage features and associated riparian areas have been identified in the central portion of the project site and are considered to be unsuitable for development, and are therefore no-go areas.
» Intact vegetation located within the project site (and associated with the CBAs) is dispersed and mainly located within the western portion of the site. Intact vegetation is considered to be no-go areas and unsuitable for the development of the proposed wind farm infrastructure. It must also be noted that development within a CBA is not permitted as per the Western Cape Biodiversity Spatial Plan, 2017.
» A small dam has been identified within the northern portion of the project site and is considered to be a no-go area and unsuitable for the development of the proposed wind farm infrastructure.

Figure 7.2 provides an illustration of the sensitive/no-go ecological areas which need to be avoided by the development.

Considering the development (i.e. construction and operation) of the Boulders Wind Farm the following impacts were identified to be associated with the development. The extent of the impacts is local and the significance of the impacts (at the scoping stage) is considered to be low, subject to the avoidance of the sensitive features located within the project site.

» Impacts on vegetation due to construction activities
» Faunal impacts due to construction activities
» Degradation of ecosystems due to construction
» Faunal impacts due to operation
» Negative impacts on CBAs and broad-scale ecological processes during operation

7.3.2 Freshwater sensitive features and associated impacts

The following sensitive freshwater features have been identified and mapped in **Figure 7.3**:

No-go areas:
» Hillslope seeps
» Drainage channels
» Floodplains
» Artificial depressions
» Channelled valley bottom wetlands

Medium ecological sensitivity:
» A buffer area of 32m which is considered as sufficient for the protection of the features.

Figure 7.4 provides an illustration of the sensitive freshwater areas which need to be avoided by the development.

Considering the development (i.e. construction and operation) of the Boulders Wind Farm the following impacts were identified to be associated with the development. The extent of the impacts is local and the significance of the impacts (at the scoping stage) is considered to be low, subject to the avoidance of the sensitive features located within the project site.

» Direct disturbance of freshwater habitats due to construction activities
» Decrease of freshwater habitat integrity due to construction activities
» Alteration of runoff patterns during construction
» Altered hydrology of freshwater features during construction
» Altered stream and base flow patterns during construction

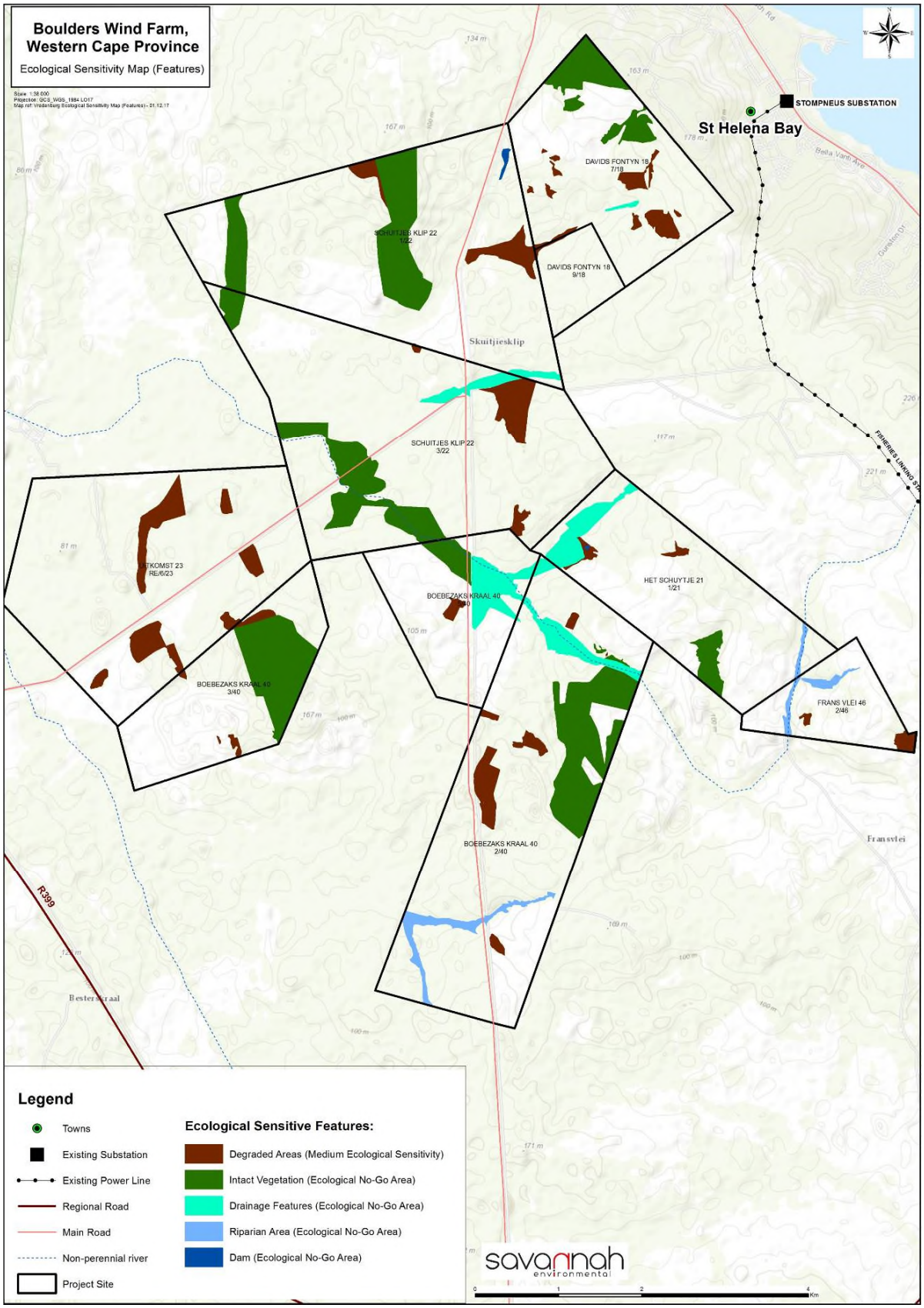


Figure 7.1: Sensitive ecological features located within the Boulders Wind Farm project site

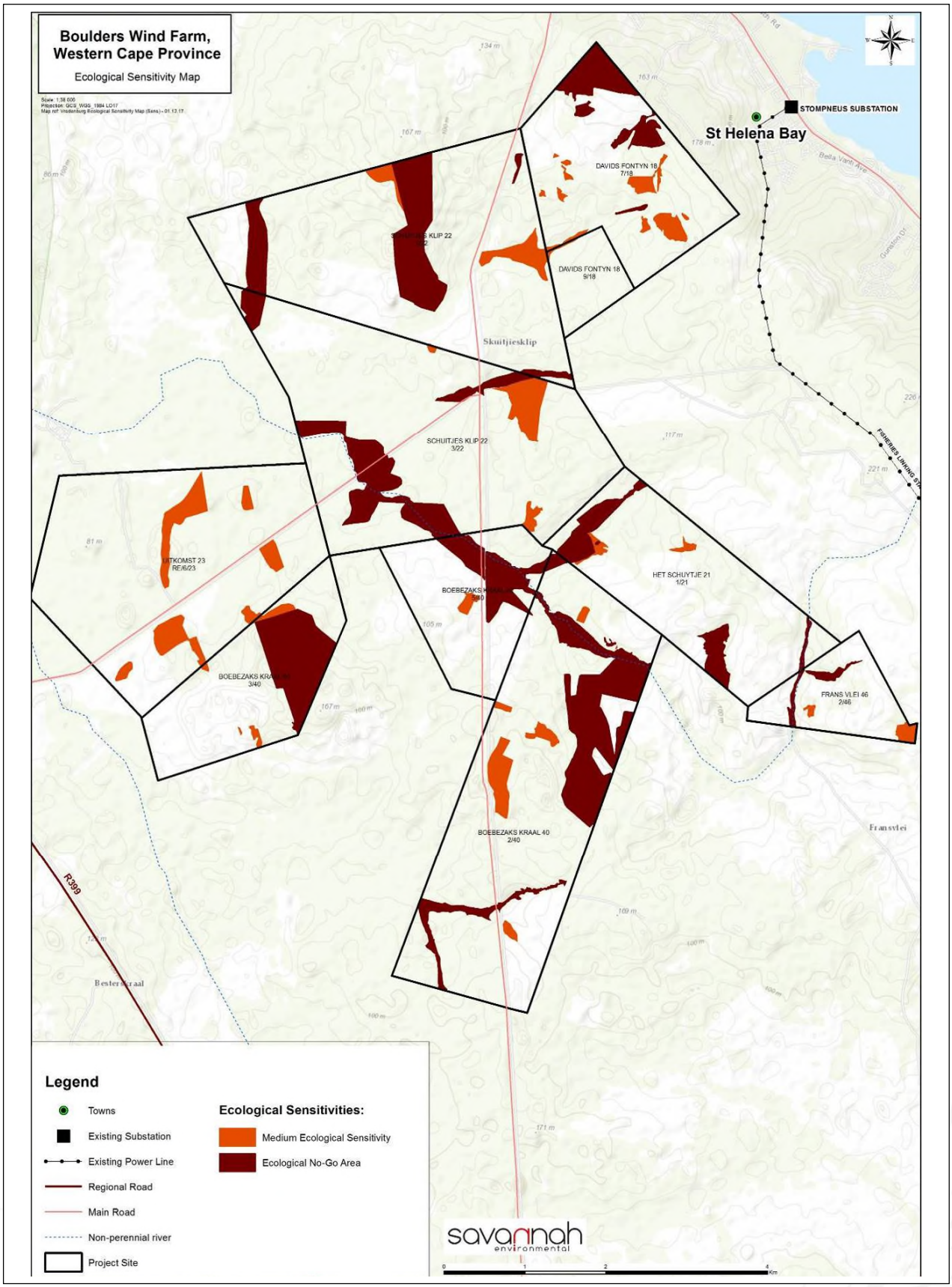


Figure 7.2: Sensitive ecological areas to be avoided by the Boulders Wind Farm development footprint

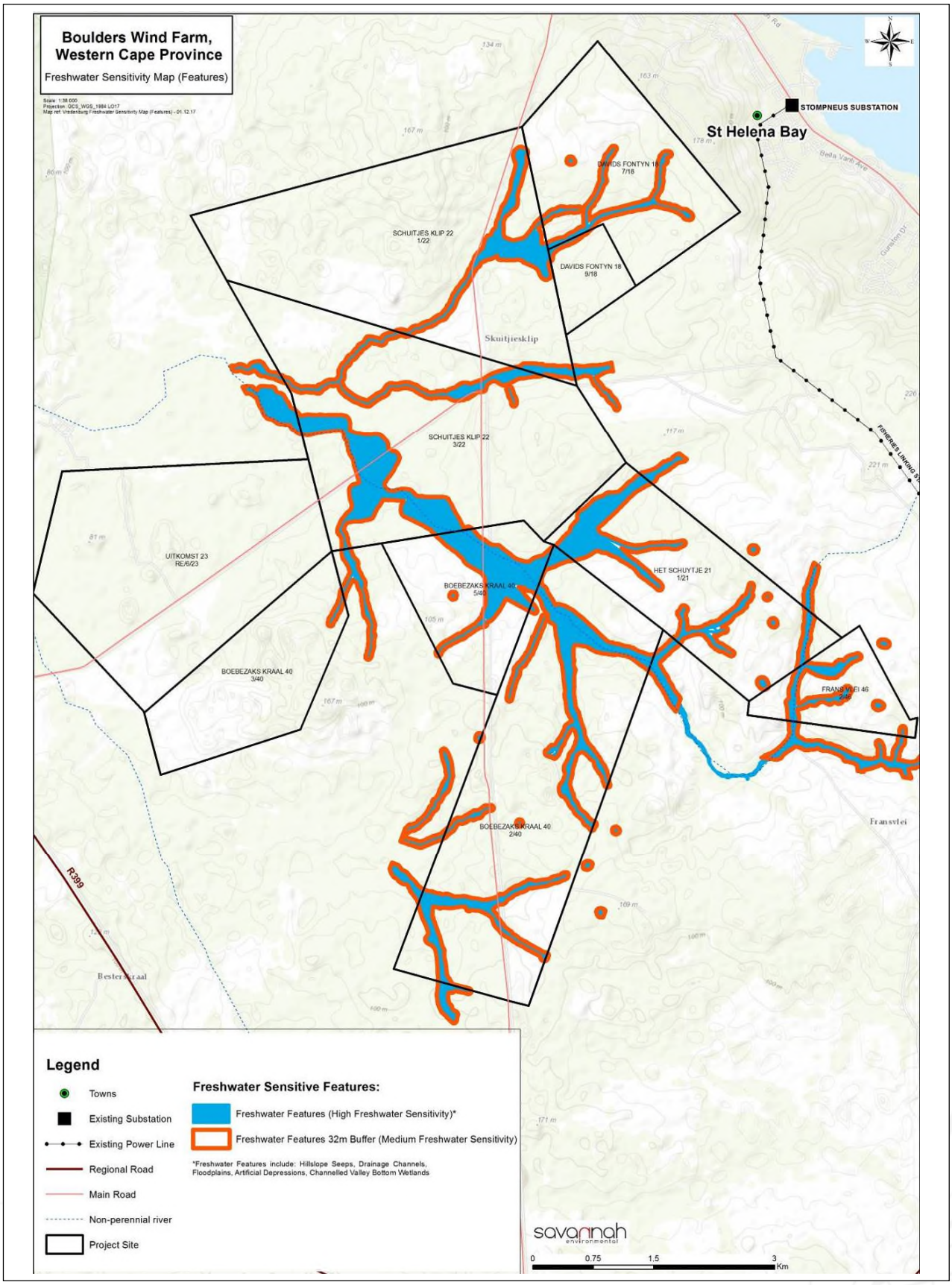


Figure 7.3: Sensitive freshwater features located within the Boulders Wind Farm project site

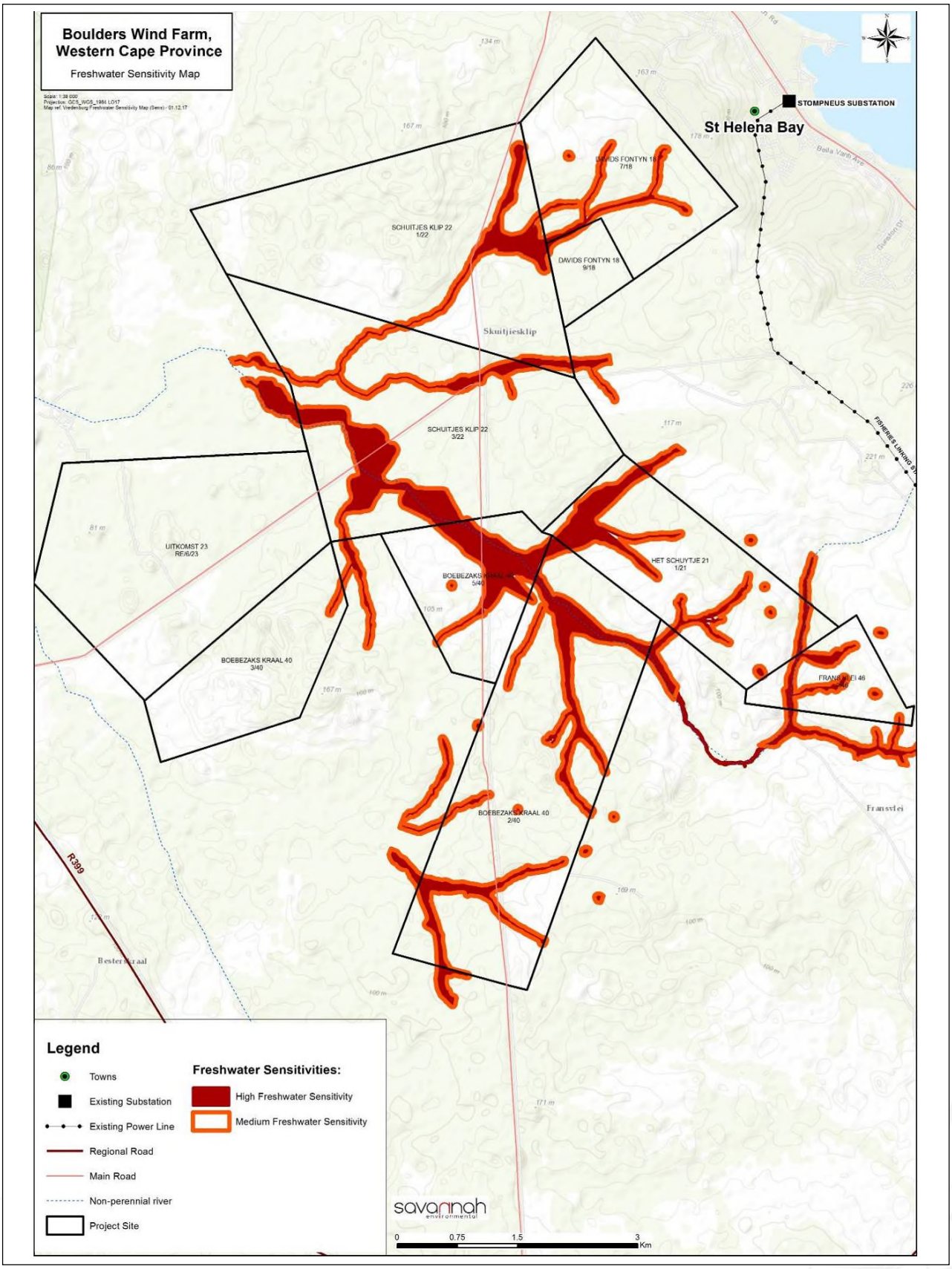


Figure 7.4: Sensitive freshwater areas to be avoided by the Boulders Wind Farm development footprint

7.3.3 Avifaunal sensitive features and associated impacts

Within the Boulders Wind Farm project site sensitive avifaunal features have been identified which need to be considered by the development footprint. The sensitive features are considered to be mainly no-go areas to the development due to their environmental sensitivity from an avifaunal perspective. The following sensitive features have been identified and mapped in **Figure 7.5**:

No-go areas:

» A Secretarybird nest and the associated 500m buffer area is located within the centre of the project site. The nest and the associated 500m buffer area are considered to be no-go areas to the development of the Boulders Wind Farm.
» Waterbodies located in the eastern portion of the project site are considered to be no-go areas to the development of the Boulders Wind Farm.
» Drainage lines traverse the project site and have been allocated a 200m buffer area. The drainage lines and the associated 200m buffer are considered to be no-go areas to the development of the Boulders Wind Farm.
» Natural (intact) vegetation is considered to be important from an avifaunal perspective. A 200m buffer area has been allocated to the natural vegetation. The vegetation and the associated 200m buffer area are considered to be no-go areas to the development of the Boulders Wind Farm.

It is noted that the exclusion areas associated with remnant natural vegetation and water bodies overlap with those areas also indicated as no-go areas in the ecology and freshwater sensitivity maps. Additional buffer areas associated with the movement of bird species have been included.

Figure 7.6 provides an illustration of the sensitive avifauna areas which need to be avoided by the development.

Considering the development (i.e. construction and operation) of the Boulders Wind Farm the following impacts were identified to be associated with the development. The extent of the impacts is expected to be local to regional and the significance of the impacts will be from a low to medium significance, subject to the avoidance of the identified no-go areas.

» Habitat destruction and disturbance and/or displacement during the construction of the Boulders Wind Farm
» Collision with wind turbine blades once the wind farm is operational
» Disturbance due to maintenance activities undertaken during operation

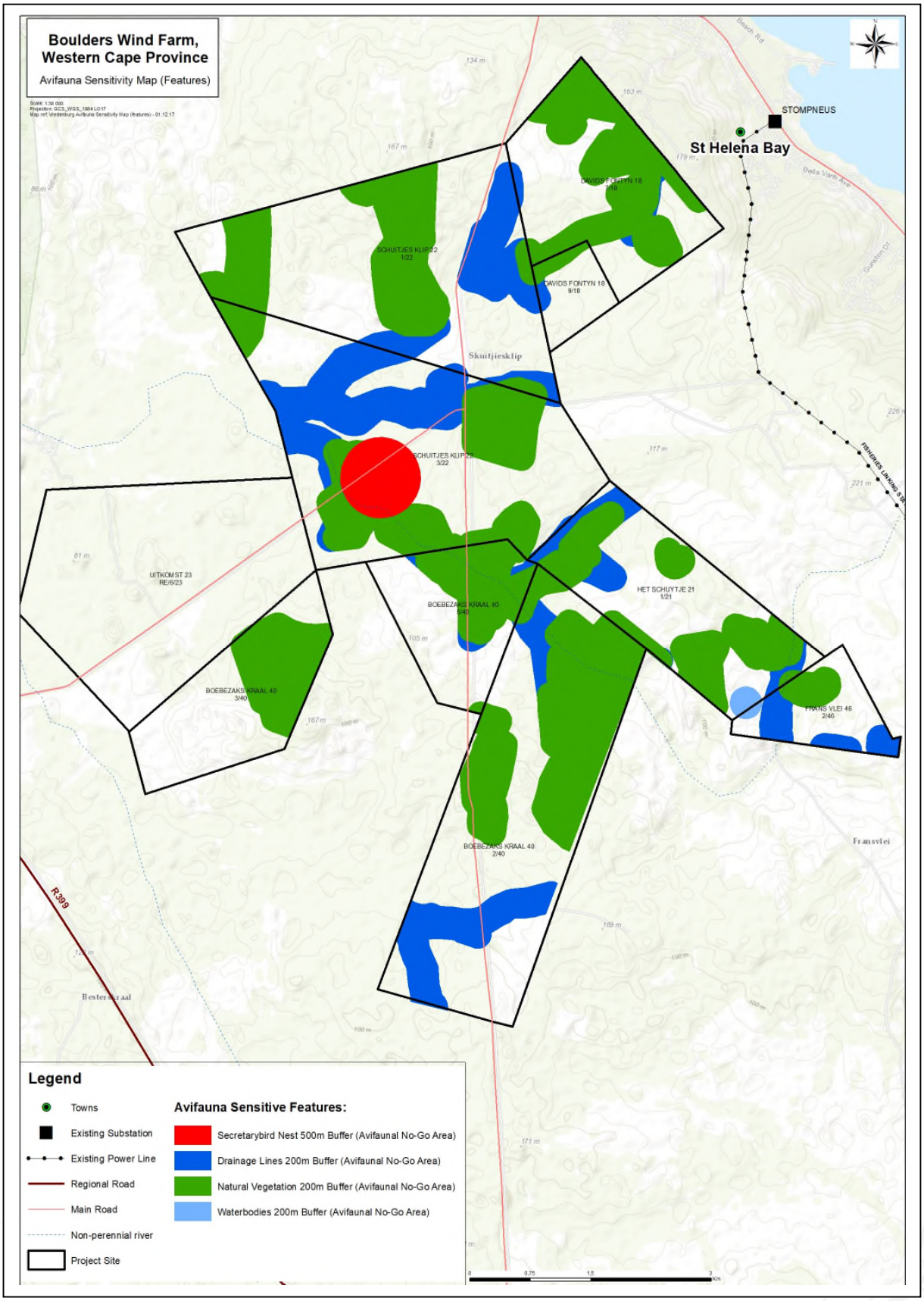


Figure 7.5: Sensitive avifaunal features located within the Boulders Wind Farm project site

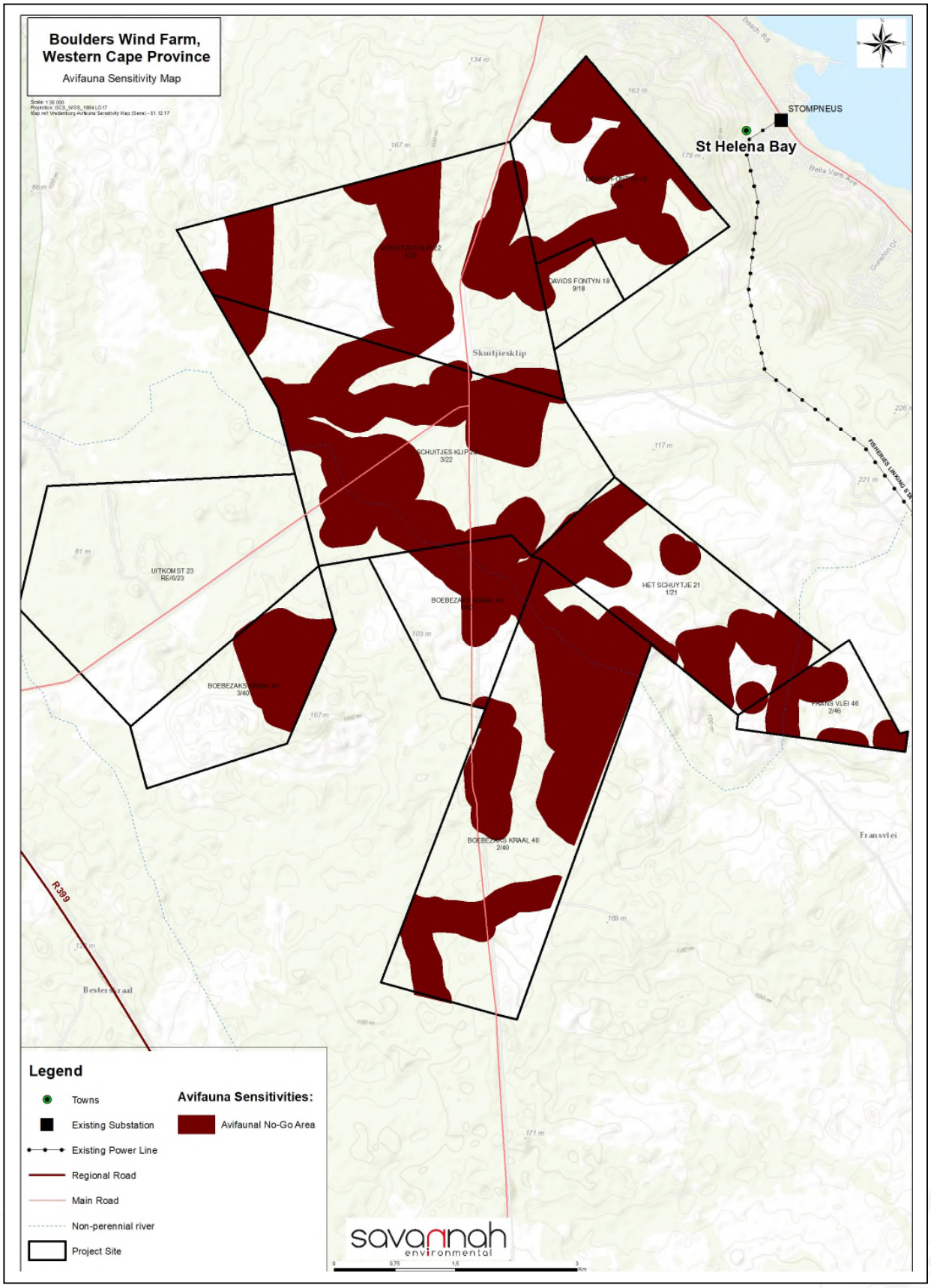


Figure 7.6: Sensitive avifauna areas to be avoided by the Boulders Wind Farm development footprint

7.3.4 Bats sensitive features and associated impacts

Within the Boulders Wind Farm project site sensitive bat features have been identified which need to be considered by the development footprint. The sensitive features are considered to be mainly no-go areas, with some moderate and high sensitivity features also present. The following sensitive features have been identified and mapped in **Figure 7.7**:

Medium bat sensitivity:

» Drainage lines and floodplains located within the centre of the project site has been identified as being of a moderate bat sensitivity. A 100m buffer has also been applied to the features and is also considered to be of a moderate sensitivity.
» Natural vegetation is dispersed throughout the project site and has been identified as being of a moderate bat sensitivity. A 200m buffer has also been applied to the features and is also considered to be of a moderate sensitivity.

High bat sensitivity:

» Significant waterbodies located mainly within the eastern portion of the project site has been identified as being of a high bat sensitivity. A 200m buffer has also been applied to the features and is also considered to be of a high sensitivity.

No-go:

» Confirmed bat roosts are located within the central and northern portions of the project site and has been identified as no-go areas to the development of the Boulders Wind Farm. A 500m buffer has also been applied to the roosts which is also considered to be no-go areas.
» Large trees are considered as important features for bats and have been identified within the south eastern portion of the project site. A 200m buffer has also been applied to the trees. Both the trees and the 200m buffer area are considered to the no-go areas for the development of the Boulders Wind Farm.
» Rocky outcrops, buildings and crevice roast sites have been identified within the project site and are dispersed throughout. A buffer of 200m has been applied to these features and the features, as well as the associated 200m buffer are considered to be no-go areas from a bats perspective.
» Ephemeral and permanent waterbodies and a vegetated watercourse has been in the central and southern portion of the project site. A 200m buffer has been applied to the features. Both the features and the associated buffer are considered to be no-go areas for the development of the Boulders Wind Farm.

It is noted that the exclusion areas associated with remnant natural vegetation and water bodies overlap with those areas also indicated as no-go areas in the ecology and freshwater sensitivity maps. Additional buffer areas associated with the movement of bat species have been included.

Figure 7.8 provides an illustration of the sensitive bat areas which need to be avoided by the development.

Considering the development (i.e. construction and operation) of the Boulders Wind Farm the following impacts were identified to be associated with the development. The extent of the impacts is expected to be local to national and the significance of the impacts will be from a low to high significance, subject to the avoidance of the identified no-go areas.

- Loss of habitat during construction
- Construction of new buildings
- Disturbance during roosting due to construction activities
- Destruction of roosts due to construction activities
- Operation of the wind turbines which may result in collisions and barotrauma

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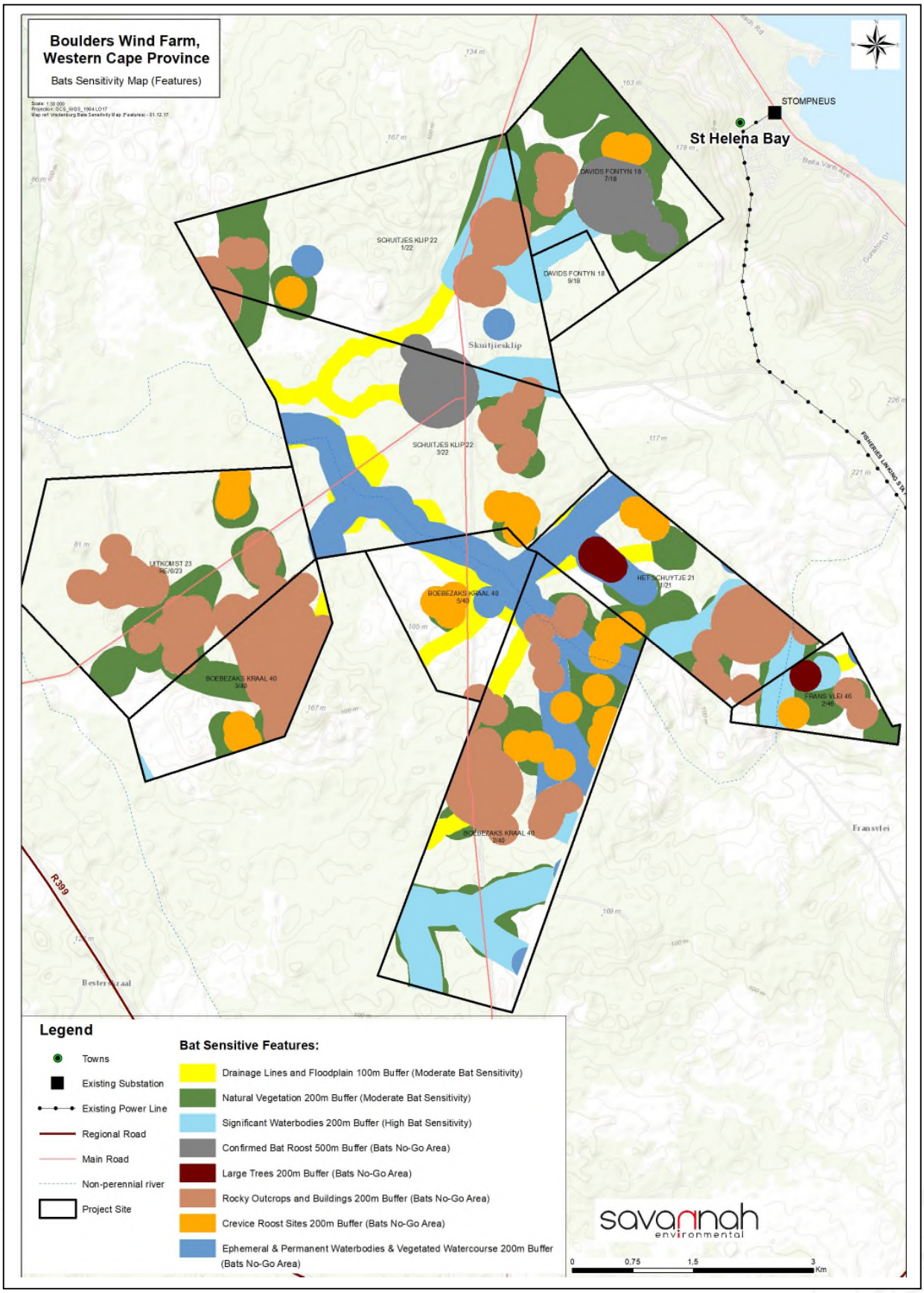

Figure 7.7: Sensitive bat features located within the Boulders Wind Farm project site

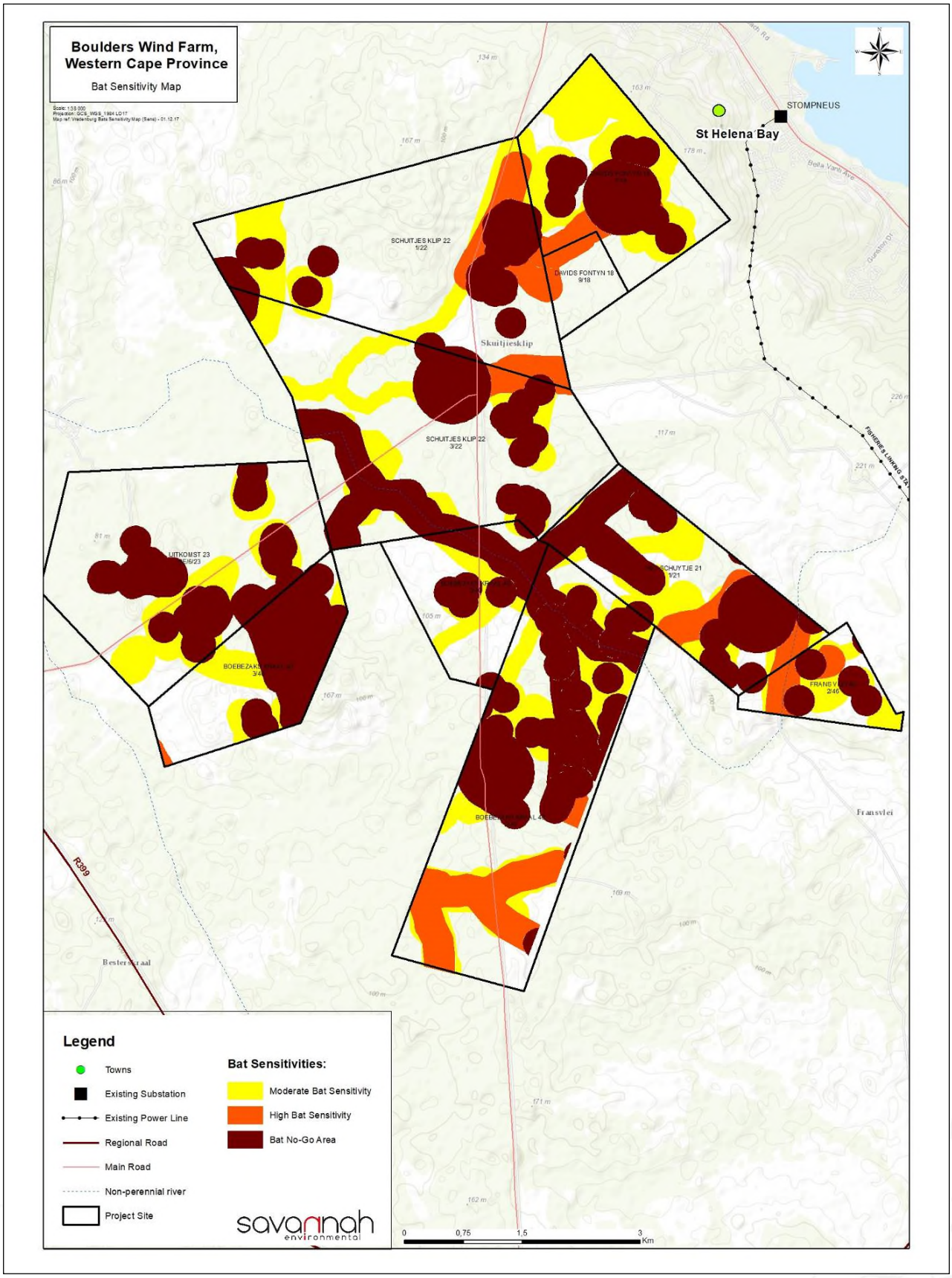

Figure 7.8: Sensitive bat areas to be avoided by the Boulders Wind Farm development footprint

7.3.5 Soils and agricultural potential sensitive features and associated impacts

The sensitive features associated with soils which need to be avoided include active drainage lines and areas with slopes of more than 15%, and these features are dispersed throughout the project site. The following sensitive soils features have been identified and mapped in **Figure 7.9:**

No-go areas:

» Active streambeds are considered to be unsuitable for development, and therefore no-go areas.
» Slopes of more than 15% are considered to be unsuitable for development, and therefore no-go areas.

It is noted that the exclusion areas associated with drainage lines overlap with those areas also indicated as no-go areas in the ecology and freshwater sensitivity maps.

Figure 7.10 provides an illustration of the sensitive soil areas which need to be avoided by the development.

Considering the development (i.e. construction and operation) of the Boulders Wind Farm the following impacts were identified to be associated with the development. The extent of the impacts is expected to be local and the significance of the impacts will be very low (i.e. negligible), subject to the avoidance of the identified no-go areas.

» An impact on the current potential farming activities - the development of the Boulders Wind Farm will create a permanent substitution of a very small portion of agricultural land.
» Increase in soil and wind erosion.
» Impact on the financial situation of the affected properties, including the profitability levels of the current farming activities, loss of farming income and possible gain in income for the farmers due to the development of the Boulders Wind Farm on their properties.

7.3.6 Heritage sensitive features, the cultural landscape and associated impacts (incl. archaeology, palaeontology)

Heritage sensitivity relates to archaeological resources, palaeontological resources, heritage resources, and the cultural landscape. The sensitivities are spatially defined – the archaeology is largely clustered around the granite koppies and old farmsteads, the palaeontology sensitive areas are confined to the Coastal Formation Terrains, and the cultural landscape sensitivity to visual receptors such as people and roads. As such, sensitive development layout and responsive turbine positioning can mitigate against negative impacts to heritage resources. The sensitivity map for the archaeology resources (refer to **Figure 7.11**) illustrates the likely exclusion zones (or no-go areas), which will be refined, specifically for archaeological and visual sensitivity, during the EIA phase.

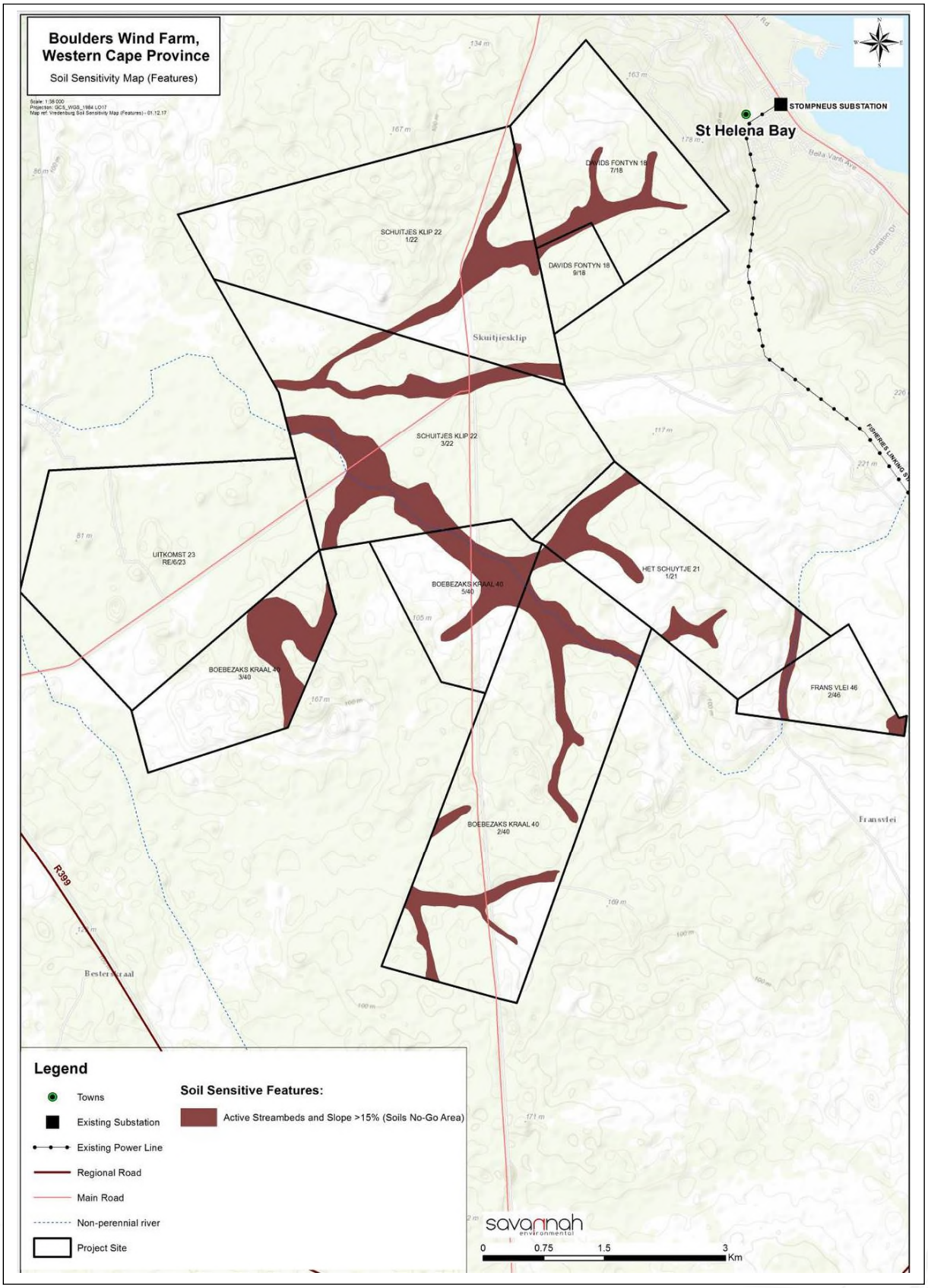

Figure 7.9: Sensitive soil features located within the Boulders Wind Farm project site

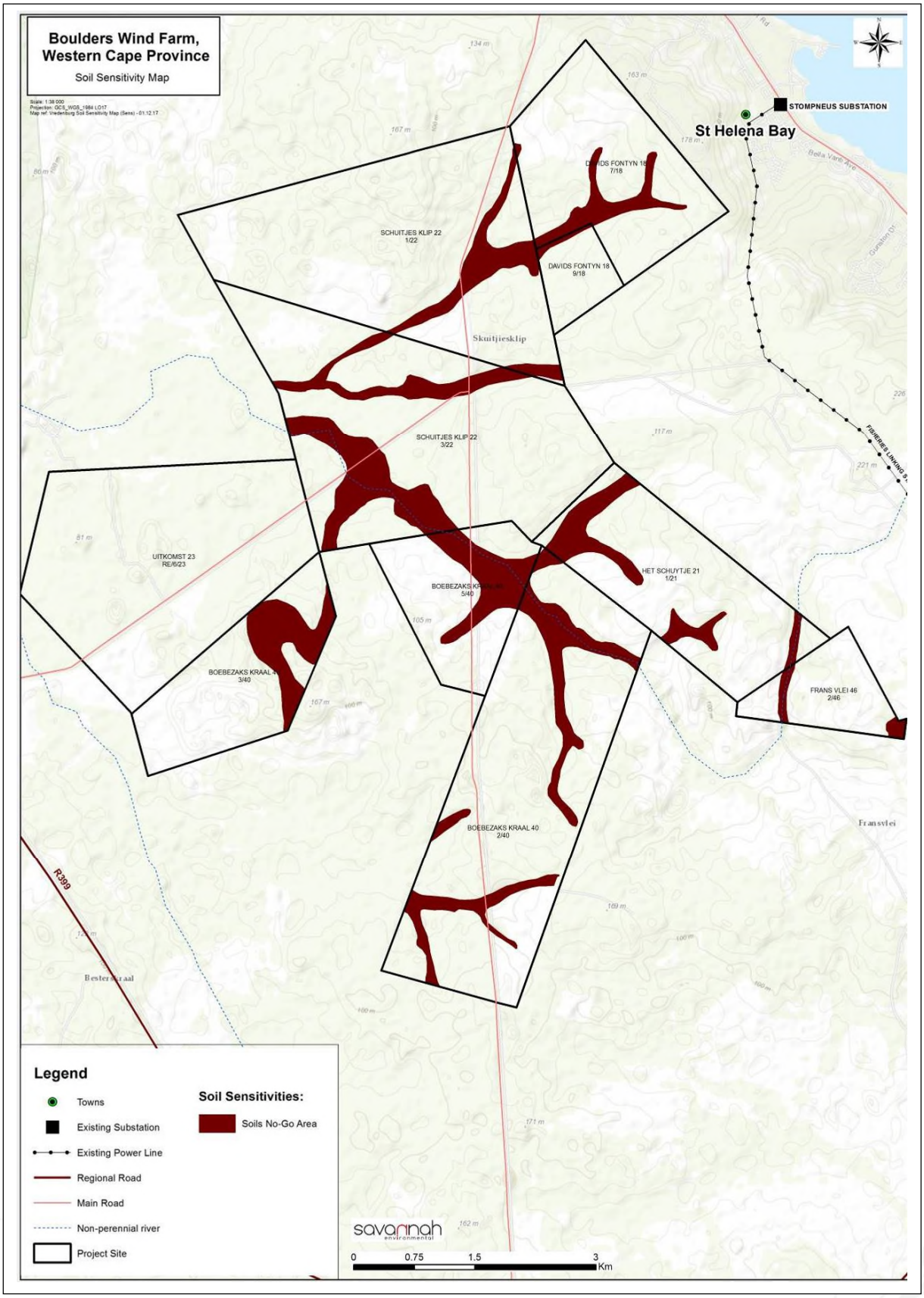

Figure 7.10: Sensitive soils areas to be avoided by the Boulders Wind Farm development footprint

Archaeology

Archaeological sites and features have been identified within the Boulders Wind Farm project site. The sensitive features are considered to be of a medium, high and no-go archaeological sensitivity. The following sensitive features have been identified and mapped in **Figure 7.11**:

Medium sensitivity:

» Streams and waterbodies have been identified as heritage indicators, which is located mainly within the central portion of the project site. These features are considered to be of a medium archaeological sensitivity and is considered as acceptable for the development, however not preferred.

High sensitivity:

» Houses and farm complexes dispersed throughout the project site are considered to be of high archaeological sensitivity due to the potential archaeological value of the features. A 500m buffer, also considered to be of a high archaeological sensitivity has been applied for the protection of the features and the buffer areas need to be avoided by any infrastructure.
» The Stompneus Bay Road, which is a gravel secondary road that traverses the project site is a north-south direction, is considered to be an important feature in terms of the archaeological landscape and the observations in terms of the archaeological features made on the route. A buffer of 250m has been applied on either side of the road for preservation purposes. The feature, as well as the applied 250m buffer is considered to be of a high archaeological sensitivity which needs to be avoided by the development.

No-go areas:

» Kasteelberg, located outside of, and directly adjacent to the project site to the west, is considered to be a significant archaeological resource which is considered to be a no-go area to development. A 2km buffer has been applied on the western side of the feature and a 1.5km buffer has been applied on the eastern side for the protection of the feature. The buffer areas included are also considered to be no-go areas to the development of the Boulders Wind Farm.
» Known archaeological sites are located and dispersed throughout the Boulders Wind Farm project site. These sites include, among others, a few stone cairns which have the potential to be graves as well as graveyards. These areas need to be avoided.

Figure 7.12 provides an illustration of the sensitive archaeological areas which need to be considered and avoided by the development

Considering the development (i.e. construction and operation) of the Boulders Wind Farm the following impacts were identified to be associated with the development. The extent of the impacts is expected to be local and the significance of the impacts will be low subject to the avoidance of the sensitive archaeological sites and the associated buffer areas.

» Disturbance and destruction of archaeological sites due to construction activities

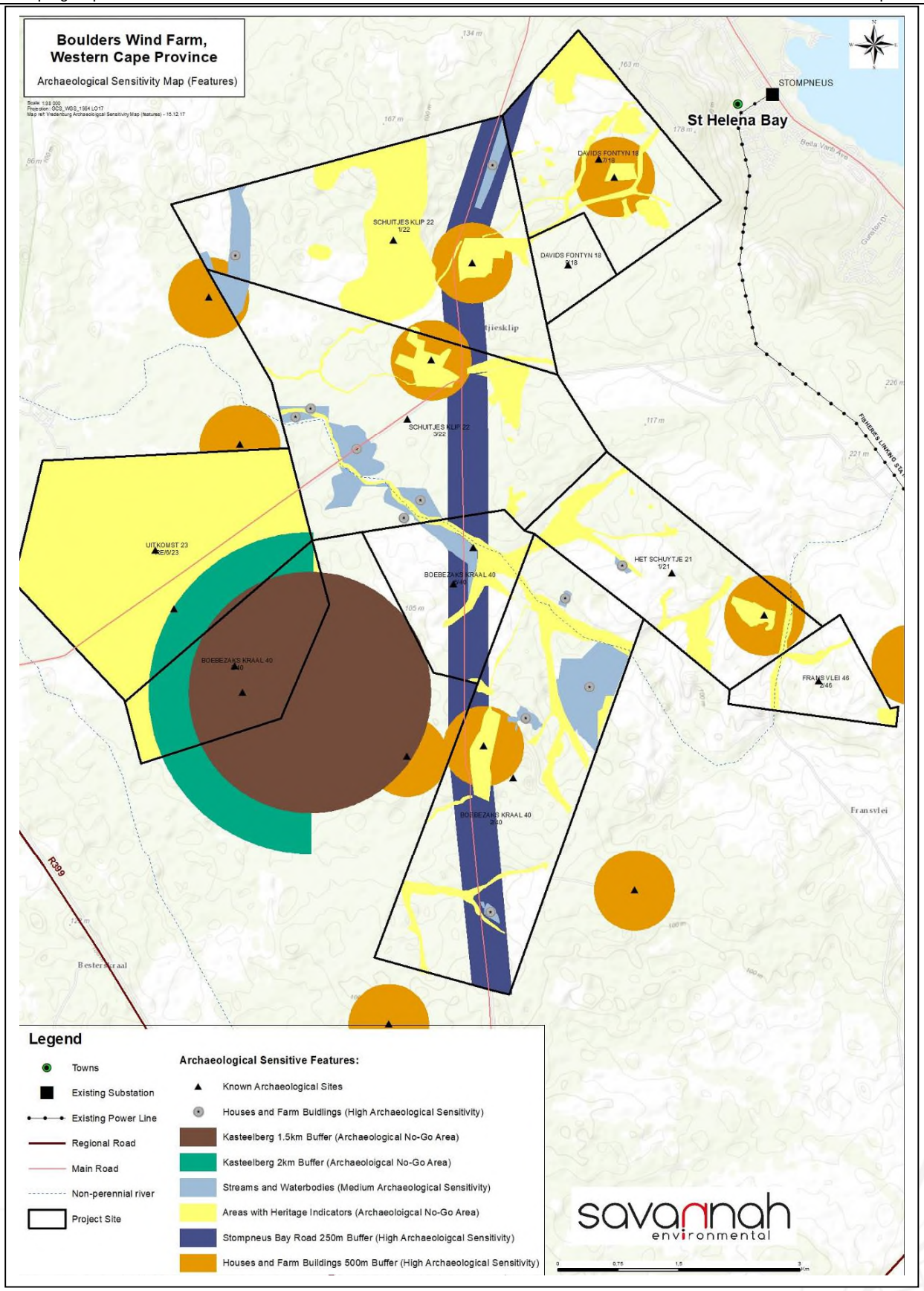

Figure 7.11: Sensitive archaeological features located within and around the Boulders Wind Farm project site

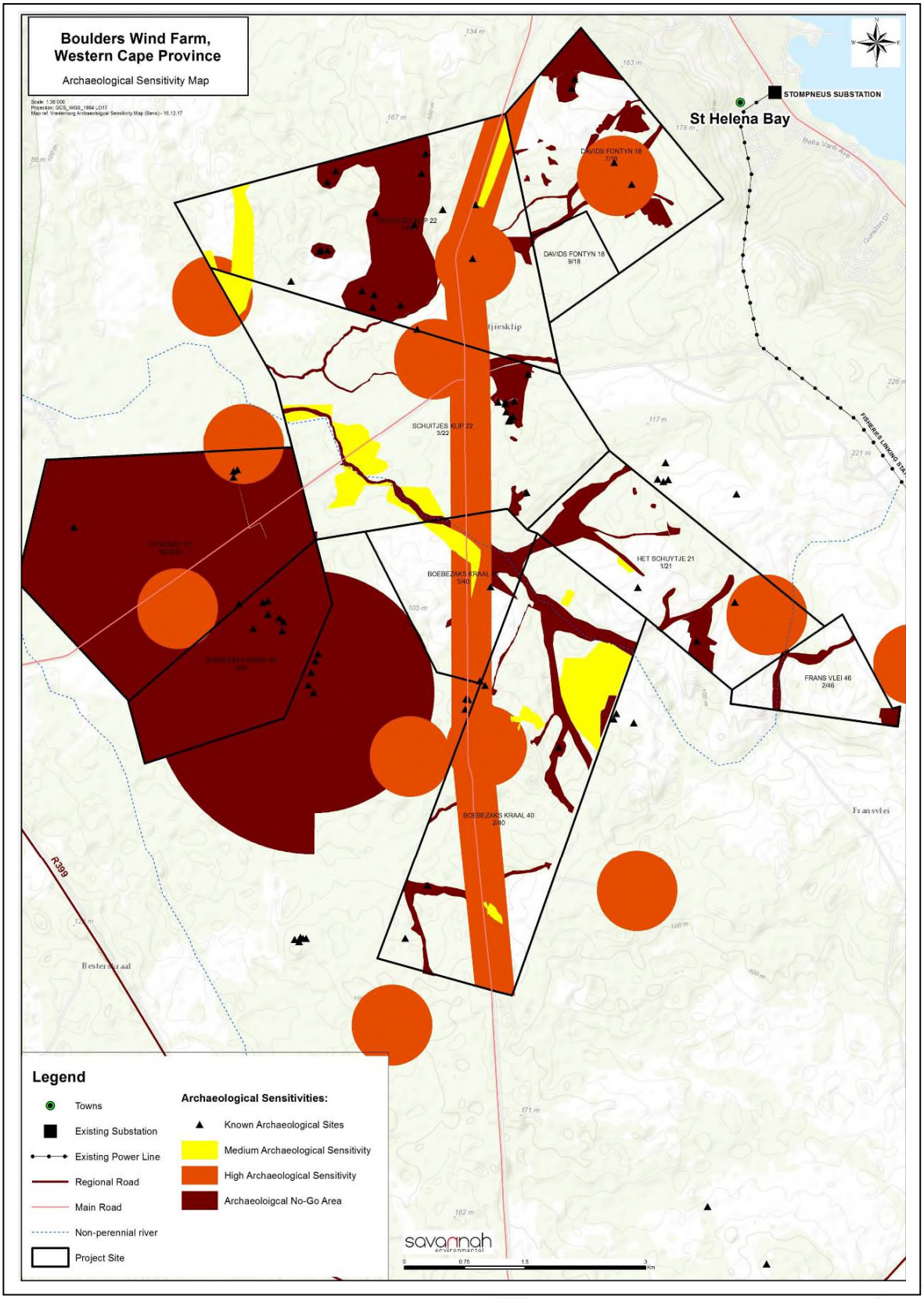

Figure 7.12: Sensitive archaeological areas to be considered by the Boulders Wind Farm development footprint

Palaeontology

Sensitive palaeontological resources have been identified within the Boulders Wind Farm project site which need to be considered by the development footprint. The sensitive features are considered to be of high and low palaeontological sensitivity due to the varying stratigraphy (and palaeontological terrains) present. The following sensitive features have been identified and mapped in **Figure 7.13**:

Low sensitivity:

» The Grantic Hills Terrain, present within majority of the project site and located in the eastern portion, has a very low likelihood to contain fossils and there is a small probability that fossils will be uncovered. The Grantic Hills Terrain has been identified as being of a low palaeontological sensitivity.

High sensitivity:

» Within the Coastal Formations Terrain, located within the north-western portion of the project site, the likelihood of fossil finds is probable. The Coastal Formations Terrain is therefore considered to be of a high palaeontological sensitivity. Nevertheless, it is considered that excavations within this high palaeontological sensitivity area will be acceptable with the implementation of appropriate mitigation measures.

Figure 7.14 provides an illustration of the sensitive palaeontological areas which need to be considered by the development.

Considering the development (i.e. construction and operation) of the Boulders Wind Farm the following impacts were identified to be associated with the development. The extent of the impacts is expected to be regional to national and the significance of the impacts will be low in the Grantic Hills Terrains; and the impacts within the Coastal Formations Terrain will be high (the area is not considered a no-go to development and excavations are still acceptable with the implementation of appropriate mitigation measures).

» Excavation into fossiliferous deposits.

Due to the fact that excavations are acceptable within both of the terrains, i.e. Grantic Hills Terrain and Coastal Formations Terrain, with the implementation of appropriate mitigation measures no further study is required from a palaeontological perspective, as recommended by the specialist.

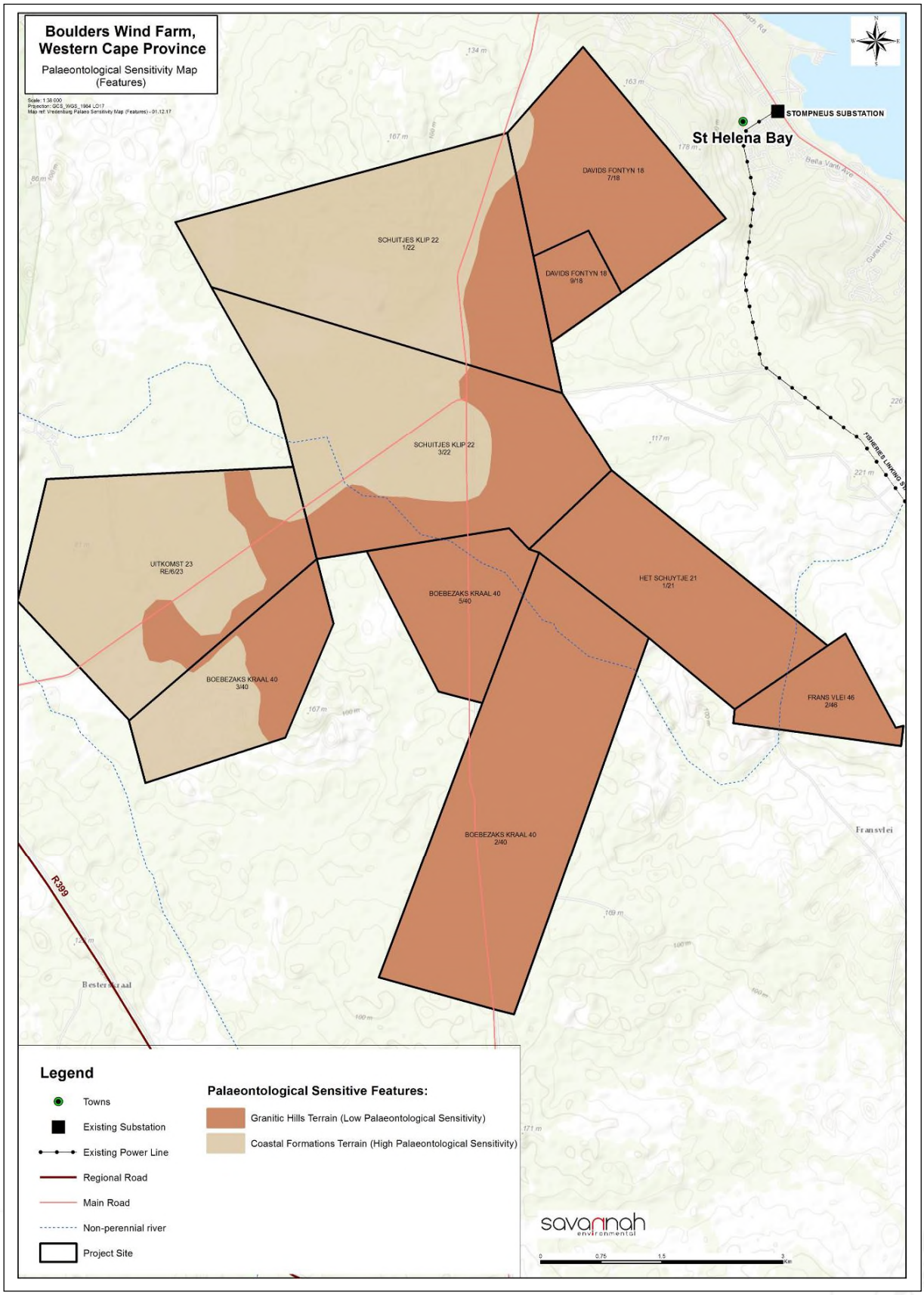

Figure 7.13: Sensitive palaeontological features located within the Boulders Wind Farm project site

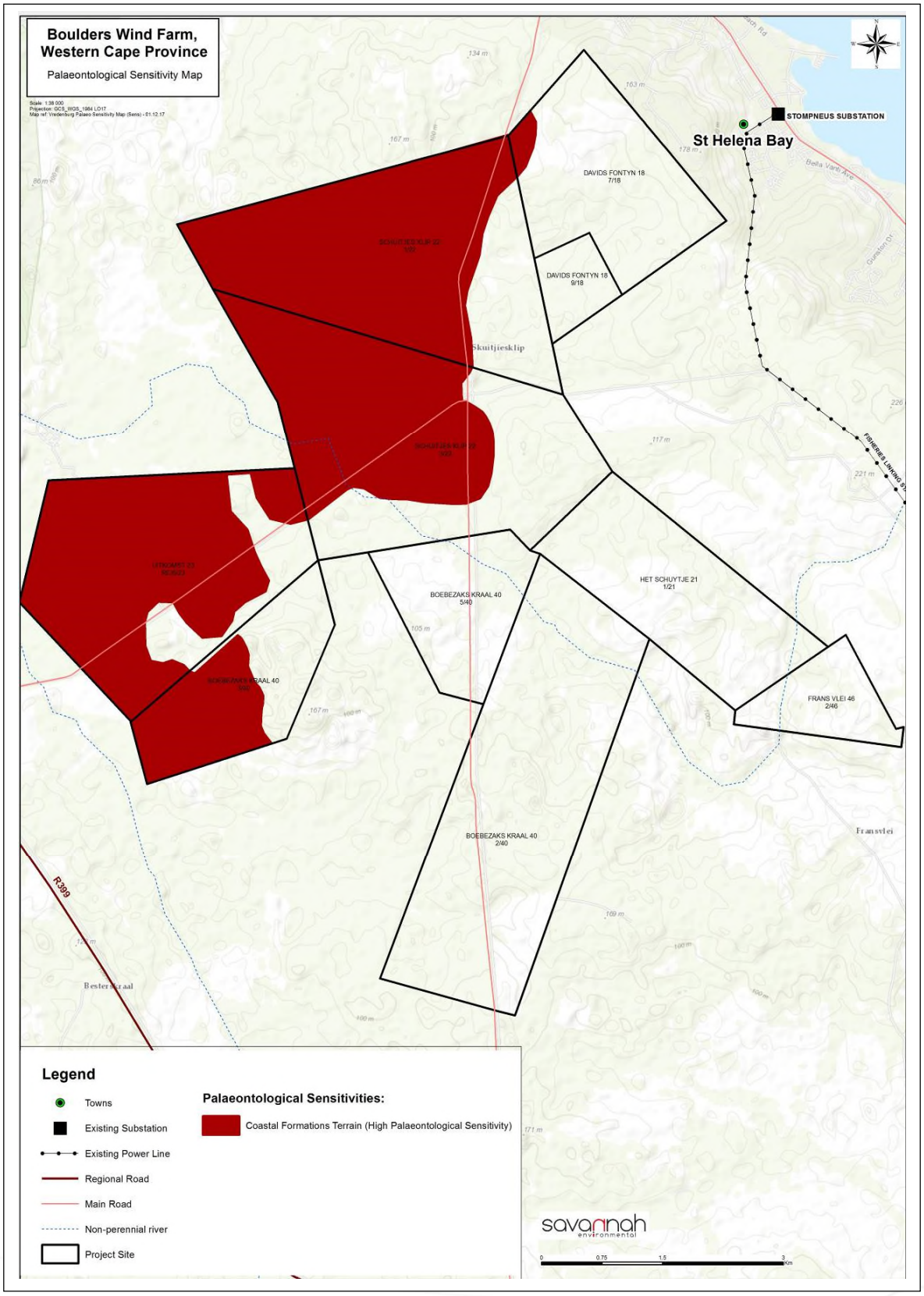

Figure 7.14: Sensitive palaeontological areas to be considered by the Boulders Wind Farm development footprint

7.3.7 Social impacts

Within the Boulders Wind Farm project site and the surrounding areas sensitive social aspects have been identified which need to be considered by the development. These aspects are related to the social and socio-economic impact that the development of a wind farm will have. No sensitive social features within the development site have been identified.

Considering the development (i.e. construction and operation) of the Boulders Wind Farm the following impacts were identified to be associated with the development. The extent of the impacts is expected to be local to national and the significance of the impacts varies from low to high. Both positive and negative impacts were also identified to be associated with the construction and operation of the Boulders Wind Farm.

Positive Impacts:

» Creation of employment (temporary and long-term) and business opportunities, and the opportunity for skills development and on-site training;
» The establishment of renewable energy infrastructure and the generation of clean, renewable energy;
» Household income will lead to the improved standard of living for households directly or indirectly benefitting from employment opportunities;
» Increase in government revenue stream due to payroll taxes and income taxes;
» Benefits associated with the establishment of a Community Trust; and
» Improved energy security and opportunities for local economy development due to increased supply of electricity.

Negative Impacts:

» Impacts associated with the presence of construction workers on site and in the area;
» Influx of job seekers to the area;
» Increased safety risk to farmers, risk of stock theft and damage to farm infrastructure associated with presence of construction workers on the site;
» Increased security risks;
» Impact of heavy vehicles, including damage to roads, safety and dust;
» Impact on farming activities;
» The visual impacts and associated impact on sense of place;
» Impact on property values due to perceptions within the area; and
» Potential impact on tourism due to perceptions within the area.

7.3.8 Noise sensitive features and associated impacts

Within the Boulders Wind Farm project site and the surrounding areas sensitive features have been identified which need to be considered by the development footprint. The identified noise sensitive developments (NSDs) are considered sensitive features and are no-go areas. The NSDs include a recommended buffer area for the protection of the features against noise impacts expected to be related to the operating wind farm. The following sensitive features have been identified and mapped in **Figure 7.15**:

No-go areas:

» Noise sensitive developments (NSDs) are dispersed throughout the project site and within the areas surrounding the project site. The features area considered to be no-go areas to the development of the Boulders Wind Farm.
» A 500m buffer has been allocated to each NSD to ensure that the feature will not be significantly impacted by the development. No wind turbines may be located within the 500m buffer area.

Figure 7.16 provides an illustration of the sensitive noise areas which need to be avoided by the development.

Considering the development (i.e. construction and operation) of the Boulders Wind Farm, the following impacts were identified to be associated with the development. The extent of the impacts is expected to be local (i.e. up to 2km from the development footprint) and the significance of the impacts will be medium to low should the 500m buffer areas be avoided and considered.

» Increase in the noise level at the closest receptors
» Noise levels exceeding the SANS 10103 rating level due to construction activities
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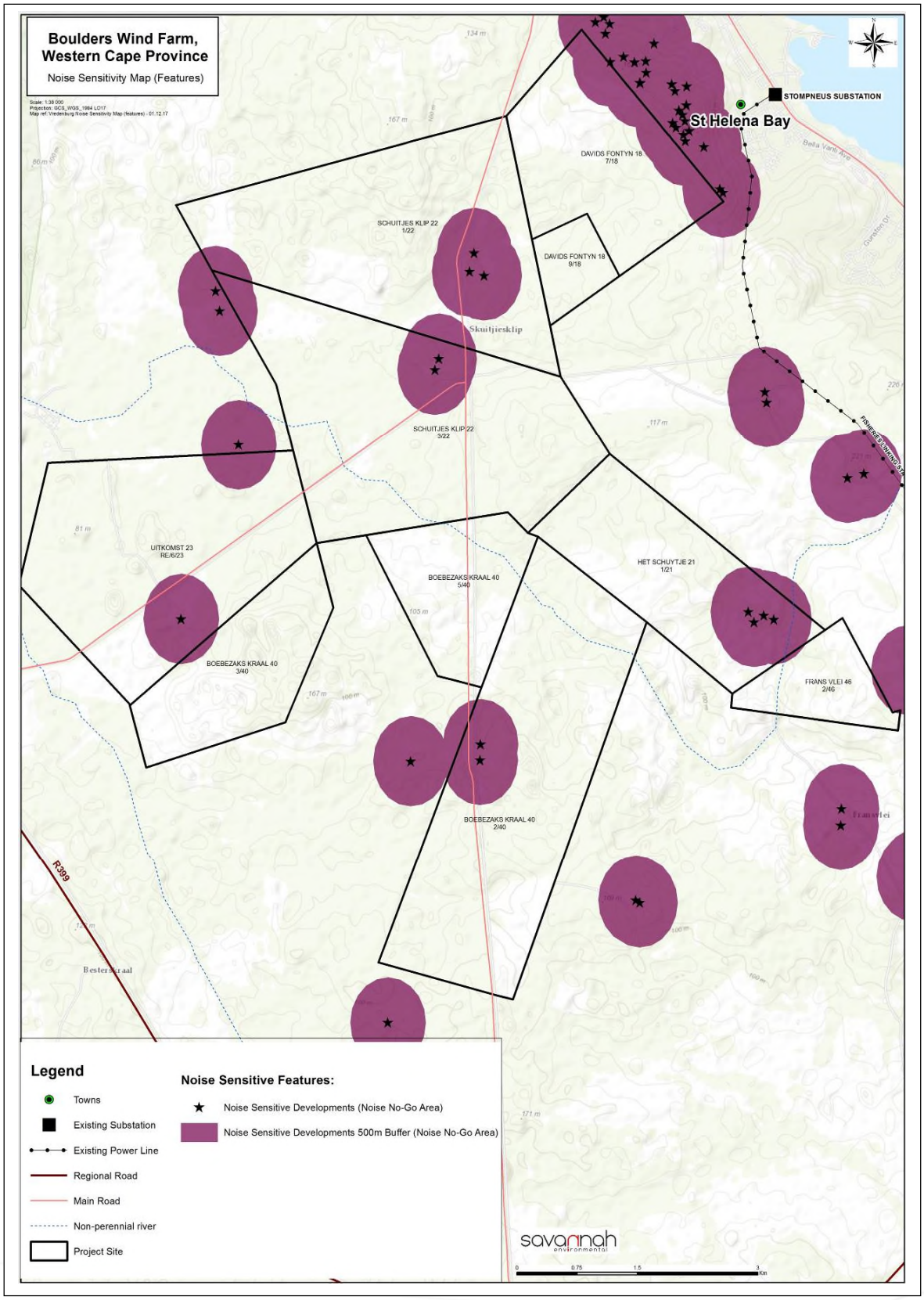

Figure 7.15: Sensitive noise developments located within the Boulders Wind Farm project site and surrounding area

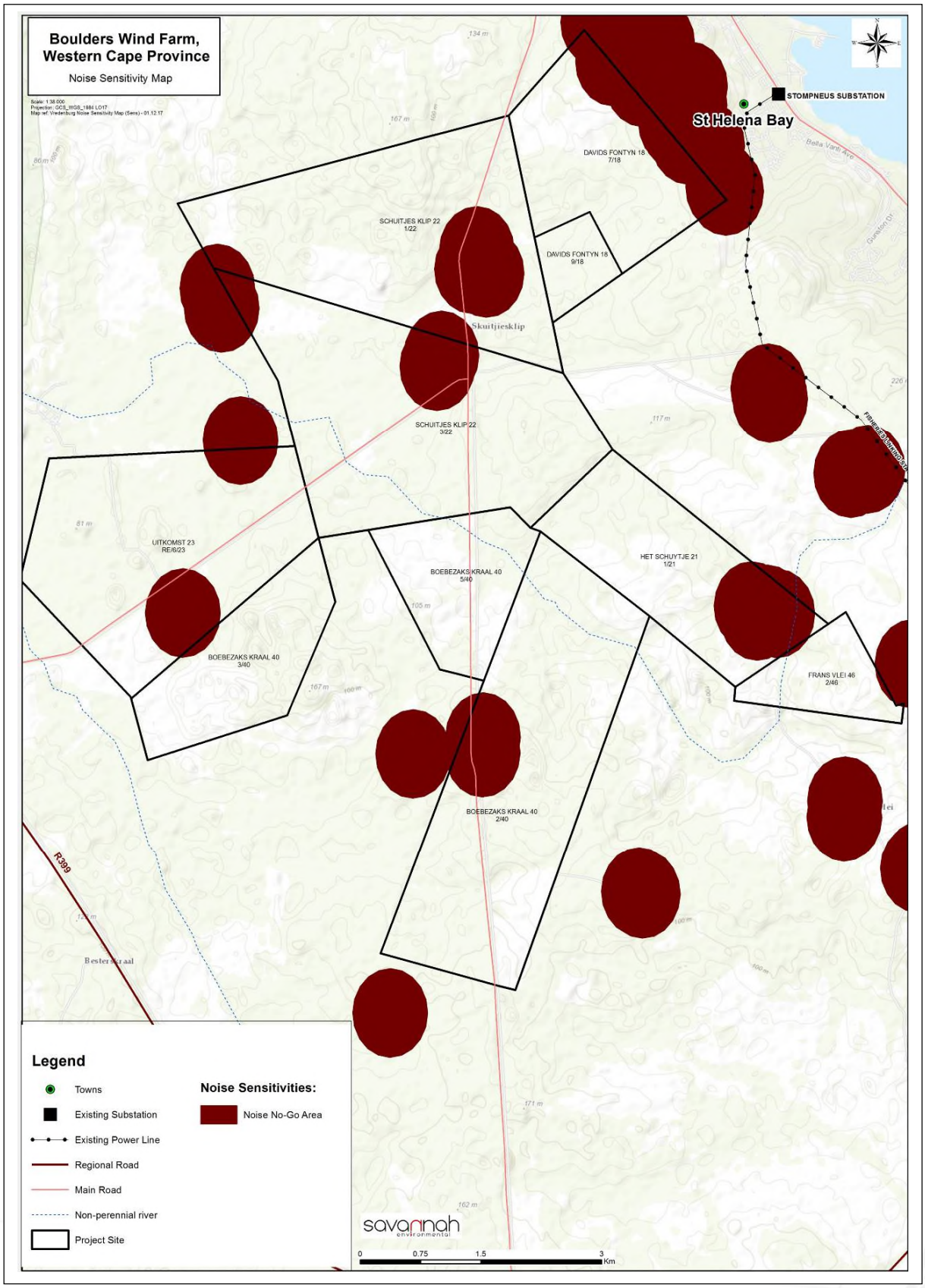

Figure 7.16: Sensitive noise areas to be avoided by the Boulders Wind Farm development footprint

7.3.9 Visual impacts

With the construction and operation of the Boulders Wind Farm visual impacts have been identified on the project site and the surrounding areas. The visual impacts will mainly occur once the wind farm is operational. Due to the nature of a wind farm, the extent of the impact is expected to be local (with the highest probability within 0km to 5km from the development footprint) and the significance of the impact can only be identified and confirmed once the layout of the facility development footprint is available. The following impacts have been identified:

» Potential visual impacts associated with the construction phase and the construction activities associated with it.
» The visibility of the facility from, and potential visual impact on observers travelling along the arterial (R27, R45 and R399) and secondary (local) roads within the project site and surrounding areas.
» The visibility of the facility from, and potential visual impact on built-up centres and populated places (i.e. the towns of Vredenburg, Paternoster, Britannia Bay, Stompneus Bay, St Helena Bay, Laingville and Velddrif) surrounding the project site.
» The visibility of the facility from, and potential visual impact on farmsteads and homesteads (rural residences, including Britannica Heights) within the project site and the surrounding areas.
» The potential visual impact of the facility on the visual character and sense of place of the region, with specific reference to the pastoral landscape and small coastal towns (tourist attractions).
» The potential visual impact of ancillary infrastructure (i.e. the substation, internal access roads etc.) on observers in close proximity to the project site.
» The potential visual impact of lighting of the facility in terms of light glare, light trespass and sky glow.
» The potential visual impact of shadow flicker.

7.3.10 Overall Sensitivity Consideration

The majority of potential impacts identified to be associated with the construction of the wind farm and associated infrastructure are anticipated to be localised and restricted to the project site itself (apart from social and visual impacts), while operation phase impacts range from local to regional to national (being the positive impact of contribution of clean energy as part of the energy mix in South Africa).

Identified impacts are anticipated to be capable of satisfactory mitigation (largely avoidance through the facility layout) to reduce impacts to acceptable levels. Environmental sensitivities have been identified, however no environmental fatal flaws are associated with the project at this stage in the process. A consolidated sensitivity map for the development site illustrates the identified sensitivities which are required to be avoided by the developer during the design of the Boulders Wind Farm development footprint (refer to **Figure 7.17**). **Figure 7.18** provides a consolidated map of the high environmental sensitivity areas located within the project site. The sensitivity maps are a rough scale estimate of sensitivity on the site identified at a desk-top level. The development area will be subject to survey and ground-truthing during the EIA phase of the project. The overall sensitivity map will be further refined in the EIA phase on the basis of specialist studies in order to inform the final design of the facility. In order to assess potential impacts within sensitive areas, the preliminary layout for the wind farm will be considered in the EIA phase.

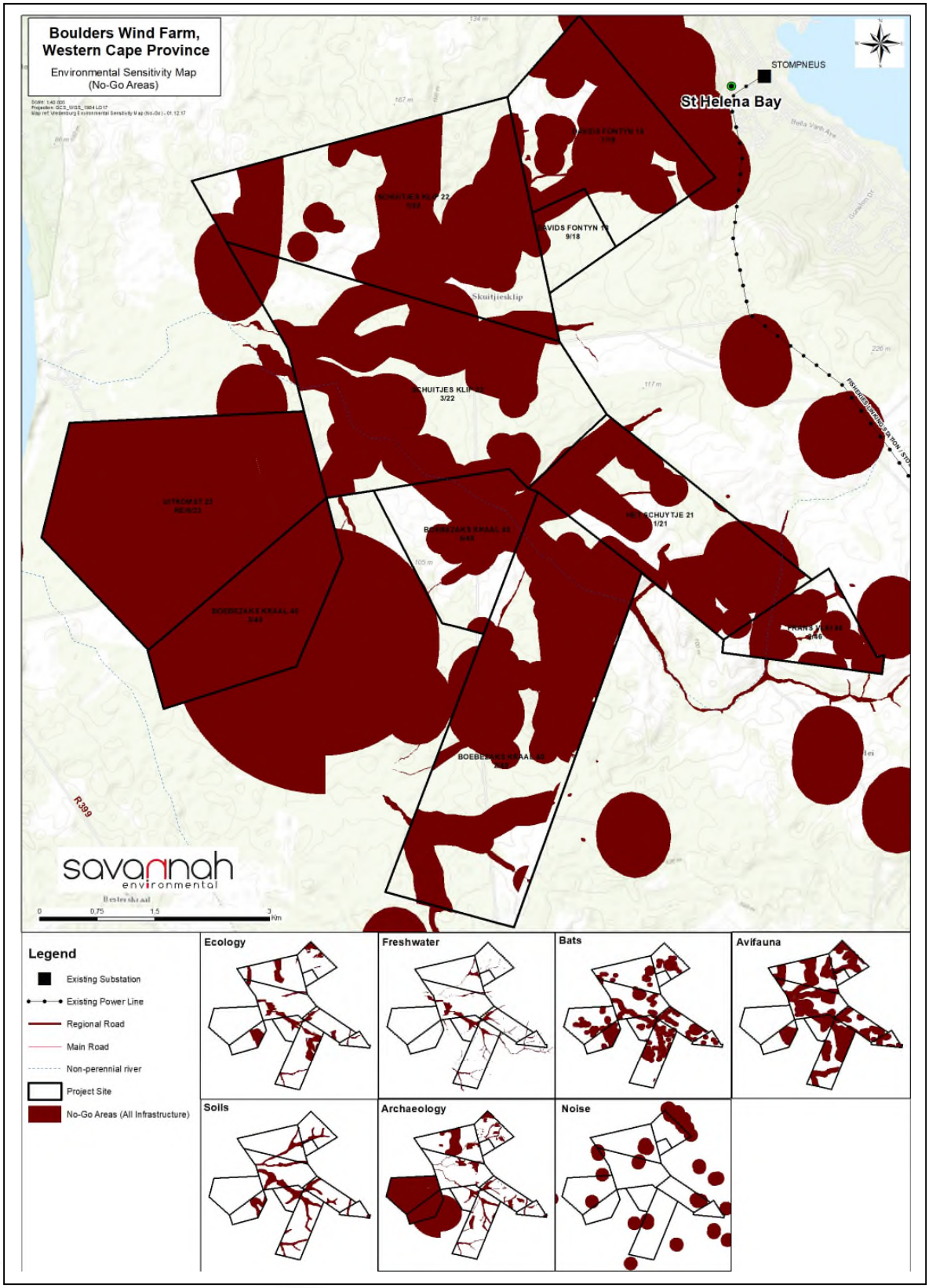

Figure 7.17: Environmental Sensitivity Map for the proposed Boulders Wind Farm which indicates the no-go areas located within the project site. The contributing sensitivities are detailed in the inset figures (refer to **Appendix Q** for A3 map).

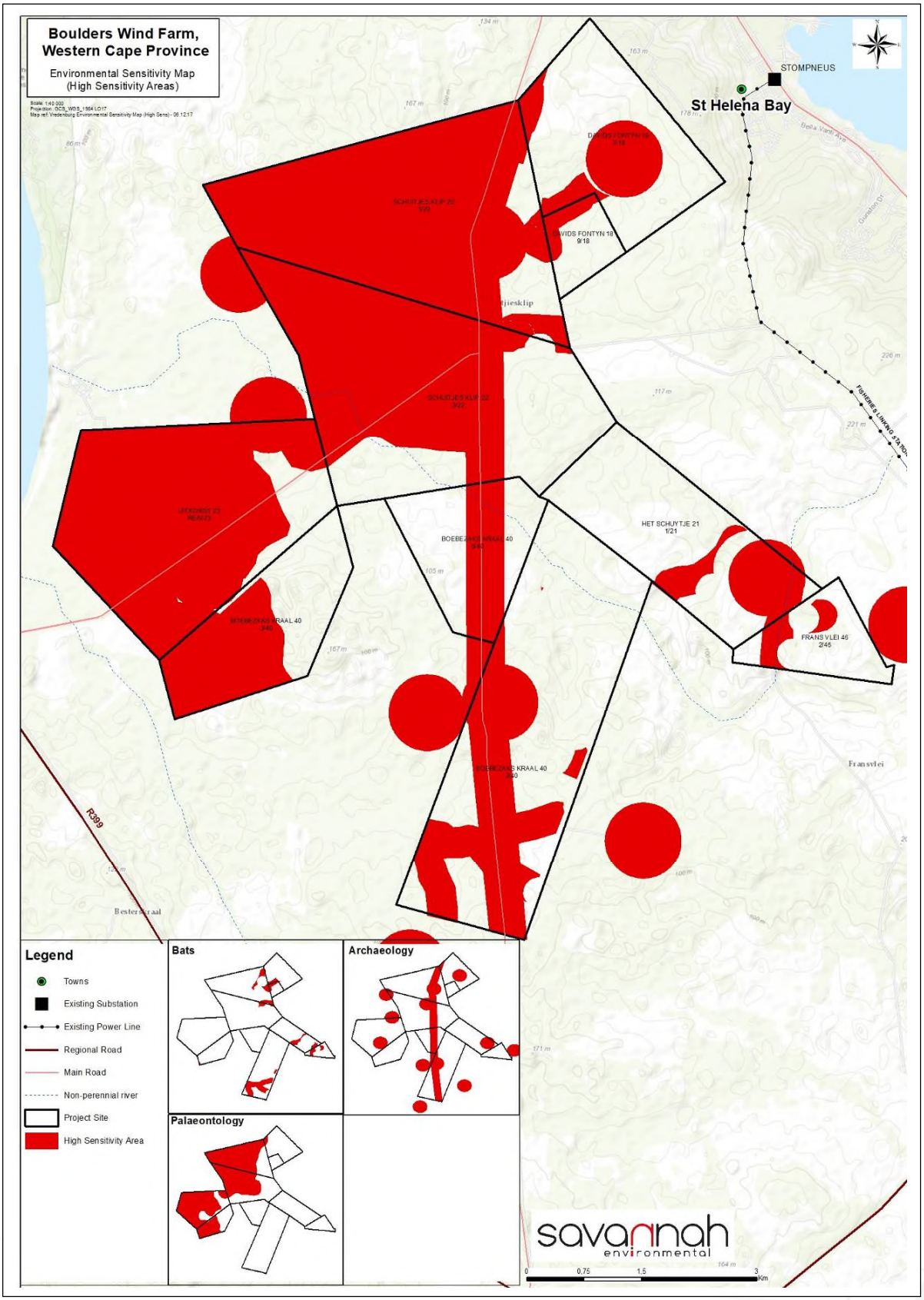

Figure 7.18: Environmental Sensitivity Map for the proposed Boulders Wind Farm which indicates the areas of high sensitivity located within the project site. The contributing sensitivities are detailed in the inset figures (refer to **Appendix Q** for A3 map).

7.4 Identification of the preferred development area

Following the sensitivity analysis of the project site throughout the Scoping Phase a preferred development area has been identified which is considered as the area that has the most potential for the development of the Boulders Wind Farm. The identification of this preferred area is based on the application of the mitigation hierarchy[26], which first aims to avoid the sensitive features or impact through project design (i.e. Step 1 of the mitigation hierarchy); and secondly aims to minimise the duration, intensity and/or extent of the impact (i.e. Step 2 of the mitigation hierarchy) by mitigating the impact to acceptable levels.

In the Scoping Phase avoidance of the sensitive environmental features as well as due consideration of social characteristics, and the issues raised by interested and affected parties are considered key in ensuring that the development of the Boulders Wind Farm is in line with and responds to the findings of the scoping report. Therefore, the environmental sensitivity associated with the identified features and the social issues raised have been considered and those properties (or portions of properties) within the project site which are considered most acceptable to the development of the wind farm are identified as the preferred development area.

Properties (or portions of properties) which are dominated by constraining factors to development are highlighted in **Table 7.1** below. These properties are considered to be less favourable for inclusion in the development footprint area as a result of overlapping no-go areas or environmental sensitives.

Table 7.1: Summary of the expansive no-go features and/or social considerations which are spatially dominant within the project site and which limit the development potential on the properties within the project site.

Specialist Field	Sensitive Environmental Feature / Social Consideration	Affected Properties/Areas considered to be constrained
Visual	Visual intrusion and change in the land-use character experienced by residents. Britannica Heights residents have raised specific concerns regarding the possible infringement on their line of sight view towards Paternoster as part of the public participation process (**Appendix C**). Line of sight impacts have not contributed or been included in the overall sensitivity map (refer **Figure 7.17**). The northern properties which are closest to the coastal areas and further from the operational West Coast One Wind Energy Facility have the greatest potential for altered current views and vistas.	» Davids Fontyn 7/18 » Davids Fontyn 9/18 » Boebezaks Kraal 3/40 » Uitkomst RE/6/23 » Schuitjes Klip 1/22 » The northern portion of Schuitjes Klip 3/22
Heritage	Entire properties considered as areas that include heritage indicators which are identified as no-go areas from an archaeological	» Boebezaks Kraal 3/40 » Uitkomst RE/6/23

[26] Steps 1 and 2 of the mitigation hierarchy:
1. Avoidance: the first step of the mitigation hierarchy comprises measures taken to avoid creating impacts from the outset, such as careful spatial or temporal placement of infrastructure or disturbance. For example, placement of roads outside of rare habitats or key species' breeding grounds.
2. Minimisation: measures taken to reduce the duration, intensity and/or extent of impacts that cannot be completely avoided. Effective minimisation can eliminate some negative impacts. Examples include such measures as reducing noise and pollution, designing powerlines to reduce the likelihood of bird electrocutions, or building wildlife crossings on roads.

	perspective. The mitigation includes the avoidance of areas, including buffers, such as a 2km buffer on the western side and a 1.5km buffer on the eastern side of Kasteelberg (which is not located on the project site).	
Palaeontology	Location of the Coastal Formations Terrain of high palaeontological sensitivity. This formation is considered fossil-rich. The stratigraphy consistent with this terrain impact occupies the vast majority of the northern and western properties of the project area.	» Boebezaks Kraal 3/40 » Uitkomst RE/6/23 » Schuitjes Klip 1/22 » North-western portion of Schuitjes Klip 3/22
Noise	High concentration/density of sensitive noise developments within the north-eastern portion of the project site. The impact can only be mitigated through avoidance in proximity to Britannica heights.	» Davids Fontyn 7/18 » Davids Fontyn 9/18 » Boebezaks Kraal 3/40 » Uitkomst RE/6/23 » Schuitjes Klip 1/22 » Schuitjes Klip 3/22
Avifauna and bats	Drainage lines and remnants of natural (intact) vegetation are all afforded 200m buffers for bird and bat movements. Features of specific concern which are to be avoided include: » A Secretarybird nest and the associated 500m buffer area located in the north western portion of Scuitjes Klip 3/22. » Confirmed bat roosts and the associated 500m buffer area located within the northern and central portions of the project site.	» Davids Fontyn 7/18 » Northern and western portion of Schuitjes Klip 3/22
Land-use conflict	Prospecting right in the project site for the proposed Duyker Eiland Phosphate Project which is a proposed phosphate mine and fertilizer operation. No mining right has been granted to date, however there is a potential for future land-use conflict on the property considering the proposed Boulders Wind Farm project site affected properties.	» Schuitjes Klip 1/22

Where the expansive no-go features and/or social considerations which are spatially dominant within the project site, and which limit the development potential on specific properties within the project site, overlap - these areas/properties are considered to present a higher risk to development, and are less favourable for inclusion in the development area.

Based on the specialist findings and sensitivities identified through the scoping phase, it is recommended that limited wind farm infrastructure should be placed on the following farms. These properties are considered to be less favourable for inclusion in the development footprint area as a result of overlapping no-go areas or environmental sensitives:

» Davids Fontyn 7/18
» Davids Fontyn 9/18
» Boebezaks Kraal 3/40
» Uitkomst RE/6/23
» Schuitjes Klip 1/22
» The northern and western portion of Schuitjes Klip 3/22

Therefore, the environmental sensitivity associated with identified features and the social issues raised have been considered and those properties (or portions of properties) within the project site which are considered most acceptable to the development of the wind farm are identified as the preferred development area. These properties include (refer to **Figure 7.19**):

» The southern and eastern portion of Schuitjes Klip 3/22
» Boebezaks Kraal 2/40
» Boebezaks Kraal 5/40
» Het Schuytje 1/21
» Frans Vlei 2/46

It is within this preferred development area that the turbine layout will be confined. The preliminary facility layout will be assessed in the EIA Phase.

7.5 Use of Existing Infrastructure

Within the preferred development area, existing access roads would be utilised during the construction and operation phases of the Boulders Wind Farm as far as possible. The existing road network provides good access to the farm portions, and would reduce the impact of the facility as the road network is the most extensive component of the wind farm and its associated infrastructure. In order to ensure that the existing roads are viable and sufficient for use during the life cycle of the wind farm, upgrades of these existing roads would be undertaken as required. The upgrade of existing access roads is to be considered in further detail in the EIA phase. This would include the upgrade of access roads which currently traverse areas which have now been flagged as no-go or high sensitivity areas.

There is consensus among the majority of the specialist team that it is preferred for the project to make use of existing road routes as these areas have already been impacted by development. These routes will be mapped in detail in the design of the facility layout. In these instances, the need to avoid no-go areas will be forfeited.

7.6 Recommendations

At this stage in the process, there are no identified environmental fatal flaws preventing the proposed development from being evaluated further through the EIA phase assessment studies.

With an understanding of which areas within the development area are considered sensitive to the development of the proposed Boulders Wind Farm, Vredenburg Windfarm (Pty) Ltd can prepare the detailed infrastructure layout footprint for consideration within the EIA Phase. It is, however, recommended that with the design of the development footprint (i.e. facility layout) the no-go and high sensitivity areas be avoided in order to ensure a reduced environmental impact.

During the EIA phase detailed environmental assessments will be conducted in line with the Plan of Study contained in Chapter 8 of this Scoping report. These studies will include recommendations for the implementation of avoidance strategies (if required), mitigation and management measures to ensure that the final assessed layout and development footprint retains an acceptable environmental impact and that impacts on the environment are minimised as far as possible.

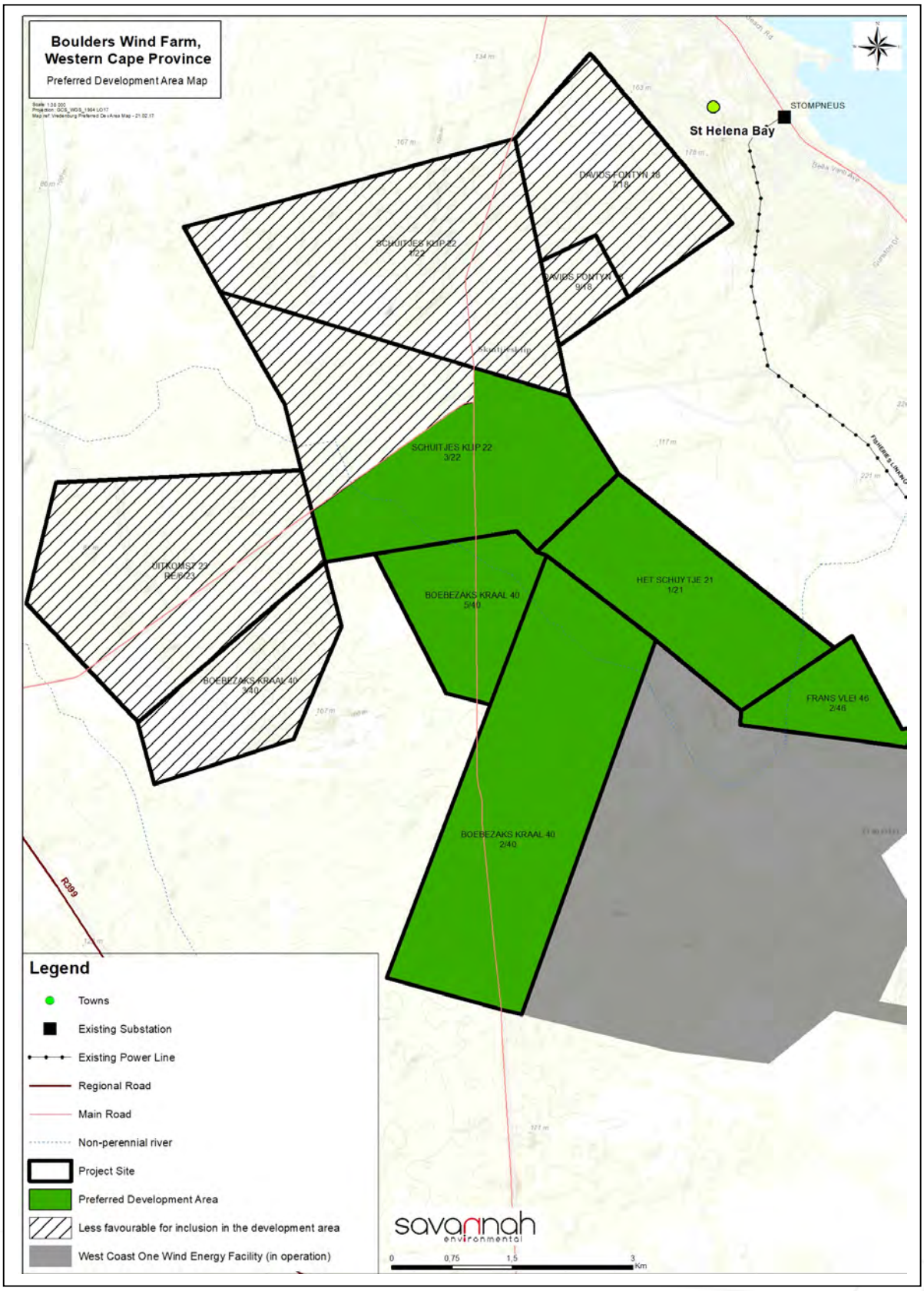

Figure 7.19: The Boulders Wind Farm preferred development area to be considered and assessed further in the EIA Phase (refer to **Appendix Q**)

CHAPTER 8: PLAN OF STUDY FOR THE ENVIRONMENTAL IMPACT ASSESSMENT

This Scoping Report includes a description of the nature, extent and expected significance of impacts associated with the development of the proposed Boulders Wind Farm. This chapter provides the Plan of Study for the Environmental Impact Assessment (EIA) phase for the wind farm, based on the outcomes of the Scoping Study and associated specialist investigations.

The key findings of the Scoping Phase includes inputs from authorities, the public, the project developer and the EIA specialist team, and are used to inform the Plan of Study for EIA together with the requirements of the NEMA EIA Regulations of 2014, as amended, and applicable guidelines. The Plan of Study describes how the EIA Phase will proceed and includes the details of the independent specialist studies required to be undertaken for those potential impacts recorded to be of potential significance.

8.1 Legal Requirements as per the EIA Regulations, 2014 (as amended)

This chapter of the final Scoping report includes the following information required in terms of Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(h) a plan of study for undertaking the environmental impact assessment process to be undertaken	A plan of study for the undertaking of the EIA phase for the Boulders Wind Farm is included within this chapter as a whole.

8.2 Aims of the EIA Phase

The EIA Phase to be undertaken for the Boulders Wind Farm and associated infrastructure will aim to achieve the following:

» Provide an overall description and detailed assessment of the social and biophysical environment affected by the development of the wind farm and associated infrastructure.
» Assess potentially significant impacts (direct, indirect and cumulative, where required) associated with the wind farm.
» Identify and recommend appropriate avoidance strategies and mitigation measures for potentially significant environmental impacts.
» Undertake a fully inclusive public involvement process to ensure that I&APs are afforded the opportunity to participate, and that their comments are recorded.

The EIA will address potential environmental impacts and benefits (direct, indirect and cumulative impacts) associated with each phase of the development including design, construction, operation and decommissioning; and will aim to provide the environmental authorities with sufficient information to make an informed decision regarding the project. The detailed facility layout footprint for the Boulders Wind Farm will be assessed through detailed specialist impact studies. As required in terms of the EIA Regulations, the assessment will include consideration of the 'do nothing' alternative.

8.3 Consideration of Alternatives

The following project alternatives will be investigated in the EIA:

Type of Alternatives Considered	Description of the Alternative relating to the Boulders Wind Farm
Site-specific Alternatives	After a detailed site selection process, one large project site has been identified for the development of the Boulders Wind Farm, taking advantage of the site specific characteristics such as the wind resource; as well as the areas classification considered to be Negotiable, Possible, Preferred or Highly Preferred for wind energy development (depending on the section of the project site being considered) in terms of the Western Cape Regional Methodology for Wind Energy Site Selection (May, 2006). The project site is 5084ha in extent, which is considered to be large enough for the development of a wind farm with a contracted capacity of up to 140MW, while allowing for avoidance of environmental sensitivities, as may be required in line with the mitigation hierarchy.
Layout Footprint Design Alternatives	The layout for the development of the Boulders Wind Farm will be designed in line with the environmental sensitivities identified during this scoping phase. The detailed facility layout will be made available as a layout alternative for assessment and ground-truthing by the independent specialists in the EIA phase. Where further conflicts are predicted, a mitigation strategy will be developed to meet the objectives of the mitigation hierarchy (avoid, minimise, mitigate).
Grid Connection Alternatives	Only the development of the on-site substation forms part of this application for environmental authorisation. The location of the on-site substation will be designed to consider the most optimal position from a technical and environmental sensitivity perspective.
'Do-nothing' Alternative	The option to not construct the Boulders Wind Farm. The 'do-nothing' alternative assumes that the site remains in its current state, that is status quo, and that the current land use practises only continue.

8.4 Description of project to be assessed during the EIA Phase of the Boulders Wind Farm

8.4.1 Project description

The aspects or nature and extent of the project to be assessed as part of the EIA are detailed in **Table 6.1** below. A more detailed description of the activities associated with the construction and operation of the project is included in Chapter 2 of this final Scoping report.

Table 6.1: Activities and associated infrastructure to be assessed in the EIA

Infrastructure	Footprint and dimensions
Number of turbines	Up to 45 turbines
Hub Height	Up to 120m
Tip Height	Up to 165m
Contracted Capacity	Up to 140MW (individual turbines up to 3.15MW in capacity each)
Tower Type	Steel or concrete towers can be utilised at the site. Alternatively, the towers can be of a hybrid nature, comprising concrete towers with top steel sections.
Area occupied by the on-site facility substation	~ 200m x 200m, as standard requirement for similar infrastructure.
Capacity of on-site facility substation	33kV/132kV

Area occupied by laydown areas	Up to four laydown areas each with a size of 100m x 50m. The total area for laydown areas will be approximately 20 000m^2 (i.e. 2 ha).
Access and internal roads	Existing roads on farms will be used where feasible and practical. The width of the access roads will be approximately 6m (this is also relevant for existing roads). The total length of the access roads is expected to be less than 35km in length (this will be confirmed in the EIA Phase). The roads will be of a gravel nature.
Crane hardstand area	Approximately 3800m^2 per turbine (which includes pre-assembly area and storage area at each turbine)
Turbine foundation	Approximately 380m^2 per turbine
Grid connection[27]	The existing Fransvlei Substation or the existing Fransvlei-Aurora 132kV power line located to the south-east of the project site are considered as potential connection points for the project.
Underground cabling	Underground cabling between the turbines is preferred and will be installed at a depth of 1.5m.

8.4.2. Scope of the EIA phase and EIA report

The EIA Report will be compiled in terms of the requirements of the EIA Regulations, and include the information as required in Appendix 3 of GNR326 The results of the specialist studies and other available information will be integrated and synthesised, and presented in the EIA report by the Savannah Environmental project team. The EIA report will assess the overall environmental impacts associated with the development, consider mitigation measures as may be required, and make recommendations regarding the best development alternative. The EIA report also identifies mitigation measures and provides management recommendations to minimise negative impacts and enhance benefits. The EIA Report will include:

- The details and expertise of the **EAP** who prepared the report.
- The **location** of the development footprint of the activity and a locality map illustrating the location of the proposed activity.
- A **description** of the scope of the proposed activity including all listed activities triggered and a description of associated structures and infrastructure.
- The **policy and legislative** context within which the development is located and an explanation of how the development complies and responds to the legislation and policy context.
- The **need and desirability** of the proposed development of the activity in the context of the preferred location.
- A motivation for the **preferred development footprint** within the approved site as contemplated in the accepted scoping report.
- A description of the **process** followed to reach the proposed development footprint within the approved site, including:
  - details of the development footprint considered;

[27] The construction of the 132kV overhead power line will be assessed as part of a separate Basic Assessment process which will consider feasible alternatives for the power line route.

- details of the public participation process undertaken in terms of Regulation 41 of the 2014 EIA Regulations, including copies of supporting documents;
- a summary of issues raised by interested and affected parties and the manner in which the issues were incorporated;
- the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;
- the impacts and risks identified including the nature, significance, consequence extent, duration and probability of the impacts, including the degree to which these impacts can be reversed, may cause irreplaceable loss of resources and can be avoided, managed or mitigated;
- the methodology used for determining and ranking the nature, significance, consequence, extent, duration and probability of potential environmental impacts and risks;
- positive and negative impacts that the activity and alternatives will have on the environment and the community;
- possible mitigation measures to be applied and the level of residual risk;
- a motivation for not considering alternative development locations;
- a concluding statement indicating the location of the preferred alternative development location; and
- a full description of the process followed to identify, assess and rank impacts of the activity and associated infrastructure on the preferred location including all environmental issues and risks that have been identified and an assessment of the significance of each issue and risk and the extent to which the issue/risk can be avoided or mitigated.

» An **assessment** of the identified potentially significant impacts and risks.
» A summary of the **findings and recommendations** of any specialist report and an indication as to how these findings and recommendations have been included.
» An **environmental impact assessment** containing a summary of key findings, an environmental sensitivity map and a summary of the positive and negative impacts and risks of the proposed activity.
» An **Environmental Management Programme** (EMPr), as per Appendix 4 of GNR326, containing the recommendations from specialists, the impact management **objectives** and the impact management **outcomes**.
» The final **alternatives** which respond to the impact management measures, avoidance and mitigation measures identified.
» Any aspects which were **conditional** to the findings of the assessment.
» Description of the assumptions, uncertainties and gaps in knowledge relating to the assessment and mitigation measures proposed.
» An **opinion** as to whether the proposed activity should or should not be authorised and the conditions thereof.
» An undertaking under **affirmation** by the EAP in relation to the correctness of the information, the inclusion of comments and inputs from stakeholders and Interested and affected parties, the inclusion of inputs and recommendations from the specialists and any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties.

Specialist studies identified during the Scoping Phase, as well as any additional studies that may be required by the authorities, will be undertaken during the EIA. Appropriately qualified and experienced specialists will be appointed to undertake the required assessments. Specialists will assess the potential for and significance of impacts as identified through the Scoping study. Specialists will make recommendations to mitigate negative impacts and enhance benefits. The findings of the specialist

assessments will be synthesised into the EIA report, and the studies appended to the EIA report. The following assessments will inform the findings of the EIA:

- Ecological Impact Assessment to be undertaken by Simon Todd of Simon Todd Consulting;
- Freshwater Resources Impact Assessment to be undertaken by Stephen van Staden of Scientific Aquatic Services;
- Avifauna Impact Assessment to be undertaken by Craig Campbell of Bioinsight;
- Bats Impact Assessment to be undertaken by Stacey Jordaan of Gaia Environmental Services;
- Soils and Agricultural Potential Impact Assessment to be undertaken by Freddie Ellis and Johann Laubscher of Stellenbosh University
- Heritage Resources Impact Assessment to be undertaken by Kathryn Smuts, Tim Hart and David Halkett of ACO Associates cc;
- Socio-Economic Impact Assessment to be undertaken by Tony Barbour of Environmental Consulting and Research and Elena Broughton of Urban Econ;
- Noise Impact Assessment to be undertaken by Morné de Jager of Enviro-Acoustic Research;
- Visual Impact Assessment to be undertaken by Lourens du Plessis of LoGIS; and
- Traffic Impact Assessment to be undertaken by Christoff Krogscheepers of ITS Engineers;
- And a cumulative impact assessment to be undertaken by Savannah Environmental with input from specialists.

The EIA Report will be released to the public and relevant stakeholders, Organs of State and Authorities for a 30-day review period. The comments received from I&APs will be captured within a Comments and Response Report, which will be included within the Final EIA Report, for submission to the authorities for decision-making.

8.5 Exclusion of specialist studies during the EIA Phase for the Boulders Wind Farm

During the Scoping Phase the palaeontological resources of the project site were fully identified and considered in terms of their sensitivity. The majority of the Boulders Wind Farm project site is located within the Grantic Hills Terrain which is considered as being of a low palaeontological sensitivity, with the northern and western portions of the project site located within the Coastal Formations Terrain which is considered as being of a high palaeontological sensitivity. The findings of the specialist study was that despite the high palaeontological sensitivity of the Coastal Formations Terrain, no further assessment is required. The reasons for this conclusion by the specialist is:

- High confidence in the findings for the study conducted.
- Acceptability of development within an area of high palaeontological sensitivity, as any loss can be mitigated through the implementation of appropriate mitigation measures. The mitigation recommended is that all excavations in this area must be inspected by the contracted palaeontologist. The aim of field inspection will be to examine a representative sample of the various deposits exposed, recording context, fossil content and to take samples of the fossils and sediments, thereby providing a positive benefit to the palaeontological record of the area.

Therefore, the impact on palaeontology is considered to be assessed on a sufficient level during the Scoping Phase and the specialist therefore recommends that no further study is required to be able to fully understand the nature, extent and significance of the impact.

Further palaeontology assessment is therefore not included as part of the Plan of Study for the EIA for the Boulders Wind Farm.

8.6 Specialist Tasks to be undertaken during the EIA Phase of the Boulders Wind Farm

A summary of the aspects which require further investigation within the EIA phase through specialist studies, as well as the proposed activities to be undertaken in order to assess and ground-truth the significance of the potential impacts is provided within **Table 8.1**. The specialists proposed to undertake detailed studies in the EIA Phase are also reflected within this table. These specialist studies will consider the development footprint proposed for the wind farm and all associated infrastructure, as well as feasible and reasonable alternatives identified for the project. The terms of reference for each specialist includes the following:

Table 8.1: Aspects requiring further investigation by specialists during the EIA Phase and terms of reference to assess the significance of the potential impacts relevant to the Boulders Wind Farm.

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
Ecology (Fauna and Flora)	The EIA Phase will include the following activities: » Fieldwork to validate and refine the findings of the Scoping study. This will include the following activities: * Ground-truth and refine the ecological sensitivity map of the project site. Particular attention will be paid to the natural vegetation patches as well as the other areas of potential concern which were identified in this report such as the areas associated with the wetlands and drainage lines. * Identify and map the presence of any unique and special habitats at the site such as quartz patches and silcrete outcrops. » Map the location of significant populations of species of conservation concern as well as evaluate the condition and status of the natural and near-natural vegetation at the project site and sensitive environments (including CBAs). » Evaluate the likely presence of listed faunal species at the project site such as the Cape Caco and identify associated habitats that should be avoided to prevent impact to such species. » Evaluate, based on the site attributes, what the most applicable mitigation measures to reduce the impact of the development on the project site would be and if there are any areas where specific precautions or mitigation measures should be implemented. » Assess the impacts identified in light of the site-specific findings and the final layout to be provided by the developer. Assessment of Impacts for the EIA: This methodology assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refers to the causes of the effect, what will be affected and how it will be affected. For each anticipated impact, recommendations will be made for feasible mitigation measures. Environmental Management Programme: For each management outcome, management recommendations for the design, construction, and operational phase will be drafted.	Simon Todd of Simon Todd Consulting

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
Freshwater resources (including all waterbodies and wetlands)	The EIA Phase will include the following activities: Freshwater resources located within the project site will be further assessed during the EIA Phase. The following activities will be undertaken: » Ground-truthing of delineation of the outermost edge of freshwater resources occurring within the development footprint and its associated zone of influence in accordance with "DWAF, 2008: A practical Guideline Procedure for the Identification and Delineation of Wetlands and Riparian Zones". Aspects such as soil morphological characteristics, vegetation types and wetness will be used to verify the delineation of the wetland temporary zone according to the guidelines; » Define the Present Ecological State (PES) of each Hydrogeomorphic (HGM) unit within the project site according to indices such as the Wet-Health / Index of Habitat Integrity as advocated by Macfarlane et al., (2008) and DWA (2007), respectively as applicable; » Determine the wetland services provided by the resources within the project site in accordance with the methodology provided by Kotze et al. (2009); » Define the Ecological Importance and Sensitivity (EIS) of the freshwater resources based on the method described by Rountree & Kotze, (2013); » Aspects regarding watercourse drivers and receptors as required by the DWS Chief Directorate Instream Water Use, as required by the Risk Assessment Matrix (GN509) will be reported on; » Advocate a Recommended Ecological Category (REC) for each wetland resource based on the findings of the wetland PES and wetland function assessment; » Evaluation of environmental issues and potential impacts (direct, indirect and cumulative impacts and residual risks) identified; » Assess the impacts identified in light of the site-specific findings and the final layout to be provided by the developer. » Development of recommendations for mitigating impacts on the receiving environment. Assessment of Impacts for the EIA: This methodology assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refers to the causes of the effect, what will be affected and how it will be affected.	Stephen van Staden of Scientific Aquatic Services

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	For each anticipated impact, recommendations will be made for feasible mitigation measures. <u>Environmental Management Programme:</u> For each management outcome, management recommendations for the design, construction, and operational phase will be drafted.	
Avifauna	<u>The EIA Phase will include the following activities:</u> An avifauna impact assessment report will be compiled and be informed by the results of 12-month pre-construction monitoring programme as well as the radar monitoring report (Millikin, 2015). The following activities will be undertaken during the EIA Phase: » Characterise the avifauna community and its utilisation of the project site, through a 12-months monitoring (conducted between 2014 and 2015); » Assessment of the project site in terms of bird habitat features (conducted between 2014 and 2015, and in October 2017); » Establish the baseline scenario from data collected during the pre-construction monitoring - providing the information required to identify potential changes in the bird community occurring within the project site, as well as the eventual exclusion/displacement effect (avoidance of the wind facility area post-construction); » Evaluate the potential changes that may arise in relation to how the target-species and overall bird community utilise the project site; » Document patterns of bird activity and movements within the project site and its immediate surroundings, as well as to establish a pre-impact baseline scenario of bird utilisation in the project site and broader area; » Estimate predicted collision risks for target-species; » Confirm sensitive areas to be avoided; » Assess the impacts identified in light of the site-specific findings and the final layout to be provided by the developer. » Propose mitigation measures. <u>Assessment of Impacts for the EIA:</u> This methodology assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refers to the causes of the effect, what will be affected and how	Craig Campbell of Bioinsight

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. <u>Environmental Management Programme:</u> For each management outcome, management recommendations for the design, construction, and operational phase will be drafted.	
Bats	<u>The EIA Phase will include the following activities:</u> A bat impact assessment report will be compiled and be informed by the results of 12-month pre-construction monitoring programme. The following activities will be undertaken during the EIA Phase: » Assessment of the project site in terms of bat habitat features (undertaken by GES in Scoping phase and September 2017); » Static bat activity monitoring for 12 months at various locations at the site (undertaken by Bioinisight in 2014-2016); » Active bat activity monitoring in areas not monitored by static bat detectors (transects) in each season (undertaken by Bioinisight in 2014-2016); » Analysis of bat activity data (echolocation recordings) to determine species assemblages and activity levels (undertaken by Bioinisight in 2014-2016); » Roost Surveys (undertaken by Bioinisight in 2014-2016); » Discover any existing information on bat activity, roosts and landscape features that may be used by bats at or near the proposed Boulders Wind Farm; » Produce a description of the project site and the surrounding area in terms of bat activity; » Determine the bat species composition at the project site; » Determine the short and long term spatial and temporal activity patterns of bats at the project site; » Determine any relationships between bat activity and environmental variables (such as wind speed, temperature and humidity); » Assessment of potential impacts to bats associated with the development of the Boulders Wind Farm at the project site; » Assess the impacts identified in light of the site-specific findings and the final layout to be provided by the developer. » Describe relevant and implementable mitigation measures to reduce, avoid, or minimise negative impacts and enhance positive impacts; » Identify any information gaps, uncertainties, study limitations and underlying assumptions; » Make Recommendations. <u>Assessment of Impacts for the EIA:</u>	Stacey Jordaan of Gaia Environmental Services

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	This methodology assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refers to the causes of the effect, what will be affected and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. <u>Environmental Management Programme:</u> For each management outcome, management recommendations for the design, construction, and operational phase will be drafted.	
Soils and Agricultural Potential	<u>The EIA Phase will include the following activities:</u> The soils impact assessment will include the consideration of those aspects listed as part of the DEA and DAFF assessment requirements. The assessment will also include: » Investigation of the profitability levels of current and potential farming activities. This analysis will be based on the soil suitability study. » Estimation of the loss in farming income during the construction phase of the project and thereafter. » Estimation of the possible gain in income for the farmers due to a profit-sharing/rent-income agreement with the wind farm developer. » Provide a soil and land use assessment. » Assess the impacts identified in light of the site-specific findings and the final layout to be provided by the developer. » Appropriate mitigation measures as far as the disturbance of agricultural practices is concerned, *inter alia* determining of a sensible placing strategy for the turbines. » Impact significance rating (local level): agricultural production potential and land use. <u>Assessment of Impacts for the EIA:</u> This methodology assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive).	Freddie Ellis and Johann Laubscher of Stellenbosch University

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	The nature of the impact will be defined and described, and refers to the causes of the effect, what will be affected and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. <u>Environmental Management Programme:</u> For each management outcome, management recommendations for the design, construction, and operational phase will be drafted.	
Heritage Resources – Including cultural heritage and Archaeology	<u>The EIA Phase will include the following activities:</u> As part of the EIA, it is necessary to undertake a Heritage and Archaeological Study to fulfil the SAHRA requirements in accordance with the National Heritage Resources Act (Act No 25 of 1999). A Heritage and Archaeological Impact Assessment will therefore be conducted, the primary objective of which is to determine the heritage and archaeological significance of features on the site, as well as the surroundings. The following activities will be undertaken during the EIA Phase: » The Archaeological Impact Assessment will be reviewed, assessed and collated as part of an Integrated Heritage Impact Assessment Report in terms of the likely impact of the development and the significance thereof to the identified archaeological heritage resources, including archaeological sites, graves and cemeteries and historic farmsteads and cultural landscapes. » The Visual Impact Assessment will be reviewed, assessed and collated as part of the Integrated Heritage Impact Assessment Report in terms of likely visual impact of the development on the identified heritage resources, including sense of place, cultural landscapes and archaeological sites. » The findings from the Palaeontological scoping study will be reviewed, assessed and collated as part of the Integrated Heritage Impact Assessment Report. The following activities will be undertaken for the Archaeological assessment during the EIA Phase: » Consideration of buffers recommended as part of previous environmental and heritage authorisations. » Consider comments raised by I&APs with respect to the archaeology of the project site and the development footprint proposed for the facility. » Identification of graves and cemeteries that have not yet been identified. » Recommend appropriate mechanisms for dealing with chance finds of human remains. » Site inspection of areas within the development footprint which have not been surveyed in order to determine the type,	Kathryn Smuts, Tim Hart and David Halkett of ACO Associates cc

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	quantity, location and significance of the resources which may be impacted. » Propose mitigation for Stone Age artefact scatters that may require mitigation in the form of recording and/or sampling if it is not possible to avoid them. » Significant colonial heritage sites, such as historic buildings will need to be recorded and assessed. » Assess the impacts identified in light of the site-specific findings and the final layout to be provided by the developer. » Recommend measures to adequately address of mitigate any identified impacts. <u>Assessment of Impacts for the EIA:</u> This methodology assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refers to the causes of the effect, what will be affected and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. <u>Environmental Management Programme:</u> For each management outcome, management recommendations for the design, construction, and operational phase will be drafted.	
Social and socio-economic	<u>The EIA Phase will include the following activities:</u> The identification and assessment of social impacts will be guided by the Guidelines for specialist SIA input into EIAs adopted by DEA&DP in the Western Cape in 2007. The Guidelines are based on accepted international best practice guidelines, including the Guidelines and Principles for Social Impact Assessment (Inter-organizational Committee on Guidelines and Principles for Social Impact Assessment, 1994) and IAIA Guidance for Assessing and Managing Social Impacts (2015). The approach to the study will include: » Review of existing project information, including the Planning and Scoping Documents; » Collection and review of reports and baseline socio-economic data on the area (IDPs, Spatial Development Frameworks etc.). This includes socio-economic characteristics of the affected areas, current and future land uses, and land uses planning documents relating to the study area and surrounds; » Identification of the components associated with the construction and operation phase of the project, including estimate	Tony Barbour of Environmental Consulting and Research

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	of total capital expenditure, number of employment opportunities created, breakdown of the employment opportunities in terms of skill levels (low, medium and high skilled), breakdown of wages per skill level, assessment procurement policies etc.; » Identify the zone of influence for the project; » Site visits and interviews with key stakeholders in the area including local landowners and authorities, local community leaders and councillors, local resident associations and residents, local businesses, tourism and conservation officials community workers etc.; » Identification and assessment of the key social issues and opportunities associated with the construction and operation phases of the proposed project. A key focus of the assessment will be an assessment of the potential socio-economic benefits for the local community associated with the proposed development; » Identify impacts of the proposed project on tourism and property values within the project area and the surrounding areas through quantifying the economic trends relating to these impacts; » A general trend analysis will be conducted looking at the accommodation numbers. If there was a visible change in trend after the construction of the West Coast One Wind Energy Facility it must be analysed to determine whether the effect of the existing wind farm on such a trend change can be identified, dissociating it form any other potentially influencing factors (where survey is required, it will be undertaken). The existing West Coast One Wind Energy Facility will be used a case study. » To provide an overview of the possible effects on property values two case studies will be conducted on recently completed wind farms in the Western Cape, the changes in property prices will be compared to the average property price changes nationally and provincially and real estate agents will be contacted and engaged with to debunk the property market status quo in the region. » Estimate the direct and follow-on effects of the proposed project expenditure, an economic modelling technique will be utilised. The modelling exercise makes use of an economic model developed on the basis of the Western Cape Province's SAM updated to 2018 figures. » Review of key specialist studies, including VIA and HIA; » Preparation of an Impact Assessment (SIA) Report, including identification of mitigation/optimisation and management measures to be implemented. <u>Assessment of Impacts for the EIA:</u> This methodology assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction	

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	(negative, neutral or positive). The nature of the impact will be defined and described, and refers to the causes of the effect, what will be affected and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. <u>Environmental Management Programme:</u> For each management outcome, management recommendations for the design, construction, and operational phase will be drafted.	
Noise	<u>The EIA Phase will include the following activities:</u> The identification and assessment of noise impacts is based on the SANS 10328:2008 standard. The following activities will be undertaken during the EIA Phase: » Identify all potential noise sensitive sites/ receptors that could be impacted upon by activities relating to the construction, operation and decommissioning of the facility. » Data as received from the developer regarding the turbine specifications and facility layout will be used to model the potential noise impact; » The potential impact will be evaluated (where possible) in terms of the nature (description of what causes the effect, what/who might be affected and how it/they might be affected) as well as the extent of the impact; » The potential significance of the identified issues will be calculated based on the evaluation of the issues/impacts; » Assess the impacts identified in light of the site-specific findings and the final layout to be provided by the developer. » Assess the noise impact at identified noise sensitive sites in terms of the latest relevant SANS for "The measurement and rating of environmental noise with respect to land use, health, annoyance and to speech communication"; Noise Control Regulations; World Bank - Environmental Guidelines. » The development of an Environmental Management Plan and a proposal of potential mitigation measures (if required); and » Recommendations will be made. <u>Assessment of Impacts for the EIA:</u> This methodology assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction	Morné de Jager of Enviro-Acoustic Research

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	(negative, neutral or positive). The nature of the impact will be defined and described, and refers to the causes of the effect, what will be affected and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. <u>Environmental Management Programme:</u> For each management outcome, management recommendations for the design, construction, and operational phase will be drafted.	
Visual	<u>The EIA Phase will include the following activities:</u> » Undertake a site visit; » <u>Undertaken a Level 4 Assessment;</u> » <u>Provide photos simulations of the facility layout;</u> » Determine the potential visual exposure of the infrastructure according to the facility layout; » Determine the visual distance or observer proximity to the wind farm; » Determine the viewer incidence or viewer perception in terms of the sensitive visual receptors; » Determine the visual absorption capacity of the landscape; » Calculate the visual impact index; » Determine the significance of the impacts; » Assess the impacts identified in light of the site-specific findings and the final layout to be provided by the developer; » Propose appropriate mitigation measures; » Compile an impact assessment report including mapping and photo simulations; » Assess the potential for cumulative impacts. <u>Assessment of Impacts for the EIA:</u> This methodology assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refers to the causes of the effect, what will be affected and how	Lourens du Plessis of LoGIS

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. <u>Environmental Management Programme:</u> For each management outcome, management recommendations for the design, construction, and operational phase will be drafted.	
Traffic	<u>The EIA Phase will include the following activities:</u> » Confirm access positions and layouts with the relevant Road Authorities. » Identify and evaluate possible construction accesses. » Evaluate different access routes for large components and equipment. » Evaluate the pavement conditions of the surrounding road network » Obtain necessary road network information for the peak periods. » Evaluate the operation of the existing road elements in terms of standard measures, such as volume/capacity ratio, delay per vehicle and level-of-service. » Estimate the daily and peak hour traffic that would be generated by the development during the construction and operation phases. » Assign the estimated site-generated traffic to the study roadways using the estimated trip distribution patterns within the site vicinity. » Evaluate the road network in the site vicinity in terms of the expected traffic impact during the construction phase and the operation phase. » Recommend mitigation measures. <u>Assessment of Impacts for the EIA:</u> This methodology assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refers to the causes of the effect, what will be affected and how it will be affected.	Christoff Krogscheepers of ITS Engineers

Aspect	Activities to be undertaken in order to assess significance of impacts	Specialist
	For each anticipated impact, recommendations will be made for desirable mitigation measures. Environmental Management Programme: For each management outcome, management recommendations for the design, construction, and operational phase will be drafted.	
Cumulative Assessment	Assess the cumulative impacts associated with the construction and operation of more than one development (i.e. wind farm developments) within the immediate surrounding areas of the project site on the ecological, heritage, soil and agricultural potential, bats, avifaunal, social, traffic, visual and noise impacts of the area. The objective is to identify and focus on potentially significant cumulative impacts so these may be taken into consideration in the decision-making process. The following will be considered: » Loss of threatened or protected vegetation types or species through clearing, resulting in an impact on the conservation status of such flora or ecological functioning; » Risk to aquatic habitat resulting due to the increase in the extent of hard or impermeable surfaces in the greater area; » Risk to avifauna and bats through loss of habitat, infringement on breeding areas, or risk to collision-prone species; » Loss of heritage resources; » Impact on ambient noise levels; » Complete or whole-scale change in the sense of place and character of an area and unacceptable visual intrusion; » The prospecting right on the farm Schuitjes Klip 22 Portion 1 held by Montero Mining and Exploration; » Positive and negative contribution from a socio-economic perspective; and » Contribution to climate change mitigation.	Savannah Environmental

8.7 Methodology for the Assessment of Potential Impacts

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

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

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

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

S = Significance weighting

E = Extent
D = Duration
M = Magnitude
P = Probability

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

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

Other aspects to be taken into consideration in the specialist studies and EIA report are:

- Impacts should be described in terms of before and after the proposed mitigation and management measures have been implemented.
- All impacts should be evaluated for the full lifecycle of the proposed development, including construction, operation and decommissioning.
- The impact assessment should take into consideration the cumulative effects associated with this and other wind farms which are either developed or in the process of being developed in the region.
- The specialist studies must quantify the magnitude of potential impacts (direct and cumulative effects) for all alternatives identified. A comparative assessment must be undertaken and recommendations made regarding a preferred option for implementation.

As Vredenburg Windfarm (Pty) Ltd has the responsibility to avoid and/or minimise impacts as well as plan for their management (in terms of the EIA Regulations), the mitigation of significant impacts will be discussed. Assessment of mitigated impacts will demonstrate the effectiveness of the proposed mitigation measures.

8.8 Authority Consultation

Consultation with the regulating authorities (i.e. Department of Environmental Affairs (DEA) and the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP)) will be undertaken and will continue throughout the EIA process. On-going consultation will include the following:

» Submission of a final Scoping Report following a 30-day review period (and consideration of comments received).
» Submission of an EIA Report for review and comment (i.e. 30-day review period).
» Submission of a Final EIA Report following a 30-day review period.
» Consultation and a site visit with DEA and Western Cape DEA&DP (as well as other authorities as may be required).

8.9 Public Participation Plan

The public participation process will be undertaken in terms of Chapter 6 of EIA Regulations, 2014, (as amended in April 2017). Consultation with key stakeholders and I&APs will be on-going throughout the EIA

Phase. Through this consultation process, stakeholders and I&APs will be encouraged to verify that their issues were recorded in the Scoping Phase and to identify additional issues of concern or highlight positive aspects of the wind farm, and to comment on the findings of the EIA Phase. In order to accommodate the varying needs of stakeholders and I&APs within the study area and the project site, as well as capture their inputs, various opportunities will be provided for stakeholders and I&APs to be involved in the EIA Phase of the process, as follows:

» Focus group or public meetings (pre-arranged and I&APs invited to attend).
» One-on-one consultation meetings (for example with directly affected and surrounding landowners).
» Telephonic consultation sessions (consultation with various parties from the EIA project team, including the public participation consultant, lead EIA consultant as well as specialist consultants).
» Written, faxed or e-mail correspondence.

The public participation process will include the following activities:

» Placement of advertisements in 2 newspapers (Weslander and Die Burger Western Cape).
» Maintenance and finalisation of the I&AP database.
» Release of the EIA report for a 30-day review period.
» Ongoing consultation with all registered I&APs regarding the progress of the EIA process and the outcomes or findings of the EIA report through stakeholder consultation via notification letters, telephone calls, focus group meetings and open-house/information sharing meetings, depending on the specific needs of the stakeholders in the area.
» Facilitate comments on the EIA report.
» Compile a Comments and Responses Report and evidence of the public participation process undertaken to be included in the final EIA report for decision-making.

8.10 Key Milestones of the Programme for the EIA

The envisaged key milestones of the programme for the EIA Phase are outlined in the following table (and include indicative dates):

Key Milestone Activities	Proposed timeframe
Make the Scoping Report available to the public, stakeholders and authorities for 30 days	1 March 2018 - 3 April 2018
Finalisation of Scoping Report, and submission of the Final Scoping Report to DEA	April 2018
Authority acceptance of the Final Scoping Report and Plan of Study to undertake the EIA	43 days from submission of the Final Scoping Report
Undertake specialist studies and public participation process	May 2018 – July 2018
Make Draft EIA Report and EMPr available to the public, stakeholders and authorities	July 2018 - August 2018
Finalisation of EIA Report, and submission of the Final EIA Report to DEA	September 2018
Authority review period and decision-making (107 calendar days)	September - December 2018

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