PROPOSED BOULDERS WIND FARM, WEST COAST DISTRICT MUNICIPALITY, WESTERN CAPE PROVINCE

DEA Reference: **14/12/16/3/3/2/1057**

FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Prepared for:

BOULDERS WIND FARM

Vredenburg Windfarm (Pty) Ltd.

Prepared by:

CES
ENVIRONMENTAL AND SOCIAL ADVISORY SERVICES

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SEPTEMBER 2019

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THE PROJECT TEAM

CES has been appointed by Vredenburg Windfarm (Pty) Ltd to conclude the Boulders Wind Farm Environmental Impact Assessment (EIA) process. CES now took over from Savannah Environmental as independent consultants in December 2019 to undertake an EIA process for the proposed project, as required by the NEMA EIA Regulations, 2014, as amended. The EAP is largely dependent on the information and assessments provided by the independent specialists and the input received during the public participation process in order to inform the overall environmental assessment of the proposed development on both environmental and social aspects.

The process where the environmental impacts associated with a project are assessed is a collective effort from a team of appropriate and independent specialists, as well as an independent Environmental Assessment Practitioner (EAP). The EIA report is required to assess the planned development from a holistic perspective, considering all aspects and characteristics within the affected natural and social environment.

The following specialist consultants have provided expert input and a detailed assessment of the project within their area of expertise, in order to assess the environmental and social impacts within the affected environment, as well as the acceptability of the application.

CES team and responsibilities

CES TEAM MEMBER	PROJECT RESPONSIBILITIES
Dr Alan Carter	EAP, Project Leader and Report Reviewer.
Dr Ted Avis	Internal reviewer and quality control
Ms Maura Talbot	Public Participation Specialist & Specialist Reviewer
Dr Greer Hawley	Specialist Reviewer
Ms Caroline Evans	Assistant Report Writer
Mr Michael Johnson	GIS and visual Specialist

Sub-consultant team members and areas of expertise

TEAM MEMBER	COMPANY	AREA OF EXPERTISE
Mr Tony Barbour	Tony Barbour Environmental Consulting and Research	Socio-Economic
Ms Elena Broughton	Urban-Econ	Socio-Economic
Mr Saul du Toit	Appraisal Corporation	Property Evaluation
Mr Lourens du Plessis	LoGIS	Visual
Mr Tim Hart *Ms Kathryn Smuts* *Mr John Pether*	ACO Associates	Cultural Heritage, Archaeology and Palaeontology
Mr Simon Todd	Simon Todd Consulting	Ecology
Mr Miguel Mascarenhas *Mr Craig Campbell* *Ms Margarida Augusto*	Bioinsight South Africa	Avifauna
Ms Stacey Jordaan	Gaia Environmental Services	Bats
Mr Stephen van Staden	Scientific Aquatic Services	Freshwater Systems
Mr Johann	Stellenbosch University	Soils and Agricultural Potential

TEAM MEMBER	COMPANY	AREA OF EXPERTISE
Laubscher *Mr Freddie Ellis*		
Mr Morné de Jager	Enviro-Acoustic Research	Noise
Mr Pieter Arangie *Mr Theodore Neels*	ITS Global	Traffic

EAP & SPECIALIST DECLARATIONS

GENERAL SITE INFORMATION

Table 1: Affected Farm Portions

Project Name	Boulders Wind Farm			
Province	Western Cape Province			
District Municipality	West Coast District Municipality			
Local Municipality	Saldanha Bay Local Municipality			
Ward Number(s)	Ward 11			
Closest Town(s)	Paternoster (7km west)			
	St Helena Bay (7km northeast)			
	Vredenburg (12km south)			
Farm Name	**SG Digit Number**	**Portion / Farm Number**	**Zoning**	**Area (ha)**
Boebezaks Kraal	C04600000000004000002	2/40	Agriculture	891.17
Boebezaks Kraal	C04600000000004000003	3/40	Agriculture	328.97
Boebezaks Kraal	C04600000000004000005	5/40	Agriculture	271.58
Frans Vlei	C04600000000004600002	2/46	Agriculture	149.91
Schuitjes Klip	C04600000000002200003	3/22	Agriculture	899.61
Schuitjes Klip	C04600000000002200001	1/22	Agriculture	843.56
Davids Fontyn	C04600000000001800009	9/18	Agriculture	85.61
Davids Fontyn	C04600000000001800007	7/18	Agriculture	428.98
Het Schuytje	C04600000000002100001	1/21	Agriculture	445.59
Uitkomst	C04600000000002300006	RE/6/23	Agriculture	757.15
			TOTAL	5 102.13ha

Turbine Design Specifications	
Number of turbines	45 (maximum)
Power output per turbine	3.15MW (maximum)
Facility output	140MW (maximum)
Turbine hub height	120m (maximum)
Foundation dimensions	570m^2 per turbine
Laydown area dimensions	2 624m^2 per turbine
Blade length	45m
Rotor diameter	103m (maximum)

Onsite Measured Wind Parameters
Two met mast have been installed on the project site to assess and confirm the expected wind potential for this site. The first mast, with a maximum measurement height of 85m, was installed and commissioned in March 2015. The second mast, with a maximum measurement height of 120m, was installed and commissioned in Aug 2016. The results of these measurements confirm and exceed the expected wind potential at the site based on the South African Wind Atlas.

STRUCTURE OF THE FINAL EIR

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    2) Layout
    3) Layout with combined sensitivities, and
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D. Ecological Impact Assessment (updated)
E. Economic, Property Values, Tourism Impact Report (updated)
F. Freshwater Impact Assessment (unchanged)
G. Heritage, Archaeological and Palaeontology Impact Assessment (updated)
H. Noise Impact Assessment (updated)
I. Property Evaluation Report (same as E above)
J. Social Impact Assessment(unchanged)
K. Traffic Impact Assessment (unchanged)
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1. INTRODUCTION

GOVERNMENT NOTICE 982, ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS, 2014 (AS AMENDED 2017). APPENDIX 3: SCOPE OF ASSESSMENT AND CONTENT OF ENVIRONMENTAL IMPACT ASSESSMENT REPORTS

3. An environmental impact assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include–

(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.

(d) A description of the scope of the proposed activity, including–
- (i) All listed and specified activities triggered and being applied for; and
- (ii) A description of the associated structures and infrastructure related to the development.

1.1 BACKGROUND TO THE STUDY

Vredenburg Windfarm (Pty) Ltd is proposing the development of a 140MW (maximum) wind energy facility and associated infrastructure approximately 12km northeast of the commercial centre of Vredenburg in the Saldanha Bay Local Municipality, West Coast District Municipality, Western Cape. The proposed project is to be known as the Boulders Wind Farm.

The project site identified for the Boulders Wind Farm is located approximately 7km east of Paternoster, 7km southwest of St Helena Bay and 12km northeast of Vredenburg. The project site is located on properties which are currently used for dryland agricultural activities (including small-grain, cattle and sheep farming) and is located directly adjacent to the existing operational West Coast One Wind Energy Facility (WEF).

In summary the wind farm includes:

- 45 wind turbines consisting of the following specifications:
  - Maximum hub height of up to 120m;
  - Tip height of up to 165m; and
  - A rotor diameter of up to 103m.
- Concrete foundations to support the turbines;
- Cabling between the turbines, to be laid underground where practical;
- Access roads to the site (23.4km) and between project components with a width of approximately 8m, of which:
  - 12.4km will be new roads; and
  - 11.0km will be upgrades to existing roads
- An on-site substation of up to 80m x 150m in extent to facilitate the connection between the wind farm and the electrical grid; and
- Laydown areas, crane hardstand pads, administrative buildings and offices.

CES has been appointed by Vredenburg Windfarm (PTY) Ltd as the Environmental Assessment Practitioner (EAP) to undertake the EIA, which is required to support the application for the necessary environmental authorisations for the project. Table 1-1 indicates the property portions and farm names associated with the Boulders Wind Farm project area. Figure 1-1 illustrates the project locality. Figure 1-2 illustrates the proposed layout for the Boulders Wind Farm. **See also Appendices A 1-4 for A3 versions of layout maps.**

Table 1-1: Property portions and farm names associated with the project area.

DESCRIPTION OF AFFECTED FARM PORTIONS			
Farm Name	**Farm number**	**21 digit SG Code**	**Size (ha)**
Boebezaks Kraal	2/40	C04600000000004000002	891.17
Boebezaks Kraal	3/40	C04600000000004000003	328.97
Boebezaks Kraal	5/40	C04600000000004000005	271.58
Frans Vlei	2/46	C04600000000004600002	149.91
Schuitjes Klip	3/22	C04600000000002200003	899.61
Schuitjes Klip	1/22	C04600000000002200001	843.56
Davids Fontyn	9/18	C04600000000001800009	85.61
Davids Fontyn	7/18	C04600000000001800007	428.98
Het Schuytje	1/21	C04600000000002100001	445.59
Uitkomst	RE/6/23	C04600000000002300006	757.15
TOTAL			**5 102.13 ha**

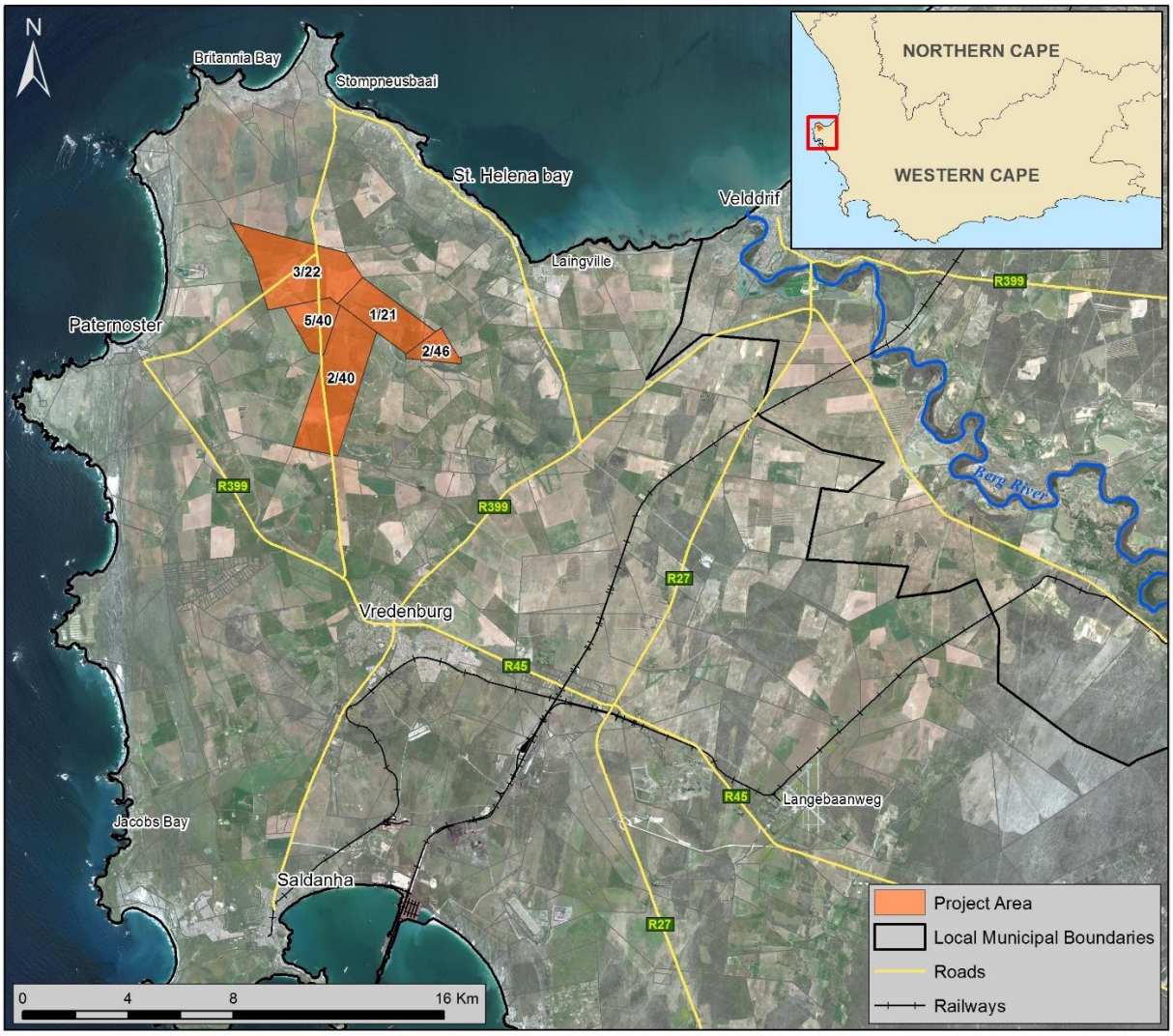

Figure 1-1: Locality Map of the proposed Boulders Wind Farm project.

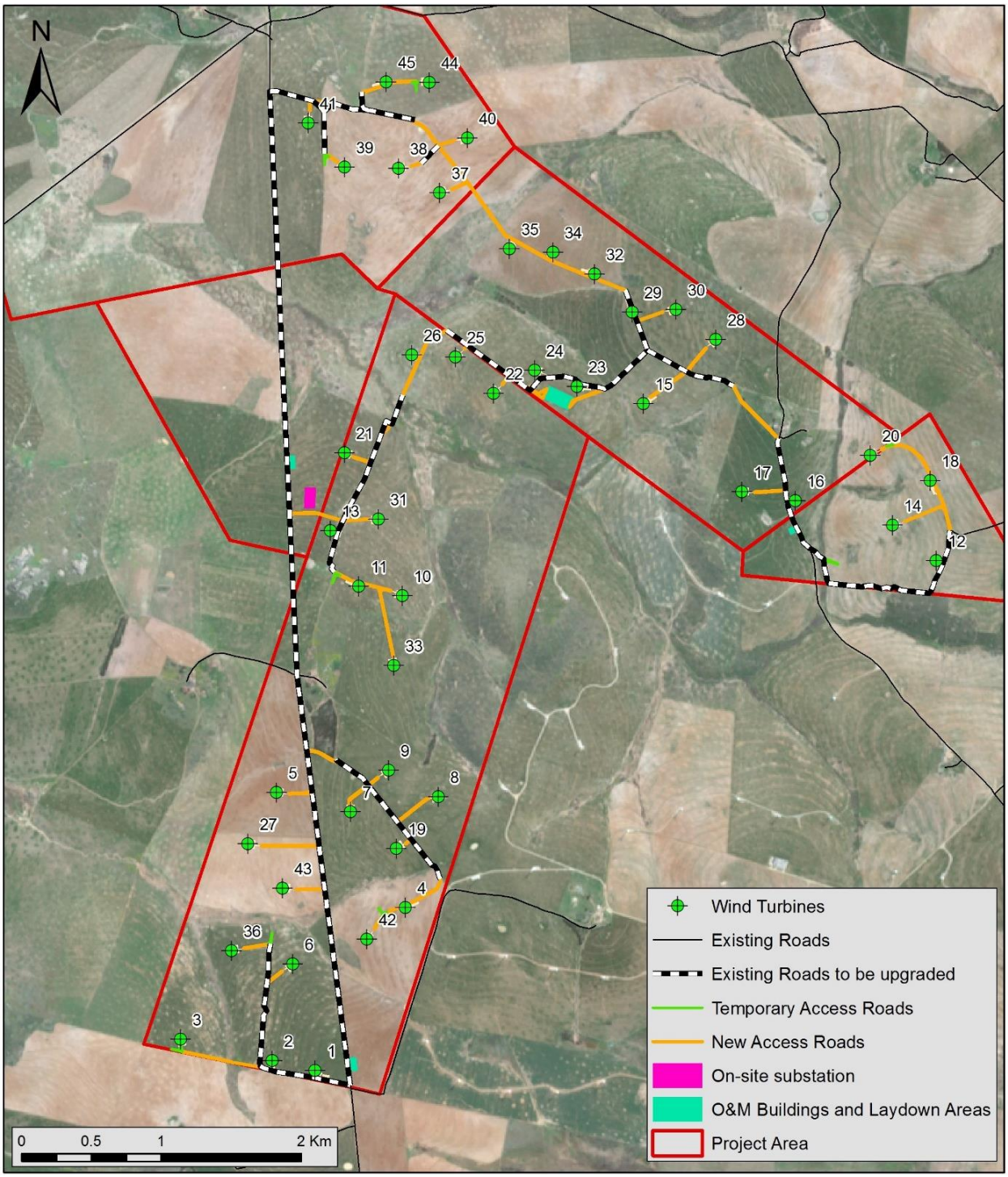

Figure 1-2: Layout of the proposed Boulders Wind Farm project.

The turbine footprints and associated facility infrastructure (internal access roads, substations, construction compound, batching plant and operations building) will potentially cover an area of approximately 44ha during the construction phase. This footprint will be reduced through rehabilitation, resulting in a final footprint of 24ha.

It should be noted that based on recommendations from draft heritage and visual impact assessments, seven turbines were relocated from the west of the Paternoster Road as shown in Figure 1.3 below. Five turbines were relocated to the east and two to the south of the Paternoster Road.

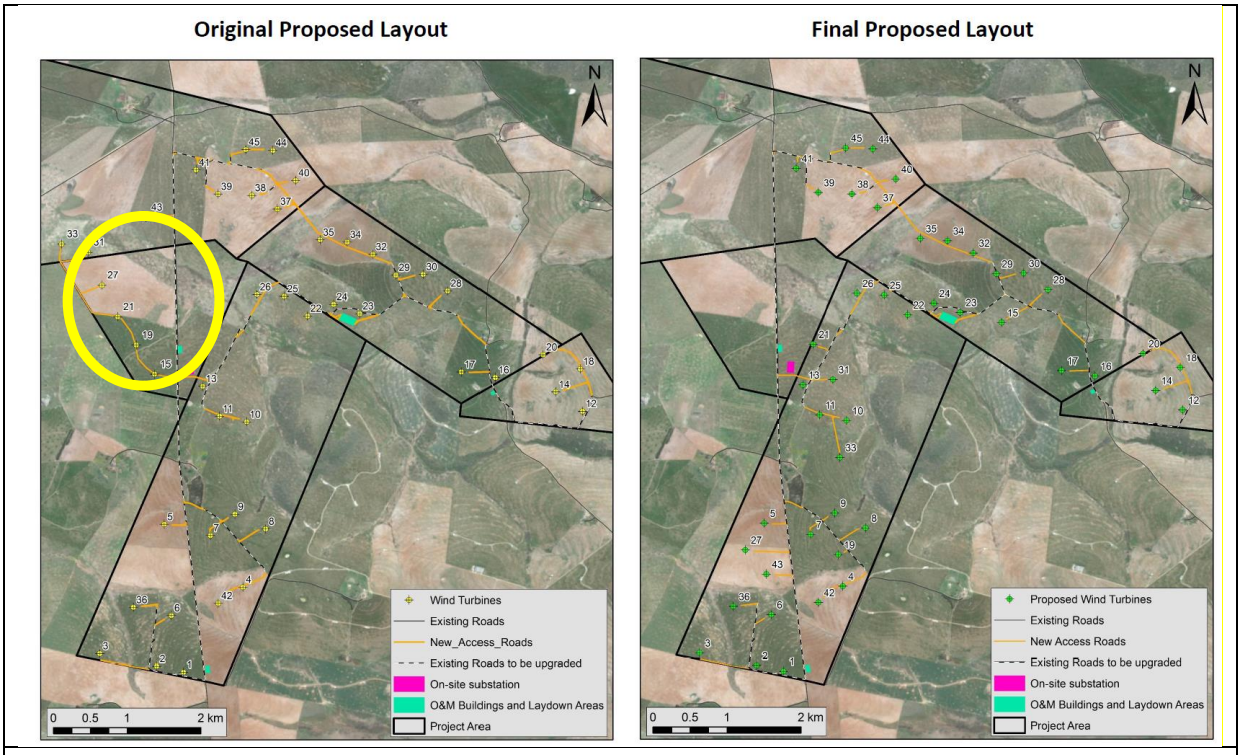

Figure 1.3: Maps showing seven turbines west of the Paternoster Road (circled) that were removed and relocated east (5) and south (2) of the road.

The footprint of the Final Layout of the facility is calculated as follows:

Table 1-2: Boulders Wind Farm footprint calculations.

FACILITY COMPONENT	CONSTRUCTION FOOTPRINT	FINAL FOOTPRINT AFTER REHABILITATION
Primary Laydown Areas (crane hardstand area)	3 800m^2 x 45 = 171 000m^2 = 17.10ha	2 000m^2 x 45 = 90 000m^2 = 9.00ha
Secondary Laydown Areas	3.00ha	0.00ha
Turbine foundation	570m^2 x 45 = 25 650m^2 = 2.57ha	570m^2 x 45 = 25 650m^2 = 2.57ha
Roads and underground cabling	23 400m x 8m = 187 200m^2 = 18.72ha	23 400m x 5m = 117 000m^2 = 11.70ha
Substation	80m x 50m = 4 000m^2 = 0.40ha	80m x 50m = 4 000m^2 = 0.40ha
OMS (Operations, Maintenance and Services) Area	2.00ha	0.00ha
TOTAL FOOTPRINT	43.79ha *of clearing needed for the construction phase of the development of the proposed wind farm*	23.67ha *of clearing remaining during the post-construction operational phase (after rehabilitation)*

In accordance with the requirements of the National Environmental Management Act No. 107 of 1998, and relevant Environmental Impact Assessment (EIA) regulations made in terms of this Act (Government Notice No R 982) promulgated in 2014 (as amended), the proposed Boulders Wind Farm requires a full Scoping and EIA process to be conducted.

1.2 ENVIRONMENTAL AUTHORISATION IN SOUTH AFRICA

The regulation and protection of the environment within South Africa, occurs mainly through the application of various items of legislation, within the regulatory framework of the Constitution (Act 108 of 1996).

The primary legislation regulating Environmental Impact Assessment (EIA) within South Africa is the National Environmental Management Act ("NEMA" Act 107 of 1998). NEMA makes provision for the Minister of Environmental Affairs to identify activities which may not commence prior to authorisation from either the Minister or the provincial Member of the Executive Council ("the MEC"). In addition to this, NEMA also provides for the formulation of regulations in respect of such authorisations.

The EIA Regulations (2014) (as amended) allow for a basic assessment process for activities with limited environmental impact (listed in GN R 983 & 985, 2014, as amended) and a more rigorous two tiered approach to activities with potentially greater environmental impact (listed in GN R 984, 2014, as amended). This two-tiered approach includes both a Scoping and EIA process. The proposed Boulders Wind Farm project activities trigger the need for an EIA under the Regulations of 2014 (as amended) in Listing Notices 1, 2 and 3 and published in Government Notices No. R 983, R 984 and R 985 respectively. The listed activities that have been applied for are provided in Table 1-3 below.

Table 1-3: Listed activities triggered by the proposed Boulders Wind Farm Project

Listed Activity as described in GN R 983, 984 and 985.	Activity Number	Listed Activity	Description of project activity that triggers listed activity
GN 983 (2014 as amended April 2017) Basic Assessment	**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.*** ***Substation Capacity: 132kV***
	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 100m^2 or more, such as grid connection infrastructure (i.e. cabling) and access roads will be constructed within a watercourse or within 32 meters of a watercourse located within the project site.***
	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 10m^3 being deposited into or removed from watercourses.***
	24 (ii)	The development of a road- (ii) with a reserve wider than	***The Boulders Wind Farm will require access roads with sections***

Listed Activity as described in GN R 983, 984 and 985.	Activity Number	Listed Activity	Description of project activity that triggers listed activity
GN 983 (2014 as amended April 2017) Basic Assessment		13,5 meters, or where no reserve exists where the road is wider than 8 metres	***up to a width of 8m, to be constructed as a result of logistical construction vehicle specification and operational requirements.***
	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 5 102.13ha 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. It is envisaged that the development footprint will be ~44ha in extent.***
	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 existing roads by more than 6m, or the lengthening of existing roads by more than 1km to accommodate the logistical construction requirements to access the site and associated infrastructure.***
GN R 984 (2014 as amended April 2017) Full EIA	**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.***
	15	The clearance of an area of 20 hectares or more of indigenous vegetation.	***Vegetation 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 R 985 (2014, as amended April 2017) Basic Assessment	**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.***
	10 (i)(ii)	The development and related operation of facilities or infrastructure for the storage, or	***The construction and operation of the Boulders Wind Farm will require the storage of dangerous***

Listed Activity as described in GN R 983, 984 and 985.	Activity Number	Listed Activity	Description of project activity that triggers listed activity
		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.	***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 R 985 (2014, as amended April 2017) Basic Assessment	**12 (i)(i)(ii)**	The clearance of an area of 300 square metres or more of indigenous vegetation; (i) in the Western Cape; (ii) 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; (iii) within critical biodiversity areas identified in bioregional plans.	***An area of more than 300m^2 of indigenous vegetation cover will be cleared for infrastructure and associated activities 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.***
	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.	***Infrastructure in excess of 10m^2 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 R 985 (2014, as amended	**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 –	***The upgrading of access roads for the project will involve the widening and/or lengthening of existing access roads. The***

Listed Activity as described in GN R 983, 984 and 985.	Activity Number	Listed Activity	Description of project activity that triggers listed activity
April 2017) Basic Assessment		(i) in the Western Cape; (ii) within all areas outside urban areas; (aa) within areas containing indigenous vegetation.	***Boulders Wind Farm will require access roads to be upgraded, which will include the widening of the roads as well as the 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.***

The competent authority that must consider and decide on the application for authorisation in respect of the activities listed in Table 1-2 is the National Department Environmental Affairs (DEA) (recently changed to the Department of Environment, Forestry and Fisheries – DEFF), as the Department has reached an agreement with all Provinces that all electricity-related projects, including generation, transmission and distribution, are to be submitted to DEA, irrespective of the legal status of the applicant. This decision has been made in terms of Section 24(C) (3) of the National Environmental Management Act (Act No 107 of 1998).

It is important to note that in addition to the requirements for an authorisation in terms of the NEMA, there may be additional legislative requirements which need to be considered prior to commencing with the activity, for example:

- National Heritage Resources Act (Act No 25 of 1999);
- Aviation Act (Act No 74 of 1962): 13th Amendment of the Civil Aviation Regulations (1997);
- NEM: Biodiversity Act (Act 10 of 2004); and
- National Water Act (Act 36 of 1998).

1.3 NATURE AND STRUCTURE OF THIS REPORT

The structure of this report is based on Section 31 of GN R 982, of the EIA Regulations (2014) (as amended), which clearly specifies the required content of an EIA Report.

1.4 DETAILS AND EXPERTISE OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

GOVERNMENT NOTICE 982, ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS, 2014 (AS AMENDED 2017). APPENDIX 3: SCOPE OF ASSESSMENT AND CONTENT OF ENVIRONMENTAL IMPACT ASSESSMENT REPORTS

3. An environmental impact assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include–

(a) Details of–

(i) The EAP who prepared the report; and

(ii) The expertise of the EAP, including a curriculum vitae

In fulfilment of the above-mentioned legislative requirement the details of the Environmental Assessment Practitioner (EAP) that prepared this environmental impact assessment report as well as the expertise of the individual members of the study team are provided below.

CES was established in 1990 as a specialist environmental consulting company based in Grahamstown, with branches in East London, Cape Town, Port Elizabeth and Johannesburg.

CES has considerable experience in terrestrial, marine and freshwater ecology, the Social Impact Assessment (SIA) process, and state of environment reporting (SOER), Integrated Waste Management Plans (IWMP), Spatial Development Frameworks (SDF), public participation, as well as the management and co-ordination of all aspects of the Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA) processes. CES has been active in all of the above fields, and in so doing have made a positive contribution to towards environmental management and sustainable development in the Eastern Cape, South Africa and many other African countries.

Dr Alan Carter is an Executive at CES and holds a PhD in Plant Sciences and is a Certified Public Accountant, with extensive training and experience in both financial accounting and environmental science disciplines with international accounting firms in South Africa and the USA. He has over 25 years of experience in environmental management and has specialist skills in sanitation, coastal environments and industrial waste. Dr Carter is registered as a Professional Natural Scientist under the South African Council for Natural Scientific Professions (SACNASP) since 1985, is a certified Environmental Assessment Practitioner in South Africa (EAPSA) and is a certified ISO14001 Environmental Management Systems Auditor.

Alan has managed EIAs and acted as EAP for over 15 utility scale wind farms and solar energy projects, and numerous other infrastructure projects.

Dr Ted Avis is the Managing Director of CES an a leading expert in the field of Environmental Impact Assessments, having project-managed numerous large-scale ESIAs to international standards (e.g. International Finance Corporation). Ted was principle consultant to Corridor Sands Limitada for the development of all environment aspects for the US$1billion Corridor Sands Project. He has managed ESIA studies and related environmental assessments of similar scope in Kenya, Madagascar, Egypt, Malawi, Zambia and South Africa. Ted has worked across Africa, and also has experience in large scale Strategic Environmental Assessments in southern Africa and has been engaged by the International Finance Corporation (IFC) on a number of projects.

Ted was instrumental in establishing the Environmental Science Department at Rhodes University whilst a Senior lecturer in Botany, based on his experience running honours modules in EIA practice

and environmental. He is an Honorary Visiting Fellow in the Department of Environmental Sciences at Rhodes. He was one of the first certified Environmental Assessment Practitioner in South Africa, gaining certification in April 2004. He has delivered papers and published in the field of EIA, Strategic Environmental Assessment and Integrated Coastal Zone Management and has been a principal of CES since its inception in 1990 and Managing Director since 1998.

Ted holds a PhD in Botany and was awarded a bronze medal by the South African Association of Botanists for the best PhD adjudicated in that year, entitled "Coastal Dune Ecology and Management in the Eastern Cape". Ted is a Certified Environmental Assessment Practitioner (since 2002) and a professional member of the South African Council for Natural Scientific Professionals (since 1993).

Ms Maura Talbot is a Principal Consultant with CES and holds a Masters Degree in Geography, as well as two BA Honours degrees, one in Human Geography and another in Economics from Rhodes University. She was also involved in the development and teaching of under-graduate Environmental Science courses at Rhodes University for 5 years. Her professional consulting experience and interests include Environmental, Social and Economic Impact Assessments, Risk Assessments, Strategic Environmental Assessments (SEA), Socio-economic Research and Surveys, Stakeholder Engagement facilitation, Resettlement Action Plans, Monitoring and Evaluation, State of the Environment Reporting, and Policy Research (industry certification, water, environmental and land reform). Maura has 5 years of experience working for CES as a Senior & Principal Environmental Consultant and another 5 years as a socio-economic sub-consultant. She has participated in and managed assessments of roads, mines, biofuel estates, golf courses, conservation, tourism, industrial and residential developments in South Africa, Madagascar, Mozambique, Malawi, Sierra Leone and Egypt.

Dr Greer Hawley is a Principal Consultant with CES and has a BSc degree in Botany and Zoology and a BSc Honours in Botany from the University of Cape Town. She completed her PhD thesis (Microbiology) at Rhodes University. Greer has been involved in a number of diverse activities. The core academic focus has been in the field of taxonomy both in the plant and fungal kingdom. Greer's research ranges from fresh water and marine algae, estuarine diatoms, plant species classification in the fynbos and forest vegetation and fungal species identification and ecology. Greer has been involved in environmental and biodiversity impact assessments and environmental and biodiversity management projects both in South Africa and other African countries. Greer has recently completed the Eastern Cape Biodiversity Conservation Plan, the Eastern Cape Biodiversity Strategy and Action Plan and assisted with the generation of the Western Cape State of the Coast Report.

Greer has participated in and managed EIAs for over 15 utility scale wind farms and solar energy projects, and numerous other infrastructure projects.

Ms Caroline Evans is a Senior Environmental Consultant based in the Grahamstown branch of CES. She holds a BSc degree in Zoology and Environmental Science (with distinction) and a BSc Honours degree in Environmental Science (with distinction), both from Rhodes University. Caroline has completed accredited courses in environmental impact assessments and wetland assessments.

Caroline's primary focuses include Project Management, the general Environmental Impact Assessment Process, Visual Impact Assessments and Wetland Impact Assessments. Examples of fields in which Caroline was the project manager and lead report writer include Wind Energy Facilities and the associated infrastructure (including powerlines), Solar PV, Waste Water Treatment Works, Housing Developments and Agricultural Developments. Her experience with wind energy facilities and associated infrastructure includes the project management and report writing for the

Umsobomvu WEF, Dassiesridge WEF, Scarlet Ibis WEF, Albany WEF, Waaihoek WEF and the Great Kei WEF.

Caroline is well versed in South African policy and legislation relating to development, particularly in the Eastern Cape Province. In addition, Caroline's project management experience has helped her gain knowledge and experience in the technical and financial management and coordination of large specialist teams, competent authority and stakeholder engagement, and client liaison.

Mr Michael Johnson is a consultant at CES and holds a BSc in Geoinformatics, a BSc (Hons) cum laude in Geoinformatics and an MSc in Geoinformatics from Stellenbosch University. Michael's Master's thesis examined the use of Remote Sensing and computer vision technologies for the extraction of near-shore ocean wave characteristic parameters. For the duration of his Master's, he was based at the CSIR in Stellenbosch. During this time, in addition to his Master's studies, he conducted work in collaboration with the CSIR Coastal Systems Research Group and provided GIS and Remote Sensing tutoring and technical assistance to the junior staff and fellow students.

2. PROJECT DESCRIPTION

GOVERNMENT NOTICE 982, ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS, 2014 (AS AMENDED 2017). APPENDIX 3: SCOPE OF ASSESSMENT AND CONTENT OF ENVIRONMENTAL IMPACT ASSESSMENT REPORTS

3. An environmental impact assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include–

(c) A plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure 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.

In fulfilment of the above-mentioned legislative requirements, this Chapter of the EIR identifies the location and size of the site of the proposed Boulders Wind Farm and provides a description of its various components and layout on the site.

2.1 PROJECT LOCALITY

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

- 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 project site identified for the Boulders Wind Farm is located approximately 7km east of Paternoster, 7km southwest of St Helena Bay and 12km northeast of Vredenburg.

The total area of the proposed Boulders Wind Farm site is to be constructed within the project site, comprising an area of approximately 5 102ha. The infrastructure associated with the wind farm will have a development footprint of less than 1% of the total project site (44Ha).

The development footprint proposed for the Boulders Wind Farm has been placed in the preferred development area as identified in the Scoping Phase where the location of the wind farm was informed by a pre-EIA feasibility study conducted by Vredenburg Windfarm (Pty) Ltd (See Appendix D-1). Subsequent to the Scoping Phase, seven turbines were moved, five to the east and two to the south of the Vredenburg-Paternoster Road.

The proposed development footprint is located within five (5) properties of the larger project site which includes:

- 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

Access to the Boulders Wind Farm project site is provided by 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 St. Helena 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.

The specific coordinates for each turbine is shown in Table 2-1 below.

Table 2-1: Wind turbine coordinates for the proposed Boulders Wind Farm project.

WIND TURBINE LABEL NUMBER	Latitude (S)	Longitude (E)
WTG01	32°50'48.99"S	17°58'12.22"E
WTG02	32°50'46.36"S	17°58'00.44"E
WTG03	32°50'40.79"S	17°57'35.40"E
WTG04	32°50'11.66"S	17°58'38.27"E
WTG05	32°49'44.07"S	17°58'03.74"E
WTG06	32°50'24.09"S	17°58'06.82"E
WTG07	32°49'49.00"S	17°58'24.01"E
WTG08	32°49'46.14"S	17°58'48.28"E
WTG09	32°49'39.64"S	17°58'34.79"E
WTG010	32°48'59.16"S	17°58'39.91"E
WTG011	32°48'56.68"S	17°58'28.06"E
WTG012	32°48'54.49"S	18° 01'07.11"E
WTG013	32°48'43.52"S	17°58'20.64"E
WTG014	32°48'45.99"S	18° 00'55.33"E
WTG015	32°48'16.09"S	17°59'47.77"E
WTG016	32°48'39.63"S	18° 00'28.77"E
WTG017	32°48'37.24"S	18° 00'14.18"E
WTG018	32°48'35.89"S	18° 01'06.04"E
WTG019	32°49'57.88"S	17°58'36.33"E
WTG020	32°48'29.65"S	18° 00'49.80"E
WTG021	32°48'25.54"S	17°58'25.16"E
WTG022	32°48'12.70"S	17°59'06.63"E
WTG023	32°48'11.64"S	17°59'29.61"E
WTG024	32°48'7.62"S	17°59'18.07"E
WTG025	32°48'4.06"S	17°58'56.39"E
WTG026	32°48'3.23"S	17°58'44.43"E
WTG027	32°49'55.79"S	17°57'55.49"E
WTG028	32°48'01.65"S	18° 00'08.18"E
WTG029	32°47'54.73"S	17°59'45.43"E
WTG030	32°47'54.45"S	17°59'57.44"E
WTG031	32°48'41.16"S	17°58'33.96"E

WIND TURBINE LABEL NUMBER	Latitude (S)	Longitude (E)
WTG032	32°47'45.63"S	17°59'35.34"E
WTG033	32°49'15.29"S	17°58'37.01"E
WTG034	32°47'40.26"S	17°59'24.06"E
WTG035	32°47'39.25"S	17°59'12.16"E
WTG036	32°50'20.53"S	17°57'50.18"E
WTG037	32°47'25.72"S	17°58'53.40"E
WTG038	32°47'19.77"S	17°58'42.23"E
WTG039	32°47'19.15"S	17°58'27.38"E
WTG040	32°47'13.20"S	17°59'01.43"E
WTG041	32°47'08.59"S	17°58'17.72"E
WTG042	32°50'18.78"S	17°58'27.48"E
WTG043	32°50'06.40"S	17°58'04.70"E
WTG044	32°47'00.03"S	17°58'51.42"E
WTG045	32°46'59.63"S	17°58'39.52"E

2.2 PROPOSED ACTIVITY

The layout of the Boulders Wind Farm is provided in Figure 1-2 above.

2.2.1 Wind Farm

The Boulders Wind Farm will be spread over 5 adjacent properties (of 10 properties initially proposed in the Scoping Phase). These land portions are planned to host up to 45 turbines, each with a nominal power output of up to 3.15MW. The Boulders Wind Farm will have a total output of up to 140MW. As the EIA process has proceeded, environmental sensitivities and engineering limitations have resulted in a refining of the layout of the Boulders Wind Farm in order to avoid sensitive areas identified by the specialist environmental and social impacts studies.

The size of the wind turbines will consist of 3 blades with a rotor diameter of up to 103 meters mounted atop high steel (or hybrid steel/concrete) tower of up to approximately 120 meters. Other infrastructure components associated with the proposed Boulders Wind Farm include:

- Concrete foundations to support the turbines;
- Cabling between the turbines, to be laid underground where practical;
- Access roads to the site and between project components with a width of approximately 8m;
- An on-site substation of up to 80m x 150m in extent to facilitate the connection between the wind farm and the electrical grid; and
- Laydown areas, crane hardstand pads, administrative buildings and offices.

2.2.2 Production of Electricity from Wind

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

A typical wind turbine consists of (refer to Figure 2-1):

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

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

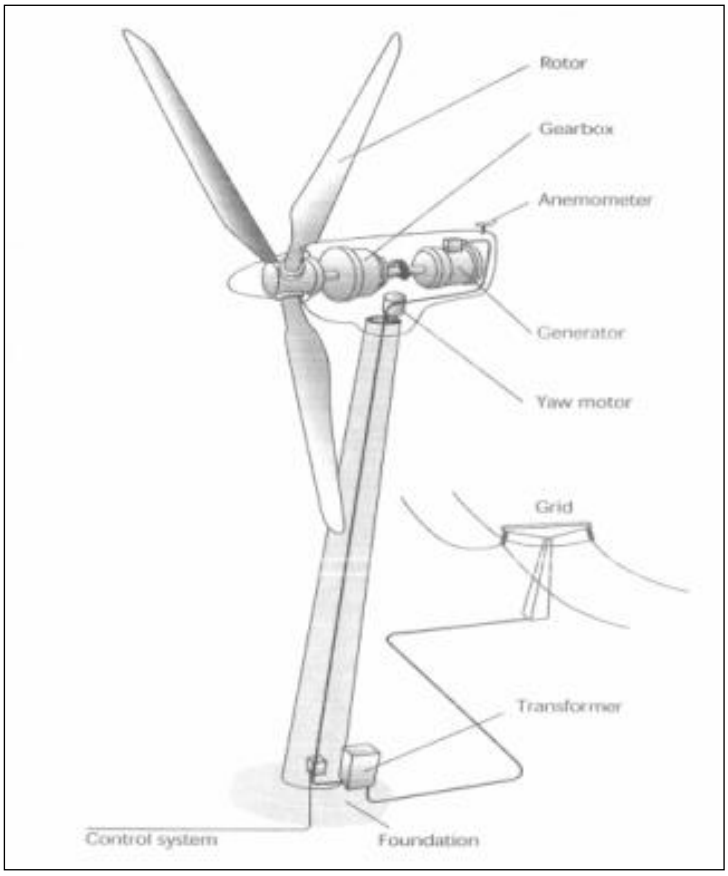

Figure 2-1: Illustration of the main components of a typical wind turbine.

2.3 STAGES OF WIND FARM DEVELOPMENT

Typically, building a wind farm is divided into four phases namely:

- Preliminary civil works
- Construction
- Operation
- Decommission

2.3.1 Preliminary Civil Works

Prior to the commencement of the main construction works, the Contractor may undertake vegetation clearance (if required) and site establishment works. The site establishment works may include the construction of one, or more, temporary construction compounds and laydown areas and the connection of services such as power and water to these compounds.

2.3.2 Construction

The construction footprint will include the platforms, or "crane pads" required to construct the wind turbines, new or upgraded access roads, lay-bys, component storage areas, turning heads and a substation to evacuate the electricity generated to the municipal or national grid.

A typical platform for the assembly of the crane and construction of the turbine is shown in Figure 2-2. These platforms will be connected by access roads (if none existing) with the following requirements:

- Should a "crawler" type crane be used, then road widths of up to 8m on straight sections may be required, of which 6m would be retained for the life of the wind farm;
- Maximum 10% vertical gradient on gravel roads; and
- Passing places of 50 m length and 5m width located approximately every 1km.

The construction footprint required will be greater than the dimensions specified above to allow for construction of the wind farm infrastructure. These areas are used temporarily over the construction period – including a temporary construction compound and road verges – and will be rehabilitated at the end of construction works to reduce the footprint on the land.

Other works during the construction phase include:

a) Geotechnical studies and foundation works

A geotechnical study of the area is undertaken for safety purposes. This comprises of drilling, penetration and pressure assessments. For the purpose of the foundations, approximately 1 500m^3 of soil would need to be excavated for each turbine. These excavations are then filled with steel-reinforced concrete (typically 45 tons of steel reinforcement per turbine including a "bolt ring" to connect the turbine foundation to the turbine tower). Foundation design will vary according to the type and quality of the soil. The typical dimensions of a foundation for a 3MW/100m high wind turbine are shown in Figure 2-3 with the underground foundation and tower connection at ground level.

b) Electrical cabling

Electrical and communication cables are laid approximately 1 m below ground level in trenches which run alongside the access roads, where possible. All previous farming activities can continue unhindered on the ground above the cables during the operational phase.

c) Establishment of hard standing surfaces and laydown areas

Laydown and storage areas will be required for the contractor's construction equipment and turbine components on site.

d) Site preparation

If not carried out in the preliminary works phase, this will include clearance of vegetation over the access roads, platforms, lay-bys, substation and any other laydown or hard-standing areas. These activities will require the stripping of topsoil which will be stock-piled, back-filled and/or spread on site.

e) Establishment of substation and ancillary infrastructure

The establishment of these facilities/buildings will require the clearing of vegetation and levelling of the development site and the excavation of foundations prior to construction. A laydown area for building materials and equipment associated with these buildings will also be required.

f) Turbine erection

Weather permitting, the erection of the turbines can be completed swiftly and erection rates generally average 1-2 turbines per week. This phase is the most complex and costly.

g) Undertake site remediation

Once construction is completed and all construction equipment is removed, the site must be rehabilitated. On full commissioning of the facility, any access points to the site which are not required during the operational phase must be closed and rehabilitated.

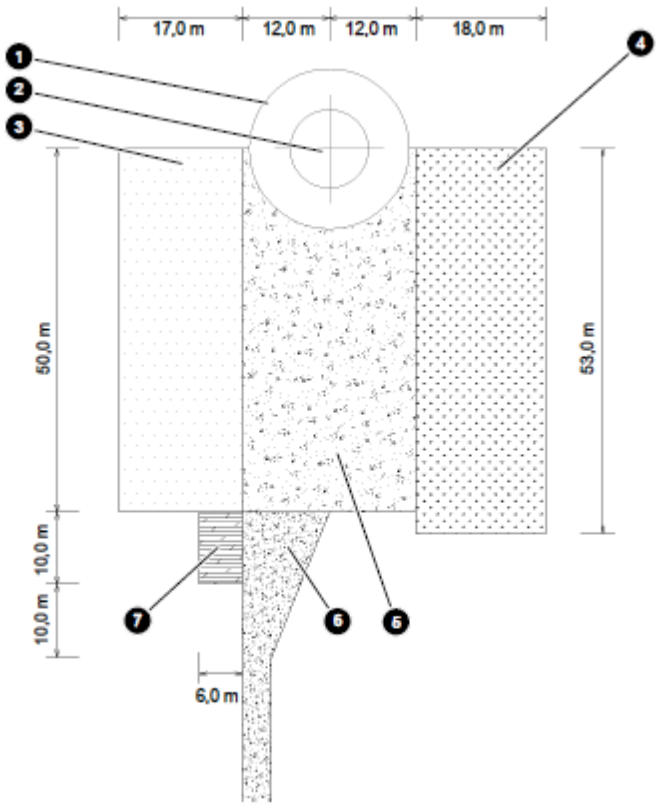

Figure 2-2: Typical construction phase turbine platform (1: Foundation; 2: Tower; 3: Assembly area with a minimum load-bearing capacity of 135 kN/m^2; 4: Storage area; 5: Crane platform with a minimum load-bearing capacity of 185 kN/m^2; 6: Access road with a maximum axle load of 12t; 7: Parking area)

A platform of the dimensions indicated above needs to be laid down during the preliminary phase of a typical wind farm for access to the site during the construction phase for various equipment and machinery (bulldozers, trucks, cranes, etc.).

2.3.3 Electrical connections

Each turbine is fitted with its own transformer that steps up the voltage usually to 22 or 33kv. The entire wind farm is then connected to the "point of interconnection" which is the electrical boundary between the wind farm and the municipal or national grid. Most of these works will be

carried out by Eskom or an Eskom-approved sub-contractor (line upgrade, connection to the sub-station, burial of the cables etc.). The interconnection of the wind farm to the Eskom Transmission electrical grid will require the construction of a high voltage electrical substation. This powerline has been applied for in a separate application.

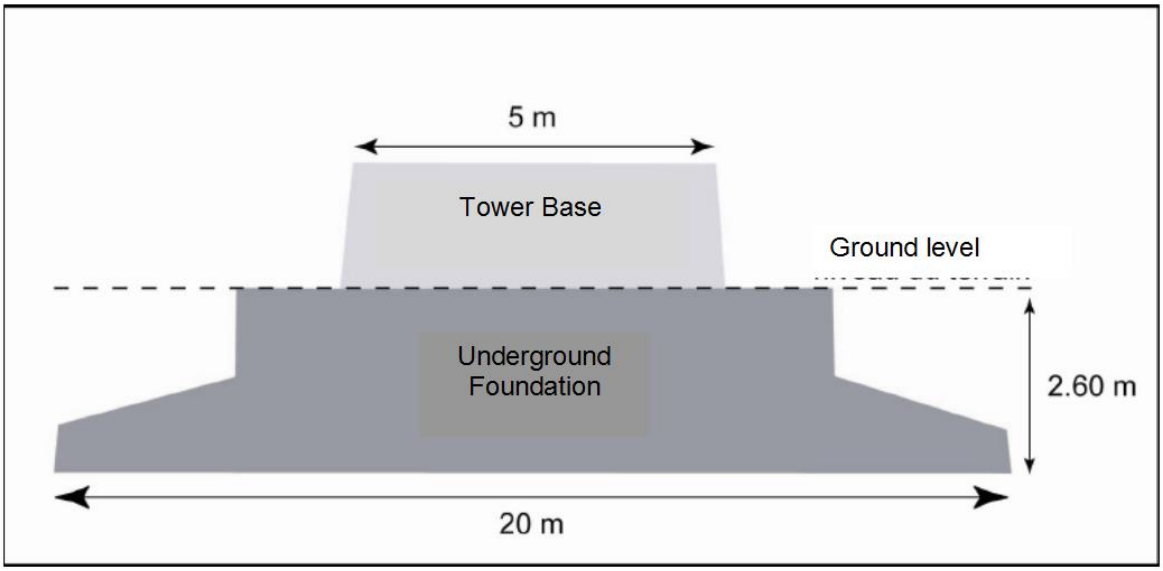

Figure 2-3: Indicative dimensions for the foundation of a 3MW/100m high wind turbine.

2.3.4 Operational Phase

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

2.3.5 Decommissioning of the Wind Farm

The infrastructure would only be decommissioned once it has reached the end of its economic or technological life of 20-25 years. If economically feasible, the decommissioning activities would comprise the disassembly and replacement of the individual components with more advanced technology/infrastructure available at the time. This operation is referred to as 'facility re-powering'. However, if not deemed so, then the facility would be completely decommissioned which would include the following decommissioning activities.

a) Site preparation

Activities would include confirming the integrity of the access to the site to accommodate the required equipment and the mobilisation of decommissioning equipment.

b) Disassemble all individual components

The components would be disassembled and reused and recycled or disposed of in accordance with regulatory requirements.

2.4 ANCILLARY INFRASTRUCTURE

Additional infrastructure such as internal access roads, underground and overhead power lines, electrical switching station and/or small substation and control buildings will also form part of the wind farm. Figure 2-4 indicates the ancillary infrastructure layout that was assessed by the EAP and the specialists as part of the EIR phase. An indication of the final layout in response to the assessment of this infrastructure can be found in Figure 11-1 (See Chapter 11).

Electrical energy generated by the Boulders Wind Farm will be transmitted to the existing Eskom Fransvlei-Aurora 132kV line for distribution via the national electrical grid network.

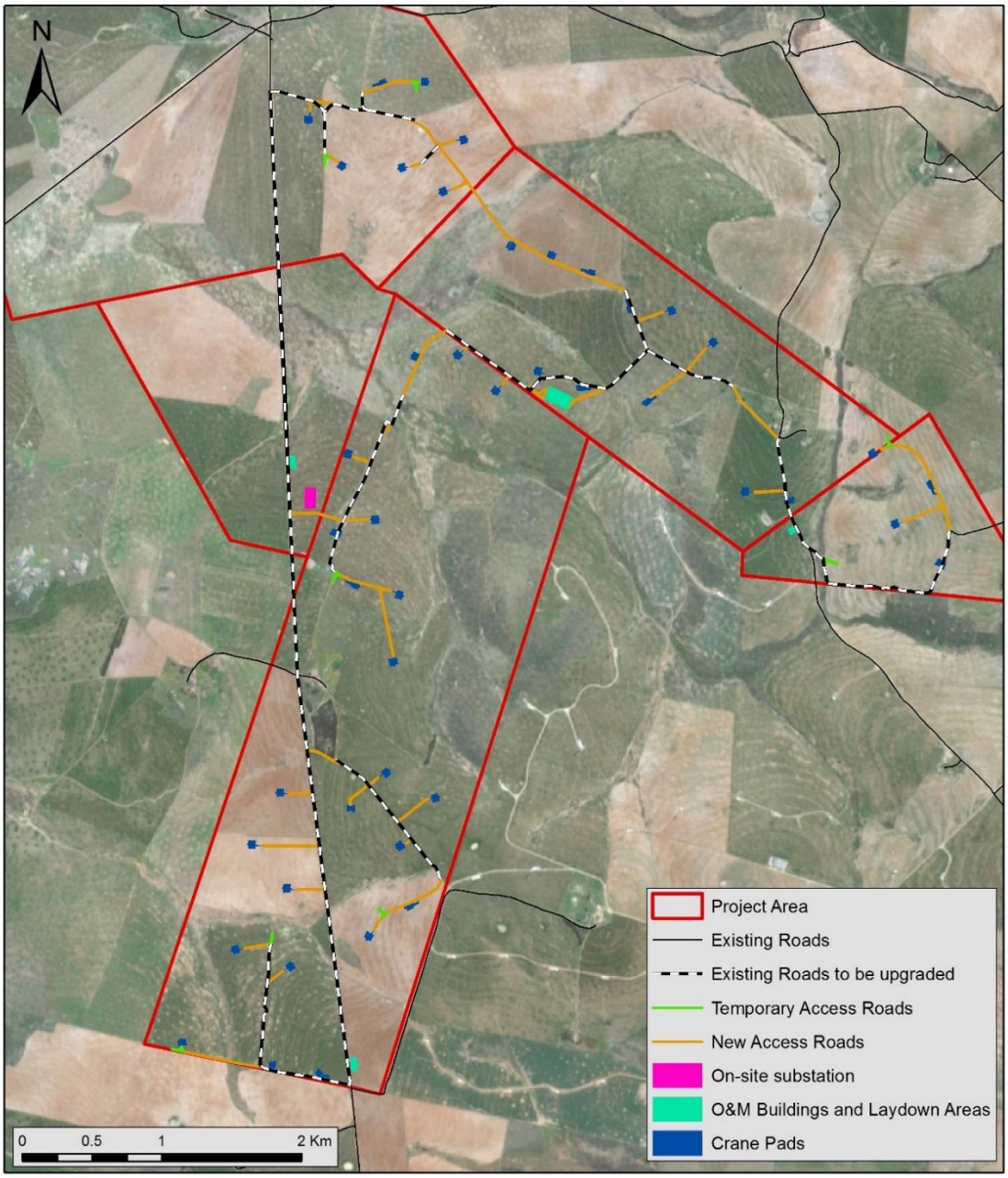

Figure 2-4: Layout of ancillary infrastructure such as access roads, substation and site camp.

2.4.1 Powerlines and substation

Vredenburg Wind Farm (Pty) Ltd proposes to develop a 132kV above-ground electricity distribution line located within and adjacent to the proposed Boulders Wind Farm, approximately 12km northeast of the commercial centre of Vredenburg in the Saldanha Bay Local Municipality, within the West Coast District Municipality in the Western Cape (Figure 2-5).

The project site includes 12 potentially affected properties:

- Boebezaks Kraal 1/40
- Boebezaks Kraal 2/40
- Boebezaks Kraal 5/40
- Het Schuytje 1/21

- Frans Vlei 2/46
- Frans Vlei 3/46
- Frans Vlei 4/46
- Frans Vlei 5/46
- Frans Vlei 6/46
- Frans Vlei 9/46
- Schuitjes Klip 3/22
- Zoutzaksfontyn 16/95

The proposed distribution line will be used to transmit electrical energy generated by the Boulders Wind Farm, up to 140 megawatt (MW), to the existing Eskom Fransvlei-Aurora 132kV line for distribution via the national electrical grid network.

The proposed electrical distribution infrastructure includes:

- 132kV above-ground distribution line to connect the onsite 33/132kV substation to the grid. The pylons for this line will have an average spacing of 250m and will require a servitude width of 31m.
- The proposed line will be connected to the grid via a Loop in Loop out connection onto the existing Aurora – Fransvlei 132kV by means of constructing a new pylon next to the AUR-FRA 82 pylon and spanning conductors overhead onto this existing line.
- There are five alternative routes being considered. The details for the proposed alternative routes can be seen in the Table 2-2 and Figure 2-5 below. Each of these distribution line alternatives will be buffered by 150m (i.e. a 300m corridor) to allow for micro-siting. Although numerous powerline alternatives are considered, only one 132kV overhead power line will be built to connect to the grid.

Vredenburg Wind Farm (Pty) Ltd has submitted a separate application for Environmental Authorisation for the proposed powerlines. The DEA Reference Number for the proposed Boulders Wind Farm Powerline BA is: 14/12/16/3/3/1/2010.

Table 2-2: Powerline coordinates for the proposed Boulders Wind Farm project.

NAME	START POINT	END POINT	LENGTH	TYPE OF PYLONS	± NUMBER OF PYLONS
Alternative 1	BWF Substation	132kV line @ AUR-FRA 82	9.4km	Self-supporting & guide structures	Strain: Up to 10 Intermediate: Up to 38
Alternative 2	BWF Substation	132kV line @ AUR-FRA 82	7.4km	Self-supporting & guide structures	Strain: Up to 10 Intermediate: Up to 30
Alternative 3	BWF Substation	132kV line @ AUR-FRA 82	6.3km	Self-supporting & guide structures	Strain: Up to 6 Intermediate: Up to 26
Alternative 4	BWF Substation	132kV line @ AUR-FRA 82	6.2km	Self-supporting & guide structures	Strain: Up to 8 Intermediate: Up to 25
Alternative 5	BWF Substation	132kV line @ AUR-FRA 82	6.5km	Self-supporting & guide structures	Strain: Up to 8 Intermediate: Up to 27

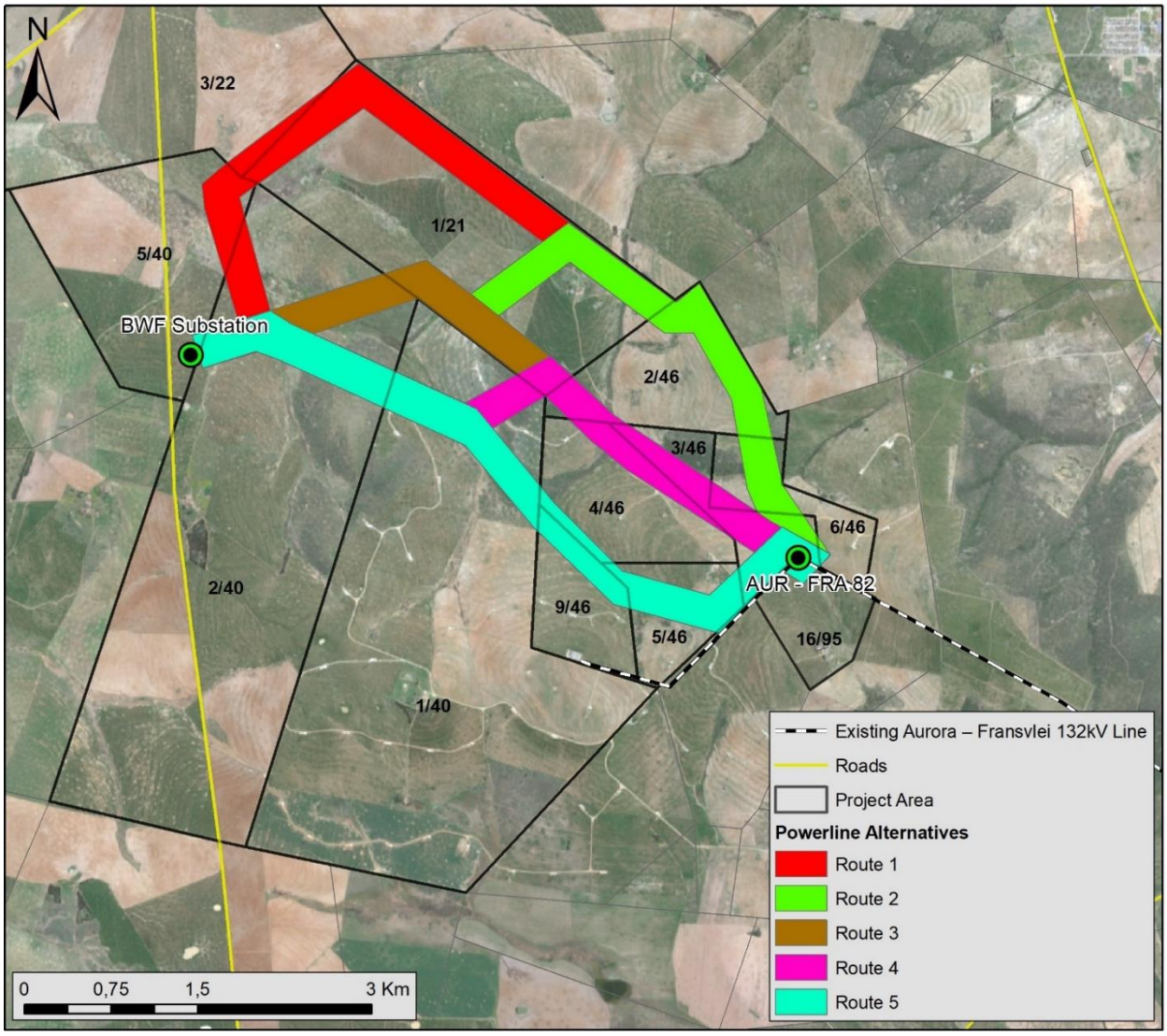

Figure 2-5: Layout of the powerlines alternatives for the Boulders Wind Farm connectivity

2.4.2 Storage and Handling of Dangerous Goods/Chemicals

Dangerous goods refers to goods that contain any of the substances as contemplated in the South African National Standards No. 10234, supplement 2008 1.00 "List of classification and labelling of chemicals in accordance with the globally harmonized systems" published by Standards South Africa, and where the presence of such goods, regardless of quantity, in a blend or mixture, causes such blend or mixture to have one or more of the characteristics listed in the Hazardous Statements in Section 4.2.3 of the Standard, namely physical hazards, health hazards or environmental hazards.

Table 2-3 provides an overall estimate of the total volumes of dangerous goods to be stored on site during the construction and operational phases of the Boulders Wind Farm, assuming that all 45 turbines are constructed, and that the construction phase lasts 24 months. Table 2-4 lists the types of dangerous material and the estimated total volume to be stored on site per year of construction.

Table 2-3: Estimated Volume of Dangerous Goods Stored on Site.

BOULDERS WIND FARM ESTIMATED VOLUME OF HAZARDOUS MATERIALS STORED ON SITE	
NUMBER OF WIND TURBINES	45
CONSTRUCTION DURATION	24 months
OPERATIONAL DURATION	20 years
CONSTRUCTION PHASE	26.59 m^3
OPERATIONS PHASE	143.02m^3

Handling and disposal of all dangerous goods on site will be conducted in terms of the prevailing construction health and safety standards. All waste for disposal will be suitably stored in marked, sealed containers prior to disposal through an appropriately registered hazardous waste disposal service.

Construction Phase

During the construction phase, the contractor would typically set aside an area within the construction camp for the storage of all plant and materials. In the case of fuels and other hazardous materials, this would be within a bunded area, in accordance with the SANS 10131.

The single largest contributor to the storage volume during construction is the storage of diesel for equipment such as excavators, trucks, rollers, etc. For above-ground storage of diesel, the SANS 10131 Standard requires that the storage tank be located within a bunded area, where such an area is either an area bounded by ground contours that confine spillage, or an area surrounded by bund walls.

Table 2-4: Estimated Volume of Dangerous Goods Stored on Site during the Construction Phase.

MATERIAL TYPE	VOLUME PER TURBINE	#	YEARS	VOLUME (M^3)	STORAGE CONTAINER
Oil cutting- 210ml WISURA® AKAFIL - blades	840	45	2	0.038 m^3	The dangerous goods will be stored onsite in storage containers (shipping containers). All dangerous goods will remain in their original packaging within the storage containers.
Adhesive WEICON LOCK VA250 black - blades	120	45	2	0.005 m^3	
LOCTITE® 290 threadlocker 50ml – blades	400	45	2	0.018 m^3	
LOCTITE® 2701 threadlocker 50ml – blades	400	45	2	0.018 m^3	
Oil cutting- 210ml WISURA® AKAFIL – tower	210	45	2	0.009 m^3	
Adhesive WEICON LOCK VA250 black – tower	30	45	2	0.001 m^3	
LOCTITE® 290 threadlocker 50ml – tower	50	45	2	0.002 m^3	
LOCTITE® 2701 threadlocker 50ml – tower	50	45	2	0.002 m^3	
Oil for formwork		45	2	1.500m^3	
Fuel (Diesel)		45	2	25.000m^3	
			TOTAL	26.59 m^3	

Operational Phase

During operations, hazardous materials will be stored in a designated and specially designed hazardous material store. Any store will also be bunded in accordance with the SANS requirements to contain any spillages and will be suitably ventilated. Table 2-5 indicates a list of dangerous materials and gives an estimation of the volumes to be stored on site.

Table 2-5: Estimated Volume of Dangerous Goods Stored on Site during the Operational Phase.

MATERIAL TYPE	VOLUME PER TURBINE	#	YEARS	VOLUME (M^3)	STORAGE CONTAINER
PERMANENT IN WIND TURBINES					
Yaw gear (Renolin Unisyn CLP 220)	84	45	20	75.60 m^3	The dangerous goods will be stored onsite in storage containers (shipping containers). All dangerous goods will remain in their original packaging within the storage containers.
Pitch gear (Renolin Unisyn CLP 220)	12	45	20	10.80 m^3	
Front hub bearing (Klüberplex BEM 41-141)	9	45	20	8.10 m^3	
Rear hub bearing (Klüberplex BEM 41-141)	9.3	45	20	8.37 m^3	
Blade flange bearing (Klüberplex BEM 41-141)	11.7	45	20	10.53 m^3	
Yaw bearing (Klüberplex BEM 41-141)	4.5	45	20	4.05 m^3	
Yaw gear rim (Klüberplex BEM 41-141)	0.25	45	20	0.23 m^3	
Hydraulic system of rotor lock (Klüberplex BEM 41-141)	4	45	20	3.60 m^3	
ENERCON service hoist cable and safety cable (HHS 2000)	1	45	20	0.90 m^3	
ENERCON service hoist winch (Mobil SHC 632)	1.5	45	20	1.35 m^3	
ENERCON service hoist winch (Goracon GTO 68)	0.6	45	20	0.54 m^3	
Winch (Spirax S4 TXM 10W30)	0.5	45	20	0.45 m^3	
Winch (Tectrol CLP 220)	0.35	45	20	0.32 m^3	
Winch chain (Renolin Unisyn CLP 220)	0.2	45	20	0.18 m^3	
Automatic nacelle extinguisher system (Mousseal-CF)	20	45	20	18.00 m^3	
			TOTAL	**143.02 m^3**	

2.4.3 Roads and Water Crossings

Approximately 24km of access roads are proposed to be constructed for the proposed Boulders Wind Farm. This includes 12.4km of new roads and 11.0km of upgrades to existing roads. These roads will be approximately 8m wide during construction, and 6m wide after construction, as 2m will be rehabilitated. There will be no road reserve. In the current layout, two water-crossings have been identified for the construction of roads. The total amount of infilling required in order to construct the two river crossings amounts to a total of approximately 18m^3. Table 2-6 indicates the location of the access roads.

Table 2-6: Road coordinates for the proposed Boulders Wind Farm project.

ROAD SEGMENTS	ROAD TYPE	STARTING CENTRE COORDINATE		ENDING CENTRE COORDINATE	
		LATITUDE (S)	LONGITUDE (E)	LATITUDE (S)	LONGITUDE (E)
A1	Upgrade	216012	6361644	216094	6362523
A2	Upgrade	216663	6361508	216012	6361644
A3	New	216065	6362240	216213	6362344
A4	New	216094	6362523	215863	6362479
A5	New	216012	6361644	215455	6361784
A6	New	216475	6362914	216230	6362907
A7	New	216434	6363225	215979	6363225
A8	New	216385	6363604	216185	6363595
B1	New	216355	6363902	216573	6363819
B2	Upgrade	216573	6363819	217307	6362994
B3	New	216796	6363656	216892	6363742

ROAD SEGMENTS	ROAD TYPE	STARTING CENTRE COORDINATE		ENDING CENTRE COORDINATE	
		LATITUDE (S)	LONGITUDE (E)	LATITUDE (S)	LONGITUDE (E)
B4	New	216796	6363656	216656	6363519
B5	New	217001	6363396	217248	6363566
B6	New	217307	6362994	216820	6362592
C1	New	216226	6365603	216608	6365555
C2	New	216374	6365607	216483	6365518
C3	New	216608	6365555	216818	6365567
C4	Upgrade	216562	6365177	217062	6366502
C5	New	217062	6366502	217352	6366921
C6	Upgrade	217352	6366921	217939	6366499
C7	New	217939	6366499	218493	6366498
C8	Upgrade	217939	6366499	218794	6366773
C9	Upgrade	218794	6366773	218637	6367206
C10	New	216562	6365177	216993	6365042
C11	New	216867	6365073	216968	6364566
C12	New	216806	6365974	216668	6366020
C13	New	217499	6366807	217459	6366755
C14	New	217797	6366595	217727	6366502
C15	New	218134	6366591	218031	6366616
C16	New	218721	6366982	218939	6367063
D1	Upgrade	218794	6366773	219407	6366517
D2	New	219070	6366623	219241	6366823
D3	New	219070	6366623	218798	6366429
D4	New	219407	6366517	219732	6366138
D5	Upgrade	219732	6366138	220088	6365113
D6	New	219782	6365773	219520	6365755
D7	Upgrade	220088	6365113	220817	6365038
D8	Upgrade	220817	6365038	220949	6365367
D9	New	220949	6365367	220437	6366040
D10	New	220914	6365664	220598	6365531
E1	New	218637	6367206	218409	6367295
E2	New	218409	6367295	217289	6368250
E3	Upgrade	217289	6368250	216093	6368631
E4	New	218299	6367341	218360	6367330
E5	New	217501	6367986	217350	6367921
E6	New	217289	6368250	217056	6368089
E7	New	217289	6368250	217445	6368290
E8	Upgrade	216742	6368505	216752	6368623
E9	New	216752	6368623	217169	6368710
E10	Upgrade	216548	6368547	216481	6368198
E11	New	216481	6368198	216580	6368122
E12	New	216478	6368485	216372	6368570
E13	New	216372	6368570	216371	6368458

Material Sources

A number of commercial material sources exist in close proximity to the Boulders Wind Farm site. These sources will need to be investigated further during the preconstruction phase to determine

the ultimate suitability of the material for the purposes of wind farm construction. Should suitable material be available onsite, a borrow pit will be appropriately licenced through the DMR (dependent on the selection of the proposed Boulders Wind Farm as a preferred bidder).

Disposal of spoil material

Backfilling of wind turbine foundation excavations typically does not account for even half of the material initially excavated for the foundation, and thus significant amounts of subsoil will need to be properly disposed of. Excavated material that cannot be used elsewhere on the site will be designated as spoil material. This material cannot be permanently stored on site without the appropriate Waste License in terms of the NEMA: Waste Act. Alternatives for the disposal of spoil could include activities such as:

- Restoration of open borrow pits.

This option proposes the use of spoil as fill within existing borrow pits within or near to the wind farm, and the use of excess topsoil for rehabilitation. The DMR will assist in identifying potential borrow pit sites within the vicinity of the proposed wind farm.

- Creation of berms

Additional subsoil and topsoil could be allocated to create berms, for managing and/or diverting storm water, during the rehabilitation of disturbed areas.

- Rehabilitation of Erosion Features

This option proposes the placement of spoil and topsoil within existing erosion gullies. This would involve filling erosion gullies, starting at the top end of the gully (at the head-cut), covering the fill with topsoil and revegetating the surface.

- Donation of materials to other off-site construction activities

The material may be suitable for backfill on other construction activities in the local area. Opportunities such as these should be taken wherever possible.

- Disposal at a registered landfill

Disposal of the material is a last resort option. This represents a significant financial and environmental cost if this option were to be initiated.

No subsoil stockpiles will be left on site once construction activities have ceased.

3. PROJECT NEEDS & DESIRABILITY

GOVERNMENT NOTICE 982, ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS, 2014 (AS AMENDED 2017). APPENDIX 3: SCOPE OF ASSESSMENT AND CONTENT OF ENVIRONMENTAL IMPACT ASSESSMENT REPORTS

3. An environmental impact assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include–

(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;

(g) A motivation for the preferred development footprint within the approved site;

Increasing pressure is being placed on countries internationally to reduce their reliance on fossil fuels, such as oil and coal, which contribute towards greenhouse gases (GHG) being emitted into the atmosphere and thus climate change. Renewable energy resources such as wind energy facilities and solar PV farms are being implemented as alternative sources of energy at a global and national scale.

South Africa has also recognised the need to expand electricity generation capacity within the country. This is based on national policy and informed by ongoing planning undertaken by the Department of Energy (DoE) and the National Energy Regulator of South Africa (NERSA).

The draft of the South African Integrated Resource Plan (IRP 2018) was released for public comment in August 2018, setting out a new direction in energy sector planning. The plan includes a shift away from coal, increased adoption of renewables and gas, and an end to the expansion of nuclear power. The South African Government has not yet communicated a timeline for the plan's final adoption. The previous two proposed IRP updates (in 2013 and 2016) were never adopted by Cabinet.

The revised plan, if adopted, would mark a major shift in energy policy. The policy aims to decommission a total of 35 GW (of 42 GW currently operating) of coal generation capacity from Eskom by 2050, starting with 12 GW by 2030, 16 GW by 2040 and a further 7 GW by 2050. The draft IRP 2018 also proposes a significant increase in renewables-based generation from wind and solar as well as gas-based generation capacity by 2030 and beyond, with no further new nuclear capacity being procured.

Implementing the IRP update of 2018 could bring South Africa close to meeting the upper range of its 2030 Nationally Determined Contribution (NDC) target. The implementation of the IRP update of 2018 would constitute significant progress in the transformation of the South African energy sector. To be in line with the Paris Agreement goals for mitigation, South Africa would still need to adopt more ambitious actions by 2050 such as expanding renewable energy capacity beyond 2030, fully phasing out coal by mid-century, and substantially limiting unabated natural gas use.

Electricity supply in South Africa

South Africa's current electricity generation and supply system is unreliable. The Western Cape Province is reliant on the import of power from other provinces, and hence constrained by the availability and stability of electricity supply.

Currently, Eskom has a net output of 47,201MWp, and it produces 85% of South Africa's electricity, which is an equivalent of 40% of Africa's electricity. Renewable energy accounts for 5% of South Africa's electricity. This is mainly due to the targets set in the IRP2010-2030 that aimed to change the electricity landscape from high coal (91.7%) to medium coal (48%) using electricity produced by the Independent Power Producers, with the utility company, Eskom, as the single buyer of the

electricity.

The REIPPP programme procured over 6.3GW by 2017 and of this, 3.8GW was already feeding into the grid. A further 2.4GW was procured in 2018, which included 27 projects signed by the minister. The REIPPP attracted $14.4 billion investment by December 2017. The concept is based on the public-private partnership model to increase new generation capacity. It also encourages industrialisation as it requires that at least 40% of the technologies involved should have local content. This results in job creation for the local communities where manufacturing takes place.

Social and Economic Development

Vredenburg Wind Farm (Pty) Ltd intends to promote local economic growth and development through direct and indirect employment, as well as the identification and implementation of social development schemes during the projects operational phase. A local community trust will be established in order to ensure that funds are channelled to these social development schemes.

The need and desirability of the proposed Boulders Wind Farm project can be demonstrated in the following main areas:

- Move to green energy due to growing concerns associated with climate change and the on-going exploitation of non-renewable resources;
- Security of electricity supply, where over the last few years, South Africa has been adversely impacted by interruptions in the supply of electricity; and
- Stimulation of the green economy where there is a high potential for new business opportunities and job creation.

The above main drivers for renewable energy projects are supported by the following International, National and Provincial (Western Cape) policy documents.

3.1 INTERNATIONAL

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

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

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM

The UNFCCC is relevant in that the proposed Boulders Wind Farm project will contribute to a reduction in the production of greenhouse gases by providing an alternative to fossil fuel-derived electricity. South Africa has committed to reducing emissions to demonstrate its commitment to meeting international obligations.

3.1.2 The Kyoto Protocol (2002)

The Kyoto Protocol is a protocol to the UNFCCC which was initially adopted for use on 11 December 1997 in Kyoto, Japan, and which entered into force on 16 February 2005 (UNFCCC, 2009). The Kyoto Protocol is the chief instrument for tackling climate change. The major feature of the Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing greenhouse gas (GHG) emissions. This amounts to an average of 5% against 1990 levels over the five-year period 2008-2011. The major distinction between the Protocol and the Convention is that,

"while the Convention encouraged industrialised countries to stabilize GHG emissions, the Protocol commits them to do so".

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM
The Kyoto Protocol is relevant in that the proposed Boulders Wind Farm project will contribute to a reduction in the production of greenhouse gases by providing an alternative to fossil fuel-derived electricity, and will assist South Africa in demonstrating its continued commitment to meeting international obligations in terms of reducing its emissions.

3.2 NATIONAL

3.2.1 National Development Plan (2012)

The National Development Plan (NDP) (also referred to as Vision 2030) is a detailed plan produced by the National Planning Commission in 2012 that is aimed at reducing and eliminating poverty in South Africa by 2030. The NDP represents a new approach by Government to promote sustainable and inclusive development in South Africa, promoting a decent standard of living for all, and includes 12 key focus areas, those relevant to the current proposed Boulders Wind Farm being:

- An economy that will create more jobs;
- Improving infrastructure; and
- Transition to a low carbon economy.

Sector	Target
Electrical infrastructure	• South Africa requires an additional 29,000 MW of electricity by 2030. About 10,900 MW of existing capacity will be retired, implying new build of about 40,000 MW. • About 20,000 MW of this capacity should come from renewable sources.
Transition to a low carbon economy	• Achieve the peak, plateau and decline greenhouse gas emissions trajectory by 2025. • About 20,000 MW of renewable energy capacity should be constructed by 2030.

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM
The proposed Boulders Wind Farm will contribute towards additional energy capacity in South Africa.

3.2.2 National Climate Change Response White Paper (2012)

The White Paper indicates that Government regards climate change as one of the greatest threats to sustainable development in South Africa and commits the country to making a fair contribution to the global effort to achieve the stabilisation of greenhouse gas concentrations in the atmosphere at a level that prevents dangerous anthropogenic interference with the climate system.

The White Paper also identifies various strategies in order to achieve its climate change response objectives, including:

- The prioritisation of mitigation interventions that significantly contribute to an eventual decline in emission trajectory from 2036 onwards, in particular, interventions within the energy, transport and industrial sectors.
- The prioritisation of mitigation interventions that have potential positive job creation, poverty alleviation and/or general economic impacts. In particular, interventions that stimulate new industrial activities and those that improve the efficiency and competitive advantage of existing business and industry.

The White Paper provides numerous specific actions for various Key Mitigation Sectors including renewable energy. The following selected strategies (amongst others) must be implemented by South Africa in order to achieve its climate change response objectives:

- The prioritisation of mitigation interventions that significantly contribute to a peak, plateau and decline emission trajectory where greenhouse gas emissions peak in 2020 to 2025 at 34% and 42% respectively below a business as usual baseline, plateau to 2035 and begin declining in absolute terms from 2036 onwards, in particular, interventions within the energy, transport and industrial sectors.
- The prioritisation of mitigation interventions that have potential positive job creation, poverty alleviation and/or general economic impacts. In particular, interventions that stimulate new industrial activities and those that improve the efficiency and competitive advantage of existing business and industry.

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM
The proposed Boulders Wind Farm will provide an alternative to fossil fuel-derived electricity and will contribute to climate change mitigation.

3.2.3 White Paper on Renewable Energy Policy (2003)

The White Paper on the Renewable Energy Policy (2003) commits SA Government support for the development, demonstration and implementation of renewable energy sources for both small and large scale applications. It sets out the policy principles, goals and objectives to achieve, "An energy economy in which modern renewable energy increases its share of energy consumed and provides affordable access to energy throughout South Africa, thus contributing to sustainable development and environmental conservation".

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM
The proposed Boulders Wind Farm is consistent with the White Paper and the objectives therein to develop an economy in which renewable energy has a significant market share and provides affordable access to energy throughout South Africa, thus contributing to sustainable development and environmental conservation.

3.2.4 Integrated Energy Plan for the Republic of South Africa (2003)

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

In addition to the above, the IEP recognised the following:

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

programme.
- The need to introduce policy, legislation and regulations for the promotion of renewable energy and energy efficiency measures and mandatory provision of energy data.
- The need to undertake integrated energy planning on an on-going basis.

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM
The proposed Boulders Wind Farm is in line with the IEP with regards to diversification of energy supply and the promotion of universal access to clean energy.

3.2.5 Integrated Resource Plan for Electricity 2010-2030 (Revision 2 – 2011)

The Integrated Resource Plan (IRP2010) for South Africa was initiated by the DoE and lays the foundation for the country's energy mix up to 2030, and seeks to find an appropriate balance between the expectations of different stakeholders, considering a number of key constraints and risks, including:
- Reducing carbon emissions;
- New technology uncertainties such as costs, operability and lead time to build;
- Water usage;
- Localisation and job creation;
- Southern African regional development and integration; and
- Security of supply.

The Policy-Adjusted IRP includes recent developments with respect to prices and allocates 17 800 MW for renewables, of the total 42 600 MW (including both renewables and non-renewables) new-build up to 2030 allocated as follows:
- Wind at 8 400 MW.
- Concentrated solar power at 1 000 MW.
- Photovoltaic at 8 400 MW.

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM
The proposed Boulders Wind Farm is in line with the IRP for electricity and will contribute towards finding an appropriate balance between the various stakeholders as per the IRP2010.

3.2.6 Draft Integrated Resource Plan 2018

The 2011 version of the IRP is currently under review with a draft version having been put out for comment in August 2018.

The draft IRP 2018 is essentially a plan for South Africa's future energy needs but also attempts to balance a number of objectives, including: security of supply, at minimal cost, with minimal environmental impacts (including CO_2 emission reduction targets) and minimal water usage.

Drawing from the conclusions of the scenarios analysed, the scenario of RE without annual build limits provides the least-cost path up to 2050. The significant change in the energy mix post 2030 and the sensitivity of the energy mix to the assumptions are key points to note.

It is therefore recommended that the post 2030 path not be confirmed, but that detailed studies be undertaken to inform the future update of the IRP. These studies should, among others, include the following:
- Detailed analysis of the appropriate level of penetration of RE in the South African national grid to better understand the technical risks and mitigations required to ensure security of supply is maintained during the transition to a low-carbon future.

For the period ending 2030, a number of policy adjustments are proposed to ensure a practical plan that will be flexible to accommodate new, innovative technologies that are not currently cost competitive, the minimization of the impact of decommissioning of coal power plants and the changing demand profile.

Applied policy adjustment and considerations in the final proposed plan includes the following:

- A least-cost plan with the retention of annual build limits (1 000MW for PV and 1 600MW for wind) for the period up to 2030. This provides for smooth roll out of RE, which will help sustain the industry.

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM
The proposed Boulders Wind Farm is in line with the draft IRP 2018 with respect to the energy mix and movement to a low carbon economy up to 2030 and beyond.

3.2.7 Renewable Energy Independent Power Producer Procurement Programme (REIPPPP)

South Africa has a high level of renewable energy potential and presently has in place a target of 17 800 MW of renewable energy. The REIPPP Programme has been designed so as to contribute towards the national target and towards socio-economic and environmentally sustainable growth, and to start and stimulate the renewable industry in South Africa.

In terms of the REIPPPP, bidders will be required to bid on tariff and the identified socio-economic development objectives of the DoE. The tariff will be payable by the Buyer (currently ESKOM) pursuant to the Power Purchase Agreement (PPA) to be entered into between the Buyer and the Project Company of a Preferred Bidder.

The following table summarises the REIPPPP bidding windows that have already been completed.

Bidding Window 1	Bidding Window 2	Bidding Window 3	Bidding Window 3.5	Bidding Window 4
Submission Date: 04/11/2011 28 Preferred Bidders 1 425 MW of contracted capacity	Submission Date: 05/03/2012 19 Preferred Bidders 1 040 MW of contracted capacity	Submission Date: 19/08/2013 17 Preferred Bidders 1 457 MW of contracted capacity	Submission Date: 31/04/2014 2 Preferred Bidders 200 MW of contracted capacity	Submission Date: 18/08/2014 26 Preferred Bidders 2 205 MW of contracted capacity

Media reports have suggested that Bidding Window 5 (BW5) of the REIPPPP will be launched in 2019 and it is estimated that it will secure 1 800 MW of renewable energy.

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM
In terms of REIPPPP, bids would be awarded for renewable energy supply to ESKOM through up to 5 bidding phases. The 1st, 2nd, 3rd and 4th round bidding processes have been completed where projects are currently reaching financial close in order to implement the projects. REIPPPP is entering the 5th bidding window.

3.2.8 Long Term Mitigation Scenarios (2007)

The aim of the Long-Term Mitigation Scenarios (LTMS) was to set the pathway for South Africa's long-term climate policy and will eventually inform a legislative, regulatory and fiscal package that will give effect to the policy package at a mandatory level. The overall goal is to "develop a plan of

action which is economically risk-averse and internationally aligned to the world effort on climate change."

The strategy assesses various response scenarios but concludes that the only sustainable option ("the preferred option") for South Africa is the "Required by Science" scenario where the emissions reduction targets should target a band of between -30% to -40% emission reductions, from 2003 levels, by 2050 which includes increasing renewable energy in the energy mix by 50% by 2050.

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM
The proposed Boulders Wind Farm will contribute towards an overall reduction in emissions and aligns with the world stance on efforts towards the mitigation of climate change.

3.2.9 Industrial Policy Action Plan 2011/12 – 2013/14

The South African Industrial Policy Action Plan (IPAP 2) 2011/12 – 2013/14 represents a further step in the evolution of this work and serves as an integral component of government's New Growth Path and notes that there are significant opportunities to develop new 'green' and energy-efficient industries and related services; and indicates that in 2007/2008, the global market value of the 'Low-Carbon Green Sector' was estimated at £3 trillion (or nearly US$5 trillion), a figure that is expected to rise significantly in the light of climate-change imperatives, energy and water security imperatives.

Based on economic, social and ecological criteria, IPAP identified a number of sub-sectors and an initial round of concrete measures were proposed for development of the renewable energy sector with the following key action programmes:

- Solar and Wind Energy - Stimulate demand to create significant investment in renewable energy supply and the manufacturing of local content for this supply.
- Green Industries special focus: The South African Renewables Initiative (SARi) - SARi is an intra-governmental initiative set to catalyse industrial and economic benefits from an ambitious program of renewables development; including financing and associated institutional arrangements that would not impose an unacceptable burden on South Africa's economy, public finances or citizens.

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM
The proposed Boulders Wind Farm will contribute towards an overall reduction in emissions and it aligns with the world stance on efforts towards the mitigation of climate change.

3.2.10 Strategic Infrastructure Projects (2012)

The National Infrastructure Plan that was adopted in 2012 together with the New Growth Path, which sets a goal of five million new jobs by 2020, identifies structural problems in the economy and points to opportunities in specific sectors and markets or "jobs drivers" resulted in the establishment of the Presidential Infrastructure Coordinating Committee (PICC) which in turn resulted in the development of 18 Strategic Infrastructure Projects (SIPS).

SIPS relevant to renewable energy include:
SIP 8: Green energy in support of the South African economy
- Support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP2010).

SIP 9: Electricity generation to support socio-economic development
- Accelerate the construction of new electricity generation capacity in accordance with the IRP2010 to meet the needs of the economy and address historical imbalances.

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM
The Boulders Wind Farm will contribute to SIP project role out.

3.3 PROVINCIAL

At a provincial level, the project will contribute towards the target of 15% renewable energy for the Western Cape Province and a reduction in carbon emissions, as set by the Provincial 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 and demand management), and the development of renewable and alternate sustainable energy resources.

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 1 000km 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 the West Coast One Wind Energy Facility as well as the 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 powerline 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.

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 (REIPPP) Programme. 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.

3.4 DISTRICT AND LOCAL

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 within 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:

- At the local context the Saldanha Bay LM 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.
- 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.

3.5 CONCLUSION

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 from a planning and policy perspective on a national level but also at the provincial, district, and most importantly, the local level.

The Boulders Wind Farm project developer has also indicated that local socio-economic benefits will be realised with the development of the wind farm, specifically in line with the socio-economic development goals under the REIPPPP, which will include:

- The realisation of the local needs and requirements within the area;
- Job creation within an area which has been primarily focused on fishing that has subsequently declined through the years;
- The creation of a second income for the affected landowners;
- An increase in the standard of living; and
- An overall economic and social upliftment within the area.

The construction and operation of the Boulders Wind Farm will contribute to local developmental objectives of poverty eradication and other social and socio-economic benefits that are integral to the REIPPPP process. The development of wind farms attracts significant direct foreign financial investment into South Africa and local communities. REIPPP local content requirements can lead to the creation of local industry and both skilled and un-skilled jobs in the RE industrial sector.

Further positive social and socio-economic benefits will be realised by the landowners that will host turbines, in the form of rental income which in turn will have multiplier effects on the local economy due to local spend. In addition, farming activities can continue alongside the wind turbines, while rental income may also be used to enhance farming activities.

It is worth noting that the ruling ANC government 2019 election manifesto specifically states that it is committed to the following concerning renewable energy:

- Continue to support the use of renewable technologies in the country's energy mix to reduce the cost of energy, decrease greenhouse emissions, build the local industry through increased localisation and create jobs, while recognising the reality that we have large coal reserves that can provide cheap energy that can also assist with affordable prices.
- Take forward NEDLAC's Green Economy Accord on renewable energy. We will ensure that workers are treated fairly and reskilled and that the needs of people and the environment are at the centre of a just transition to a sustainable and low carbon energy future.
- Develop and implement a dedicated education and training programme on renewable energy targeting young people.
- Contribute to investment to boost greater demand in the renewable sector – particularly solar, municipal waste, biomass, biogas and wind – to support rural development, localisation, research and development, small enterprises and co-operatives.

Therefore, considering the above need for the project from a national, provincial and local level, it can be concluded that the Boulders Wind Farm will contribute to the reduction of the human contribution to climate change, while also assisting with the alleviation of poverty through improving the economic and social structures on national, provincial and local levels.

3.6 SITE FEASIBILITY STUDY

Prior to the commencement of the formal EIA process a feasibility study was undertaken by Savannah Environmental. This study was on the proposed site for the Boulders Wind Farm, and also provides an indication of the desirability of the project on that site. This section provides a summary description of the process followed to identify a feasible project site for the development of the Boulders Wind Farm (See Appendix D-1 for information provided by Vredenberg Windfarm (Pty) Ltd on the initial pre-EIA site screening process.

The project site proposed for the development of the Boulders Wind Farm displays characteristics which contribute to the overall need and desirability. These include:

EXTENT OF THE PROJECT SITE: The affected properties desirable for and available for the wind farm development cover an area of 5 102 ha. This area is sufficient to accommodate the proposed Boulders Wind Farm and considered to be sufficient space for the development footprint to be designed and to consider the identified environmental sensitivities raised in the Scoping Phase. A development footprint of ~44ha is required for the wind farm, which is less than 1% of the entire project site.

SITE ACCESS: Access to the project site is adequate with the presence of an existing 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 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 St. Helena 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. The Stompneus Bay Secondary gravel road has been identified as the main access route for the development footprint of the Boulders Wind Farm and is considered to be appropriate for use during the construction and operation phases of the development.

CURRENT LAND USE AND CHARACTER: The West Coast One Wind Energy Facility is located directly adjacent to the identified Boulders Wind Farm project site. This wind farm 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 project site is agricultural. This is considered desirable as the majority of farming practices can continue in tandem to the construction and operation of the wind farm. This has been proven to be the case at the adjacent West Coast One Wind Energy Facility. The directly affected landowners are supportive of the development and do not view the development as a conflict with their current land use practices. 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 project site due to the close proximity of the existing Fransvlei-Aurora 132kV power line located to the east of the project site. This power 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 powerline.

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 project site is located directly adjacent to the West Coast One Wind Energy Facility, which has already been developed under the REIPPP Programme. It is proven that the area has high wind resources with the development of the existing wind energy facility next to the project site under assessment. Wind monitoring has been taking place on the project site since 2015 and 2016 respectively 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 unemployment rate of 23% (i.e. 10 587 unemployed individuals). The agriculture, forestry and fishing sector employed the largest number of people 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 in 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 development of the Boulders 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 of 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 farm 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 and socio-economic upliftment 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 socio-economic upliftment.

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.

STAKEHOLDER ENGAGEMENT: As part of the Feasibility Assessment undertaken by the project developer, the developer engaged with numerous stakeholders to obtain a sense from key entities regarding the acceptability of the proposed wind farm facility on the planned site. In response, letters supporting the development were received from:

- Western Cape Department of Economic Development and Tourism
- Saldanha Bay Municipality
- University of the Witwatersrand: School of Geography, Archaeology and Environmental Studies
- Bester Eiendomme Trust (Impacted Landowner)
- Nicolaas Daniël Lombard (Impacted Landowner)
- Uitkoms Boerdery Vredenburg
- Cape Chamber of Commerce & Industry
- City of Cape Town: Electricity Generation & Distribution

- Western Cape Department of Transport and Public Works
- SARATEC
- WESGRO
- ELRU

As these letters were received outside of the formal public participation process and EIA process, the content of the written comments were not included in the Comments and Responses Report. These letters can be found in Appendix C of this report.

4. RELEVANT LEGISLATION

GOVERNMENT NOTICE 982, ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS, 2014 (AS AMENDED 2017). APPENDIX 3: SCOPE OF ASSESSMENT AND CONTENT OF ENVIRONMENTAL IMPACT ASSESSMENT REPORTS

3. An environmental impact assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include–

(e) A description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;

4.1 NATIONAL

4.1.1 The Constitution Act (No. 108 of 1996)

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

(a) To an environment that is not harmful to their health or well-being.
(b) To have the environment protected for the benefit of present and future generations, through reasonable legislative and other measures that:
  (i) Prevent pollution and ecological degradation.
  (ii) Promote conservation.
  (iii) Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM

- *The wind farm developer has an obligation to ensure that the proposed activity will not result in pollution and ecological degradation.*
- *The wind farm developer has an obligation to ensure that the proposed activity is ecologically sustainable, while demonstrating economic and social development.*

4.1.2 National Environmental Management Act (No.107 of 1998)

The National Environmental Management Act (No.107 of 1998) (NEMA) provides for the basis for environmental governance in South Africa by establishing principles and institutions for decision-making on matters affecting the environment.

A key aspect of NEMA is that it provides a set of environmental management principles that apply throughout the Republic to the actions of all organs of state that may significantly affect the environment. Section 2 of NEMA contains principles (see Table 4-1) relevant to the proposed wind farm, and likely to be utilised in the process of decision making by DEA.

Table 4-1. NEMA Environmental Management Principles

(2)	Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.
(3)	Development must be socially, environmentally and economically sustainable.
(4)(a)	Sustainable development requires the consideration of all relevant factors including the following: i. That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied; ii. That pollution and degradation of the environment are avoided, or, where they cannot be

	altogether avoided, are minimised and remedied; iii. That waste is avoided, or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner.
(4)(e)	Responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle.
(4)(i)	The social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment.
(4)(j)	The right of workers to refuse work that is harmful to human health or the environment and to be informed of dangers must be respected and protected.
(4)(p)	The costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.
(4)(r)	Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.

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

NEMA introduces the duty of care concept, which is based on the policy of strict liability. This duty of care extends to the prevention, control and rehabilitation of significant pollution and environmental degradation. It also dictates a duty of care to address emergency incidents of pollution. A failure to perform this duty of care may lead to criminal prosecution and may lead to the prosecution of managers or directors of companies for the conduct of the legal persons.

Employees who refuse to perform environmentally hazardous work, or whistle blowers, are protected in terms of NEMA.

In addition, NEMA introduces a new framework for environmental impact assessments, the EIA Regulations (2010) – discussed previously.

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM

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

4.1.3 National Environment Management: Biodiversity Act (No. 10 of 2004)

The National Environment Management: Biodiversity Act (No. 10 of 2004) (NEMBA) provides for the management and conservation of South Africa's biodiversity and the protection of species and ecosystems that warrant national protection.

The objectives of this Act are to:

- Provide, within the framework of the National Environmental Management Act.
- Manage and conserve of biological diversity within the Republic.
- Promote the use of indigenous biological resources in a sustainable manner.

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

1. The conservation of endangered ecosystems and restriction of activities according to the categorisation of the area (including The Endangered and Threatened Ecosystem Regulations, Government Notice R. 1002 dated 9th December 2011).
2. Application of appropriate environmental management tools in order to ensure integrated environmental management of activities thereby ensuring that all developments within the area are in line with ecological sustainable development and protection of biodiversity.
3. Limit further loss of biodiversity and conserve endangered ecosystems.

The Act's permit system is further regulated in the Act's Threatened or Protected Species Regulations Government Notice R. 152 of 23 February 2007.

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM

- *The wind farm developer must not cause a threat to any endangered ecosystems and must protect and promote biodiversity;*
- *The wind farm developer must assess the impacts of the proposed development on endangered ecosystems;*
- *The wind farm developer may not remove or damage any protected species without a permit; and*
- *The wind farm developer must ensure that the site is cleared of alien vegetation using appropriate means.*
- *AIS Regulations, Government Notice R. 598 of 1st April 2014 are applicable.*

4.1.4 National Environmental Management: Waste Management Act (No. 59 of 2008)

The National Environmental Management: Waste Management Act (No. 59 of 2008) (NEMWMA) gives legal effect to the Government's policies and principles relating to waste management in South Africa, as reflected in the National Waste Management Strategy (NWMS).

The objects of the Act are (amongst others) to:

- Protect health, well-being and the environment by providing reasonable measures for:
  - minimising the consumption of natural resources;
  - avoiding and minimising the generation of waste;
  - reducing, re-using, recycling and recovering waste;
  - treating and safely disposing of waste as a last resort;
  - preventing pollution and ecological degradation; and
  - securing ecologically sustainable development while promoting justifiable economic and social development.

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM

- *The wind farm developer must ensure that all activities associated with the project address waste related matters in compliance with the requirements of the Act.*
- *The wind farm developer must consult with the local municipalities to ensure that waste is disposed of at a registered landfill site.*

4.1.5 National Forests Act (No. 84 of 1998)

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

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

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM

- *If any protected trees or indigenous forest in terms of this Act occur on site, the wind farm developer will require a licence from the Department of Forestry (DAFF) to perform any of the above-listed activities.*

4.1.6 National Heritage Resources Act (No. 25 of 1999)

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

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM

- *A heritage impact assessment (HIA) has be undertaken.*
- *No person may alter or demolish any structure or part of a structure, which is older than 60 years or disturb any archaeological or paleontological site or grave older than 60 years without a permit issued by the relevant provincial heritage resources authority.*
- *No person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter or deface archaeological or historically significant sites.*

4.1.7 Electricity Regulation Act (No. 4 of 2006)

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

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

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM

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

4.1.8 Occupational Health and Safety Act (No. 85 of 1993)

The objective of this Act is to provide for the health and safety of persons at work. In addition, the Act requires that, "as far as reasonably practicable, employers must ensure that their activities do not expose non-employees to health hazards". The importance of the Act lies in its numerous regulations, many of which will be relevant to the proposed Boulders Wind Farm. These cover, among other issues, noise and lighting.

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM

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

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

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

Of particular importance to the proposed Boulders Wind Farm are the following:

- Wind farm placement:
  - Due to the potential of wind turbine generators to interfere on radio navigation equipment, no wind farm should be built closer than 35km from an aerodrome. In addition, much care should be taken to consider visual flight rules routes, proximity of known recreational flight activity such as hang gliders, enroute navigational facilities etc.
- Wind farm markings:
  - Wind turbines shall be painted bright white to provide the maximum daytime conspicuousness. The colours grey, blue and darker shades of white should be avoided altogether. If such colours have been used, the wind turbines shall be supplemented with daytime lighting, as required.
- Wind farm lighting:
  - Wind farm (3 or more units) lighting: In determining the required lighting of a wind farm, it is important to identify the layout of the wind farm first. This will allow the proper approach to be taken when identifying which turbines need to be lit. Any special consideration to the site's location in proximity to aerodromes or known corridors, as well as any special terrain considerations, must be identified and addressed at this time.
- Turbine Lighting Assignment:
  - The following guidelines should be followed to determine which turbines, need to be equipped with lighting fixtures. Again, the placement of the lights is contingent upon which type of configuration is being used.

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM

- *Due to requirements of the Act to ensure the safety of aircrafts, the wind farm developer must engage directly with the Civil Aviation Authority regarding the structural details of the facility.*

4.1.10 National Environmental Management: Air Quality Act (No. 39 of 2004)

The National Environmental Management: Air Quality Act (No. 39 of 2004) (NEMAQA) is the principal legislation regulating air quality in South Africa. The objects of the Act are to:

- Give effect to section 24(b) of the Constitution in order to enhance the quality of ambient air for the sake of securing an environment that is not harmful to the health and well-being of people, and
- Protect the environment by providing reasonable measures for:
  - Protection and enhancement of the quality of air in the Republic.
  - Prevention of air pollution and ecological degradation.
- Securing ecologically sustainable development while promoting justifiable economic and social development.

The Air Quality Act empowers the Minister to establish a national framework for achieving the objects of this Act. The said national framework will bind all organs of state. The said national framework will inter alia have to establish national standards for municipalities to monitor ambient air quality and point, non-point and mobile emissions.

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM

- *Although no major air quality issues are expected, the wind farm developer needs to be mindful of the Act as it also relates to potential dust generation during construction, etc.*

4.1.11 National Water Act (No. 36 of 1998)

The National Water Act (No. 36 of 1998) (NWA) provides for fundamental reform of the law relating to water resources in South Africa.

The purpose of the Act amongst other things is to:

- Ensure that the national water resources are protected, used, developed, conserved, managed and controlled in ways which take into account amongst other factors:
  - Promoting equitable access to water.
  - Promoting the efficient, sustainable and beneficial use of water in the public interest.
  - Facilitating social and economic development.
  - Protecting aquatic and associated ecosystems and their biological diversity.
  - Reducing and preventing pollution and degradation of water resources.

The NWA is concerned with the overall management, equitable allocation and conservation of water resources in South Africa. To this end, it requires registration of water users and licenses to be obtained for water use except for certain limited instances set out in the Act. These instances include domestic use, certain recreational use, where the use occurs in terms of an existing lawful use or where the Department of Water Affairs (DWA) has issued a general authorisation that obviates the need for a permit.

Water use for which a permit is required

For the purposes of this Act, water uses for which a permit is required (amongst other), are defined in Section 21 as follows:

- Taking water from a water resource.
- Storing water.
- Impeding or diverting the flow of water in a watercourse.
- Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit.
- Disposing of waste in a manner which may detrimentally impact on a water resource.
- Altering the bed, banks, course or characteristics of a watercourse.

PLEASE NOTE THAT WULAs ARE ONLY AUTHORISED TO BE SUBMITTED TO DWS ONCE A WIND ENERGY FACILITY HAS BEEN GRANTED PREFERRED BIDDER STATUS. SHOULD THE BOULDERS WIND FARM BE GRANTED PREFERRED BIDDER STATUS THEN WULAs WILL BE SUBMITTED FOR CONSIDERATION BY THE DWS.

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM

- *There may be certain instances where the wind farm developer may need to obtain approval in terms of the Water Act.*

4.1.12 Conservation of Agricultural Resources Act (No. 43 of 1983)

The Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA) is the main statute that deals with agricultural resource conservation.

The objects of the Act are to provide for the conservation of the natural agricultural resources of South Africa by the maintenance of the production potential of land. In order to maintain production potential of land, CARA provides for the following mechanisms; namely:

- Combating and prevention of erosion and weakening and destruction of water sources.
- Protection of vegetation.
- Combating of weeds and invader plants.

CARA Regulations

In order to give meaning to mechanisms aimed maintaining production potential of land provided for in CARA, Minister of Agriculture published regulations under CARA (CARA Regulations) which prescribes control measures which all land users have to comply, in respect of a number of matters, including the:

- Cultivation of virgin soil.
- Protection of cultivated land.
- Utilisation and protection of the veld.
- Control of weed and invader plants.
- Prevention and control of veld fires and the restoration and reclamation of eroded land.

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM

- *An agricultural potential assessment must be conducted to determine how the proposed development may impact on the agricultural production potential of the wind farm site.*

IT SHOULD BE NOTED THAT THE CARA REGULATIONS FOR THE LEGAL OBLIGATIONS REGARDING ALIEN INVASIVE PLANTS IN SOUTH AFRICA ARE SUPERSEDED BY THE NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT, 2004 (ACT NO. 10 OF 2004) – ALIEN AND INVASIVE SPECIES (AIS) REGULATIONS WHICH BECAME LAW ON 1 OCTOBER 2014.

4.1.13 Subdivision of Agricultural Land Act (No. 70 of 1970)

The Subdivision of Agricultural Land Act (No. 70 of 1970) controls the subdivision of all agricultural land in South Africa and prohibits certain actions relating to agricultural land. In terms of the Act, the owner of agricultural land is required to obtain consent from the Minister of Agriculture, Forestry and Fisheries in order to subdivide agricultural land.

The purpose of the Act is to prevent uneconomic farming units from being created and degradation of prime agricultural land. The Act also regulates leasing and selling of agricultural land as well as registration of servitudes.

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM

- *Approval will be required from the Department of Agriculture, Forestry and Fisheries (DAFF) for any activities on the land zoned for agriculture and any proposed rezoning or sub-divisions of agricultural land.*

4.1.14 Mineral and Petroleum Resources Development Act (No. 28 of 2002)

Mineral and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA) makes provision for equitable access to and sustainable development of the South Africa's mineral and petroleum resources and to provide for matters connected therewith.

The objects of this Act are (amongst others) to:

- Give effect to the principle of the State's custodianship of the nation's mineral and petroleum resources.

- Promote equitable access to the nation's mineral and petroleum resources to all the people of South Africa.
- Give effect to section 24 of the Constitution by ensuring that the nation's mineral and petroleum resources are developed in an orderly and ecologically sustainable manner while promoting justifiable social and economic development.

Application for a mining right
As per Section 27 (1) of the Act, the Department of Minerals and Energy (DME) must grant permission for all mining operations. Both the removal of sand and/or stone from a borrow pit or quarry requires an application for a mining right.

There are two categories of permission relevant to borrow pits and hard rock quarries, namely; "Mining Permits" and secondly "Mining Rights or Licence." As is reflected in the table below, these categories are linked to the size of the proposed operation and the proposed operational period.

Table 4-2. Categories of permission required for a borrow pit vs quarry

Category	Size	Period of operation	DMR Requirement
Mining Permit	< 1.5ha	< 2 years	Basic Assessment (BA) Environmental Management Programme (EMPr)
Mining Right (Licence)	Not specified	Not specified	Full Scoping and EIA Environmental Management Programme (EMPr)

In addition, Section 53 of the Act requires that Ministerial approval is attained for "any person who intends to use the surface of any land in any way which may be contrary to any object of this Act or is likely to impede any such object".

PLEASE NOTE THAT A SECTION 53 APPLICATION WILL BE SUBMITTED FOR MINISTERIAL APPROVAL ONCE THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS HAS BEEN COMPLETED.

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM
- *Any activities associated with the wind farm requiring extraction of sand or hard rock for construction purposes will require the submission of an application to DMR for either a mining permit or mining licence.*
- *The Boulders Wind Farm must apply to the Minister of Mineral Resources for approval to use the land for the purposes of the wind farm.*
- *The DMR has aligned its authorisation process with that of the DEA, and from August 2015, all applications for mining activities require an Environmental Impact Assessment, as per the EIA Regulations.*

4.1.15 National Road Traffic Act (No. 93 of 1996)

The National Road Traffic Act (No. 93 of 1996) (NRTA) provides for all road traffic matters and is applied uniformly throughout South Africa. The Act enforces the necessity of registering and licensing motor vehicles. It also stipulates requirements regarding fitness of drivers and vehicles as well as making provision for the transportation of dangerous goods.

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM
- *All the requirements stipulated in the NRTA will need to be complied with during the construction and operational phases of the proposed wind farm.*

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

The aim of the Act is to "prevent and combat veld, forest and mountain fires" in South Africa. Of particular relevance to the proposed Boulders Wind Farm development, the following requirements of the Act need to be considered:

Relevant Section of the Act	Relevance to the proposed Boulders Wind Farm:
Section 3: Fire Protection Associations.	The proposed Boulders Wind Farm must register as a member of the fire protection association in the area.
Chapter 4 Section 12-14: Veld fire prevention: duty to prepare and maintain firebreaks	The proposed Boulders Wind Farm will be required to take all practicable measures to ensure that fire breaks are prepared and maintained according to the specifications contained in Section 12 – 14.
Section 17: Firefighting: readiness	The proposed Boulders Wind Farm must have the appropriate equipment, protective clothing and trained personnel for extinguishing fires.

4.1.17 Other Relevant National Legislation

Other legislation that may be relevant to the proposed Boulders Wind Farm includes:

- The Environment Conservation Act No 73 of 1989 (ECA) Noise Control Regulations, which specifically provide for regulations to be made with regard to the control of noise, vibration and shock, including prevention, acceptable levels, powers of local authorities and related matters;
- The Telecommunication Act (1966) which has certain requirements with regard to potential impacts on signal reception; and
- Provincial Nature and Environmental Conservation Ordinance (No. 19 of 1974), which lists species of special concern which require permits for removal. Schedules 1 to 4 list protected and endangered plant and animal species.
- Spatial Planning and Land Use Management Act (SPLUMA) (Act 16 of 2013 – came into force on 1 July 2015) aims to provide inclusive, developmental, equitable and efficient spatial planning at the different spheres of the government. This act repeals national laws on the Removal of Restrictions Act, Physical Planning Act, Less Formal Township Planning Act and Development Facilitation Act.

4.2 PROVINCIAL

4.2.1 Western Cape Noise Control Regulations (Provincial Notice 200/2013) of 20 June 2013

The control of noise in the Western Cape is regulated by the Western Cape Noise Control Regulations in terms of Section 25 of the Environment Conservation Act (Act 73 of 1989).

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM

- *All the requirements stipulated in the WCNCR will need to be complied with during the construction and operational phases of the proposed wind farm.*

4.2.2 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.

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM
- *The wind farm developer must not cause a threat to any endangered ecosystems and must protect and promote biodiversity;*
- *The wind farm developer must assess the impacts of the proposed development on endangered ecosystems;*
- *The wind farm developer may not remove or damage any protected species without a permit; and*
- *The wind farm developer must ensure that the site is cleared of alien vegetation using appropriate means.*

4.2.3 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.

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM
- *Approval to construct any wind farm (or ancillary infrastructure) within 200m of provincial roads must be sought prior to construction.*

4.2.4 Western Cape Land Use Planning Ordinance 15 of 1985

Details land subdivision and rezoning requirements and procedures.

Section 9(2) of the Land Use Planning Ordinance 1985 provides planning restrictions in terms of the development of wind farms. In this regard, the "maximum height of 200m for a wind turbine, measured from the mean ground level of the footprint of each structure to the highest point of the blade".

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM
- *Wind turbines may not exceed 200m in height.*

4.2.5 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.

RELEVANCE TO THE PROPOSED BOULDERS WIND FARM
- *The proposed Boulders Wind Farm must be aligned with provincial spatial planning guidelines and targets.*

4.3 OTHER

In addition to the above, aside from the environmental authorisation, there are other permits, contracts and licenses that will need to be obtained by the project proponent for the proposed

project some of which fall outside the scope of the EIA. However, for the purposes of completeness, these include:

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

5. ALTERNATIVES

GOVERNMENT NOTICE 982, ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS, 2014 (AS AMENDED 2017). APPENDIX 3: SCOPE OF ASSESSMENT AND CONTENT OF ENVIRONMENTAL IMPACT ASSESSMENT REPORTS

3. An environmental impact assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include–

(h) A full description of the process followed to reach the proposed development footprint within the approved site, including:

(i) Details of the development footprint alternatives considered;

(ix) If no alternative development locations for the activity were investigated, the motivation for not considering such; and

(x) A concluding statement indicating the preferred alternative development location within the approved site.

5.1 REASONABLE AND FEASIBLE ALTERNATIVES

Alternatives should include consideration of all possible means by which the purpose and need of the proposed activity could be accomplished. In all cases, the no-go alternative must be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed. The determination of whether site or activity (including different processes, etc.) or both is appropriate, needs to be informed by the specific circumstances of the activity and its environment.

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

(a) the property on which or location where it is proposed to undertake the activity.
(b) the type of activity to be undertaken.
(c) the design or layout of the activity.
(d) the technology to be used in the activity.
(e) the operational aspects of the activity.
(f) the option of not implementing the activity.

5.2 FUNDAMENTAL, INCREMENTAL AND NO-GO ALTERNATIVES

5.2.1 Fundamental Alternatives

Fundamental alternatives are developments that are totally different from the proposed project description and usually include the following:

- Alternative property or location where it is proposed to undertake the activity.
- Alternative type of activity to be undertaken.
- Alternative technology to be used in the activity.

5.2.2 Incremental Alternatives

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

- Alternative design or layout of the activity.
- Alternative operational aspects of the activity.

5.2.3 No-go Alternative

It is mandatory to consider the "no-go" option in the EIA process. The "no-go" alternative refers to the current status quo and the risks and impacts associated with it. Some existing activities may carry risks and may be undesirable (e.g. an existing contaminated site earmarked for a development). The no-go is the continuation of the existing land use, i.e. maintain the status quo.

5.3 BACKGROUND INFORMATION REGARDING THE ALTERNATIVES CONSIDERED THROUGHOUT THE BOULDERS WIND FARM PHASES

5.3.1 Technology Alternatives

The choice of alternative technologies for the developer is constrained by the financial feasibility considerations. In South Africa, the licencing of all renewable energy developments is controlled by the Department of Energy's (Independent Power Producers Procurement Programme (IPPPP) who decide when and which types of renewable energy developments will be licenced through regulated competitive bidding processes. Since 2010 there have been seven competitive bidding processes for renewable energy developments, with 112 renewable energy producers being licenced to produce electricity. 43% of the renewable energy to be produced from these will be from wind energy projects. Solar energy accounts for 42% and the remainder from hydro and various forms of bio sources. This competitive process ensures that only the most financially feasible and competitive developments are selected. This forces the developers to look for sites which will maximise the production of energy and be most cost effective. As a result of this, solar plants will only be competitive if they are located in the highest radiation potential areas, and the same with wind, hydro and biomass energy developments. The relative potential for these four kinds of renewable energy production in South Africa has been assessed and mapped nationally. These potential energy production maps have been reproduced below (see Figures 5-1 to 5-4) and indicate that the West Coast area, were the developer was wanting to develop a project, is the most suitable for wind energy production. While this area also has some potential for solar energy production, this would not be competitive with the solar plants located in the higher radiation potential areas.

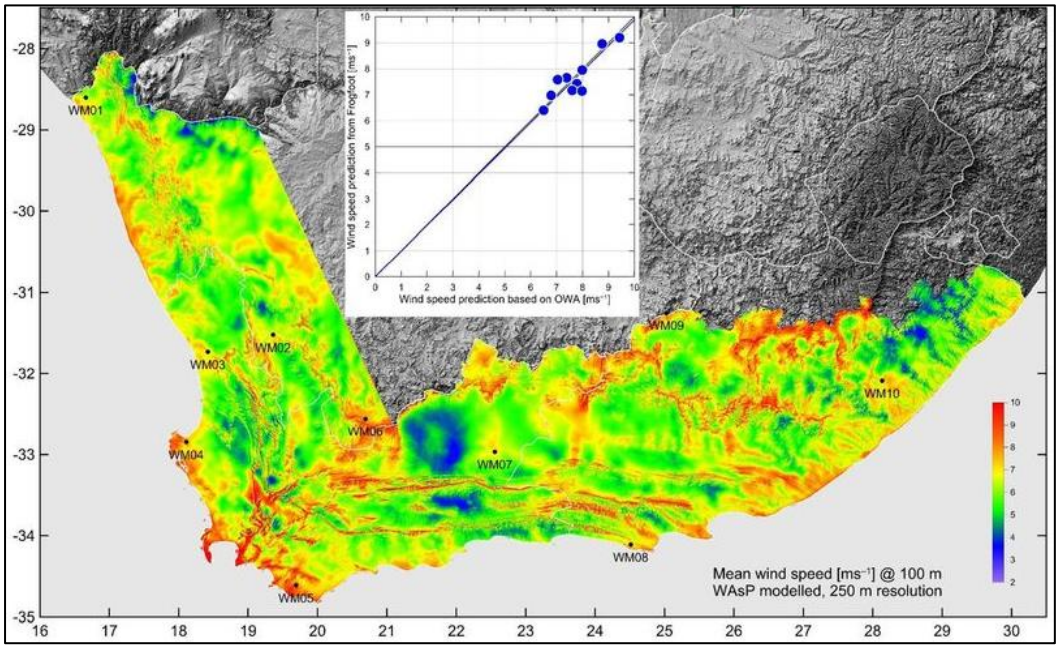

Figure 5-1: Mean Wind Speed (ms-1 at 100m) (WASA, 2014)

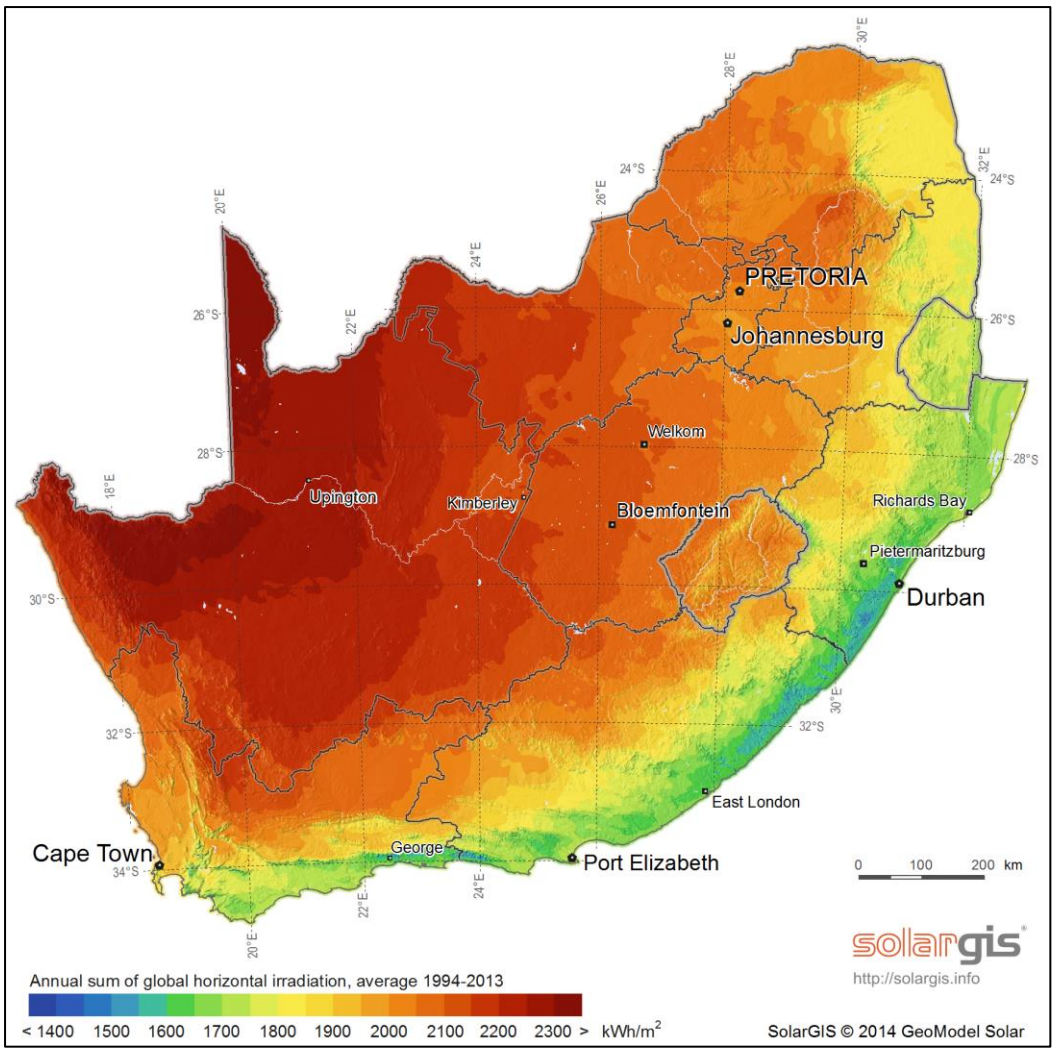

Figure 5-2: Solar Resource Availability (SolarGIS, 2013)

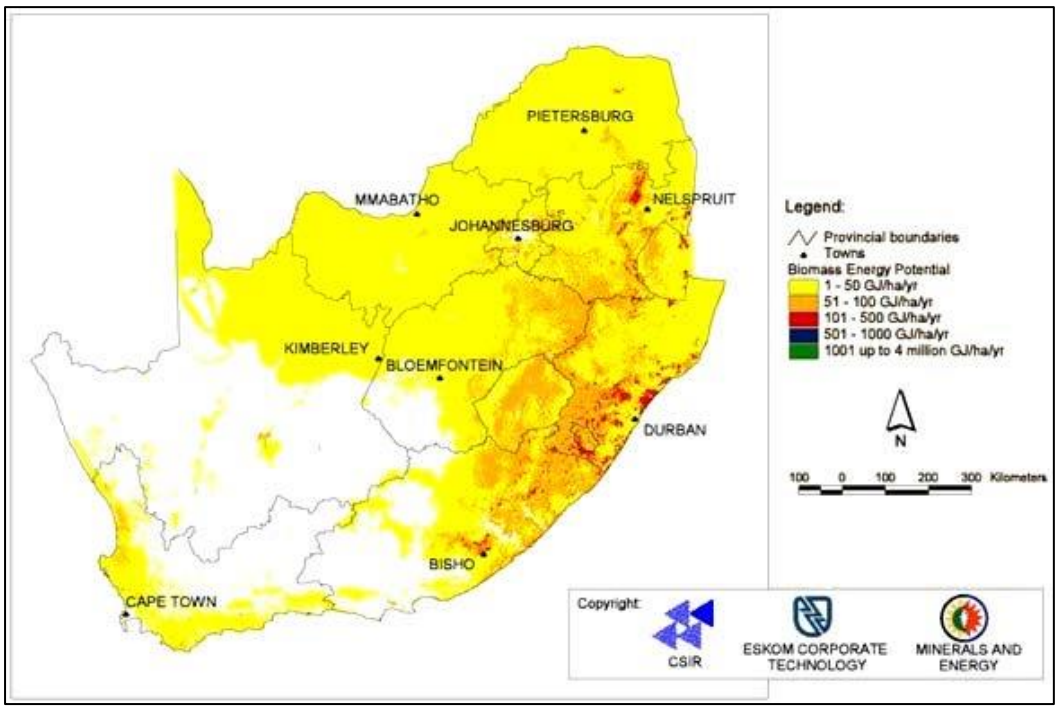

Figure 5-3: Biomass Potential (DME, Eskom, CSIR)

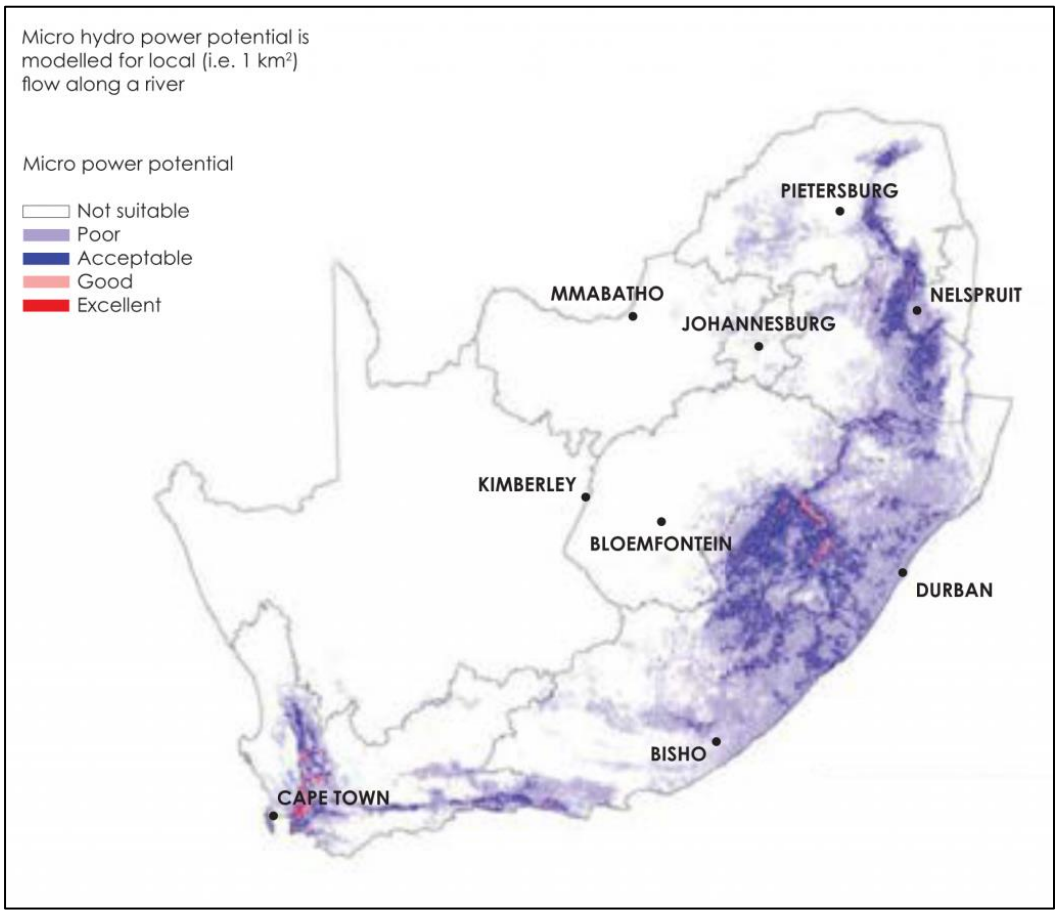

Figure 5-4: Micro Hydro Potential (DME, CSIR)

5.3.2 Site Alternatives Considered

Prior to the initiation of the Scoping process, the Vredenburg Wind Farm (Pty) Ltd developers considered four different sites (Figure 5-5 below) in the West Coast peninsula area for the development of a wind farm (see information provided at Appendix D-1). As required in terms of the NEMA Regulations, they assessed the suitability of these sites using seven criteria that were critical to the environmental and financial feasibility of the project (see Table 5-1 below). These include:

- Availability of good wind resources;
- Land availability;
- Environmental sensitivities;
- Distance to the national electrical grid;
- Site accessibility;
- Civil Aviation Authority acceptance;
- Topography;
- Suitability of current land uses; and
- The willingness of landowners to be involved.

After considering all these criteria, the current proposed site (site 4), proved to be most feasible site for the development of a wind farm.

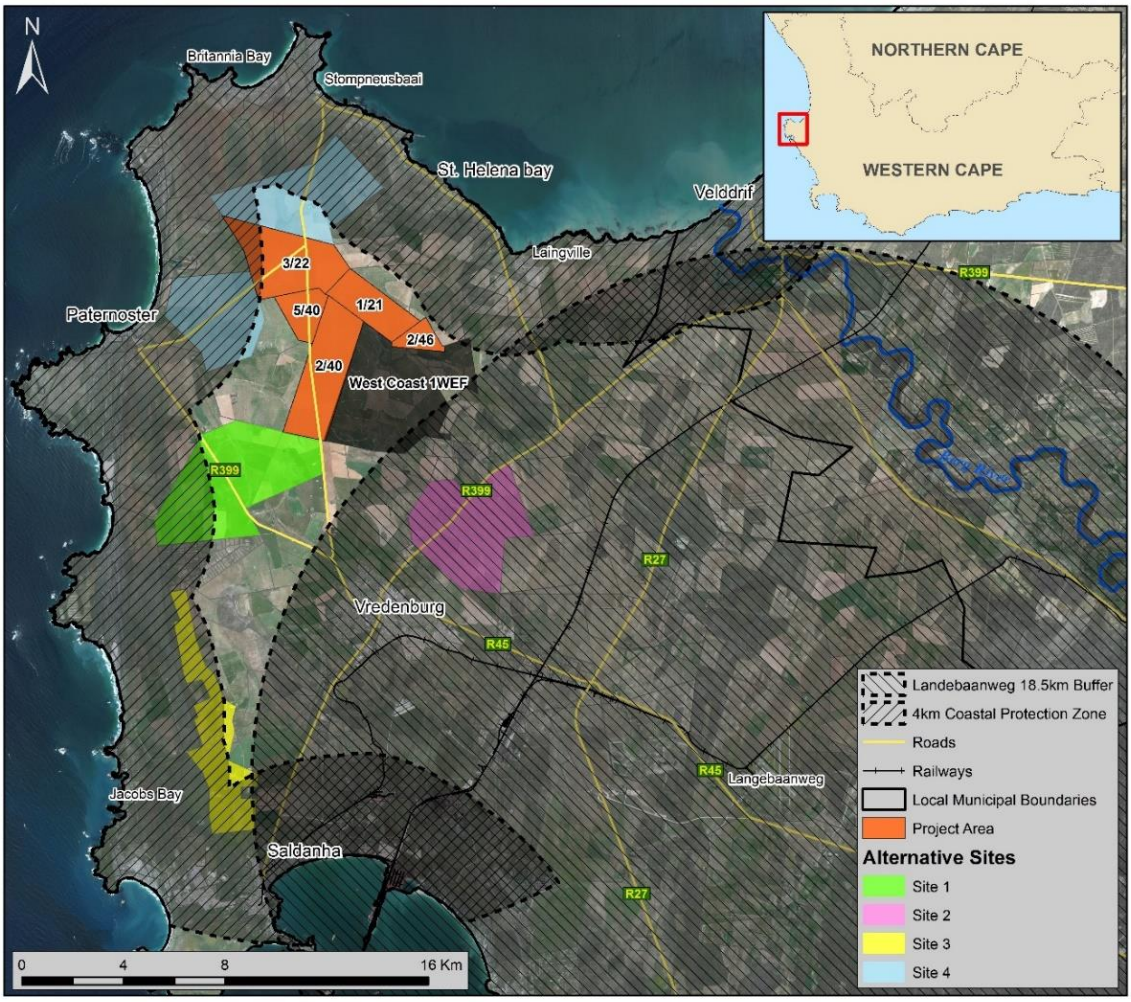

Figure 5-5: Map of the Original Site Alternatives Considered during the Pre-feasbility Stage of the Boulders Wind Farm.

Table 5-1: Assessment of Alternative Sites during the Pre-feasibility Stage

Factor	Site 1	Site 2	Site 3	Site 4
Land Availability	✓	✓	x	✓
No unacceptable environmental sensitivities on site	x	✓	x	✓
Suitable wind speed levels	✓	✓	✓	✓
Acceptable maximum distance to and availability of the Grid	✓	✓	✓	✓
CAA Acceptable	✓	x	✓	✓
Topography	✓	✓	✓	✓
Current Land use compatibility	✓	✓	✓	✓
Landowner willingness	✓	✓	✓	✓

Taking the above into consideration, the outcomes of the site feasibility analysis can be summarised as follows:

Site 1: This site was deemed unacceptable due to its location along the R399, which due to the large tourist traffic volume and link between Paternoster and Vredenburg, is being considered as a scenic route.

Site 2: Due to the 18,5km (setback) exclusion area for the Langebaan Airforce base (see Figure 5-6), and the close proximity of the Lower Berg River Wetlands Important Bird Area, this site was considered unacceptable.

Site 3: Due to the 1km proximity to the town of Hoogland and the 3km proximity to the SAS Saldanha Nature Reserve, this site is considered unacceptable from an environmental perspective.

Site 4: Due to this site being furthest away from the Important Bird Areas, outside the Airforce base exclusion zone, and furthest from Vredenburg town, it was considered the preferred alternative.

Figure 5-6: Map of the West Coast Peninsula in the Saldanha Bay Municipality showing the Aviation exclusion zone.

5.3.3 Incremental Alternatives Considered in the EIA

The key concerns arising out of the Scoping process were the visual impacts on some Britannica Heights residents along the top of the ridge, the Paternoster residents and the Kasteelberg Heritage resource. To minimise these visual impacts, the footprint of the proposed development was reduced in the EIA phase from the original 10 farms, to the five farms closest to the existing WC1 energy facility. In addition, as the turbines and other infrastructure for the proposed development will only use 1% of the whole project area, a sensitivity analysis in the EIA phase was used to identify the most suitable turbine and road layout for the proposed development that would ensure that it avoids any sensitive areas. This sensitivity analysis was used by the developers to design an initial proposed layout on the remaining 5 farms. The specialists were then asked to assess the impacts of this layout. Thereafter, the layout was further refined to adhere to the recommendations of the Heritage Impact Assessment, where seven turbines were relocated, to produce a final mitigated layout. The EIA specialist studies, therefore, assessed the relative impacts of both these proposed layouts (i.e. pre-relocation of 7 turbines and post-relocation of 7 turbines).

5.4 ANALYSIS OF ALTERNATIVES

Table 5-1 illustrates the methodology used to assess the identified alternatives. The table assesses the advantages and disadvantages and provides further comments on the selected alternatives. The Table also identifies and assesses the Preferred Alternative.

The categories of alternatives that are assessed include:

- Location;
- Activity;
- Associated technology;
- Design and layout; and
- No-go alternative.

Statement of Preferred Alternative

The Table also identifies and assesses the Preferred Alternative, which is the current proposed layout comprising:

- 45 wind turbine according to the current proposed layout (after the relocation of seven turbines from the west of the Vredenberg to Paternoster Road, and consisting of the following specifications:
    - Maximum hub height of up to 120m;
    - Tip height of up to 165m; and
    - A rotor diameter of up to 103m.

Table 5-1. The alternatives for the proposed Boulders Wind Farm.

ALTERNATIVE LEVEL	ALTERNATIVES	ADVANTAGES	DISADVANTAGES	REASONABLE AND FEASIBLE	COMMENT
Property or location This refers to the **fundamental location options**, and the environmental risks and impacts associated with such options.	**Alternative location 1** - Current proposed site (Preferred alternative). This site has been selected based on good wind resource potential and proximity to available electricity grid.	– Located close to existing necessary Eskom electrical infrastructure. – Suitable wind resource. – Land availability (Vredenburg Windfarm and landowners have formally agreed to the proposed development on the site and are in full support of the use of this area).	– Land previously undeveloped – Potential visual intrusion to surrounding communities. – Potential impacts on avifauna and bats.	**YES**	The main determining factors for selecting the proposed location were: – Proximity to a grid connection point. – Available land. – Available wind resource. Preliminary investigations have identified that the proposed project site meets the above land specifications.
	Alternative location 2 - None identified as rights to private land must be sought from local landowners. Location 1 has been agreed to. Alternative sites in the area do not yield the same wind resource potential.	N/A	N/A	**N/A**	– Alternative locations for the current project are limited and probably not reasonable or feasible due to lower wind resources. This is excluding the four locations that were eliminated in the pre-EIA feasibility assessment (Appendix D-1). – The connectivity to the grid is a critical factor to the overall feasibility of the project. – The available wind resource was considered a critical aspect.
Type of technology This refers to the fundamental technology options, such as energy generation from wind	**Alternative energy technology 1** – Wind turbines (Preferred alternative)	– Clean and renewable energy. – Mitigate climate change. – Does not require large areas of land.	– Visually intrusive. – Avifaunal and bat impacts.	**YES**	The activity does not exclude all current land uses i.e. farming or stock grazing can still take place between turbines. In addition, wind is the optimal

ALTERNATIVE LEVEL	ALTERNATIVES	ADVANTAGES	DISADVANTAGES	REASONABLE AND FEASIBLE	COMMENT
vs. coal fired power plant, etc. and the environmental risks and impacts associated with such options.					renewable energy resource in the Western Cape peninsula.
	Alternative energy technology 2 – Solar PV	– Clean and renewable energy. – Mitigate climate change.	– Visually intrusive – Requires large area of land. – Requires unobstructed north facing topography. – Fog which occurs along this West Coast reduces radiation.	**NO**	Wind and solar are not mutually exclusive, i.e. both developments can take place in close proximity to one another (see below). However, the solar atlas shows the project area to occur in an area that receives <5.0 kWh/m^2 of solar radiation per day. Areas receiving 7 and 8 kWh/m^2 radiation per day are required.
	Alternative energy technology 3 – Concentrated Solar Power (CSP)	– Clean and renewable energy. – Mitigate climate change.	– Visually intrusive. – Requires large area of land. – Water a limiting factor. – Reflectivity of mirrors potentially a significant issue.	**NO**	Not enough intense radiation in the area to be considered viable. The solar atlas shows the project area to occur in an area that receives <5.0 kWh/m^2 of solar radiation per day. Although moderately favourable for solar radiation there are areas in South Africa that receive between 7 and 8 kWh/m^2 radiation per day.
	Alternative energy technology 4 – Coal fired power plant	– Provide a large base load of electricity	– Air pollution from coal dust and smokestack emissions (SO_2). – Contribution to climate change. – Ground contamination from coal dust.	**NO**	Not environmentally desirable.
	Alternative energy technology 5 – biomass	– Clean and renewable energy. – Mitigate climate change.	– Expensive source of energy	**NO**	Sufficient suitable biomass may not be available in proximity to the site.

ALTERNATIVE LEVEL	ALTERNATIVES	ADVANTAGES	DISADVANTAGES	REASONABLE AND FEASIBLE	COMMENT
					Biomass and wind energy are not mutually exclusive.
	Alternative energy technology 6– nuclear power	Greater electricity generation with little raw material required	– Raw material highly radioactive – Water availability a severe limitation.	**NO**	The significant dependence of nuclear energy generation on high volumes of water preclude its development on the proposed site. Nuclear and wind energy are not mutually exclusive.
Design or layout This relates mostly to alternative ways in which the proposed development or activity can be physically laid out on the ground to minimise or reduce environmental risks or impacts	**Alternative layout 1:** Preliminary wind farm layout, access route, electrical switching stations and short connecting powerline	The preliminary layout, access route and switching station have been selected according to the most appropriate technical design.	There may be impacts associated with upgrading and expanding road reserves in sensitive environments.	**YES**	Considering the wind farm layout: A maximum of 45 turbine structures will be assessed. The preferred layout (Alternative 2) has been informed by the EIA process and initial associated specialist assessments. Thus, the final proposed wind farm layout included in this EIR is the optimal layout from an environmental perspective, where all environmentally sensitive areas have been designated as NO-GO areas.
	Alternative layout 2 Preferred wind farm layout site access route, electrical switching stations and evacuation powerline	The preferred alternative has undergone a rigorous environmental assessment to confirm its suitability for the area.		**YES**	
Operational aspects This relates mostly to alternative ways in which the development or activity can operate in order to reduce environmental risks or impacts	**Alternative operational activities**	Operational management alternatives will be informed by specialist input (e.g. bird and bat monitoring). None have yet been identified.	N/A	**YES**	N/A
No-go option This refers to the current status quo and	The affected farms contained in the project area are	The proposed project site and the activities associated with the site (currently small-scale agriculture	The loss of the potential of this particular wind farms contribution	**YES**	The no-go option has various positive and negative impacts associated with this alternative.

ALTERNATIVE LEVEL	ALTERNATIVES	ADVANTAGES	DISADVANTAGES	REASONABLE AND FEASIBLE	COMMENT
the risks and impacts associated with it.	currently used for agricultural purposes, including small-grain and livestock farming. These farms are marginal and unsustainable in the current economic and physical environment.	and natural vegetation) may remain as is. However, the marginal and unsustainable nature of the farming in this area may result in further degradation and a search for alternative land uses or livelihood options by the farms. There is interest amongst tourism developers for farms along and close to the coastline, but the extent to which they are willing to purchase and develop the land is uncertain.	towards the National renewable energy and greenhouse gas emissions reduction targets. No financial benefit for the affected landowners and local/regional service providers and labourers.		All baseline information provided in this report relates to the current situation on site and can be considered the no-go alternative. Impacts are limited to the status quo. Positive and negative impacts are as follows. Positive: - Agricultural activities will continue but farmers may seek other land use development options; - Ecological processes will continue as is (impacts associated with current agricultural practices will continue); - Vegetation clearance will be limited to activities associated with the current agricultural practices; - All negative impacts, specifically related to the development of the wind farm, discussed in this report will not materialise. Negative: - The economic impact of the rental received by farmers will be lost, meaning that agricultural activities will continue as is or may be replaced by other new land use options;

ALTERNATIVE LEVEL	ALTERNATIVES	ADVANTAGES	DISADVANTAGES	REASONABLE AND FEASIBLE	COMMENT
					- All positive impacts, specifically related to the development of the wind farm, discussed in this report will not materialise, except the energy benefits which will not be lost (as renewable energy projects will be developed elsewhere).

6. DESCRIPTION OF THE AFFECTED ENVIRONMENT

GOVERNMENT NOTICE 982, ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS, 2014 (AS AMENDED 2017). APPENDIX 3: SCOPE OF ASSESSMENT AND CONTENT OF ENVIRONMENTAL IMPACT ASSESSMENT REPORTS

3. An environmental impact assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include–

(h) A full description of the process followed to reach the proposed development footprint within the approved site, including:

(iv) The environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;

This chapter provides a description of the affected environment within the vicinity of the proposed Boulders Wind Farm. This information is provided in order to assist the reader in understanding the possible effects of the project on the environment within which it is proposed to be developed. This information has been sourced from both existing information available for the area as well as the specialist consultants who have undertaken studies for the proposed Boulders Wind Farm. This chapter aims to provide the context within which this EIA is being conducted.

6.1 BIOPHYSICAL ENVIRONMENT

6.1.1 Climate

The average precipitation in this region of the Western Cape is 408mm per annum, with peak rainfall 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 6-1 below provides a climate graph for the town of Vredenburg.

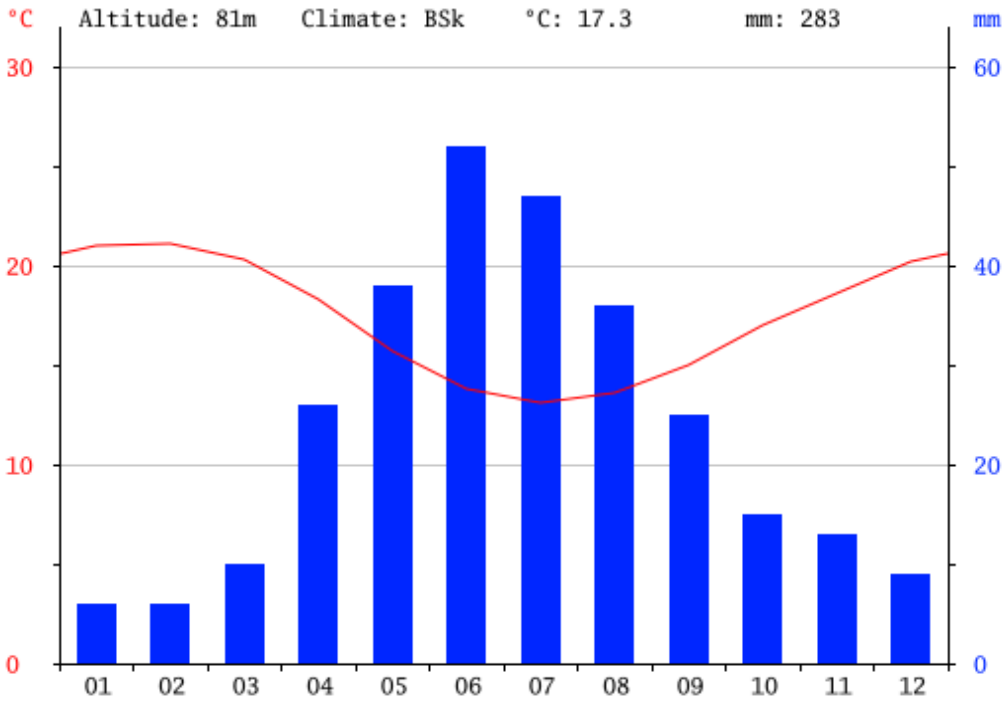

Figure 6-1: Climate graph for the town of Vredenburg.

6.1.2 Topography

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 terrain 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.

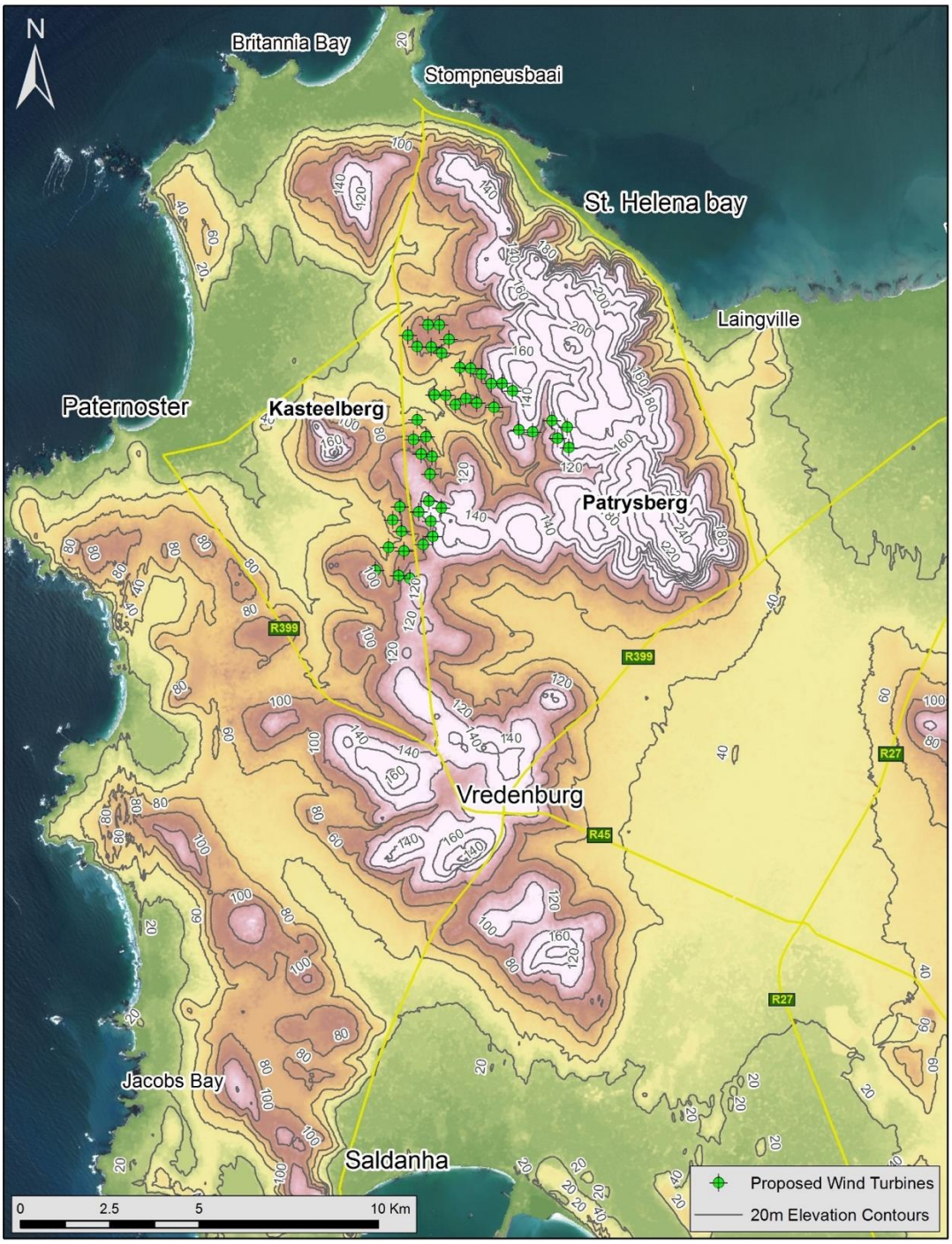

Figure 6-2: Topographical map of the Boulders Wind Farm surrounding area.

6.1.3 Geology

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 Cape West Coast 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.

Figure 6-3 illustrates the geological profile of the proposed Boulders Wind Farm project site.

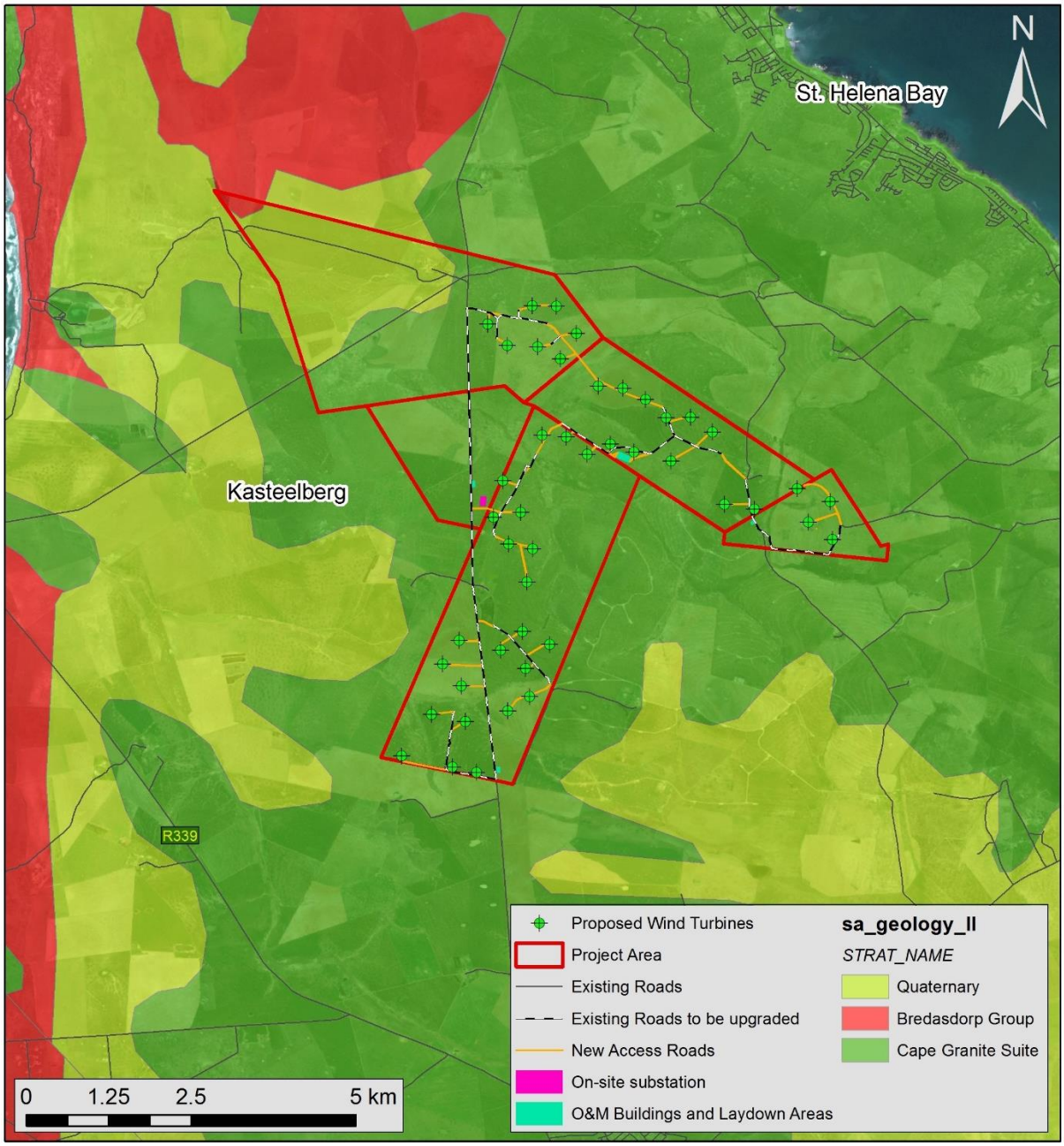

Figure 6-3: Geological Profile of the Boulders Wind Farm Project Site

6.1.4 Watercourses

The degradation and disturbance of current and historical agricultural activities has resulted in the loss of natural vegetation throughout much of the project site and has subsequently resulted in the proliferation of alien and invasive floral species in some of the identified freshwater features.

Several freshwater wetland features have been identified within the project site. These features include:

- Several channelled valley bottom wetland features located within the northern and south eastern portions of the project site;
- Several hillslope seep wetland features within the south eastern portion and one within the western portion of the project site. These hillslope seep wetlands can be distinguished between:

  - Impaired hillslope seep wetlands: these features are severely degraded by the historical and current surrounding agricultural activities and are also located relatively close to the main road, allowing for easier accessibility to these features; and
  - Intact hillslope seep wetlands: these features are located away from any easily accessible roads, making them less susceptible to anthropogenic impacts, however, the surrounding agricultural activities have still impacted them to some degree.
- A floodplain wetland is located in the central portion of the project site.

In addition to the freshwater wetland features, the following features were also identified:

- Numerous artificial depressions (i.e. farm dams, borrow pits) located throughout the project site;
- Drainage channels, most of which are connected to wetland features and traverse cultivated areas. Although historically these drainage channels may have formed part of the larger drainage systems in the area, these drainage lines have been severely modified due to the surrounding agricultural activities and no longer have any discernible wetland characteristics. 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, wherein water does not accumulate for a sufficient period to facilitate hydromorphic soils which are capable of supporting facultative and obligate wetland vegetation.
- Although these drainage lines cannot be classified as a wetland in the traditional sense due to the lack of saturated soils and wetland/riparian vegetation, they may still function as a watercourse through episodic relaying of water.

Figure 6-4 provides an indication of the wetland types and rivers associated with the Boulders Wind Farm project site. Figure 6-5 illustrates the various watercourses and wetlands which were identified on the Boulders Wind Farm project site and includes their regulatory buffers.

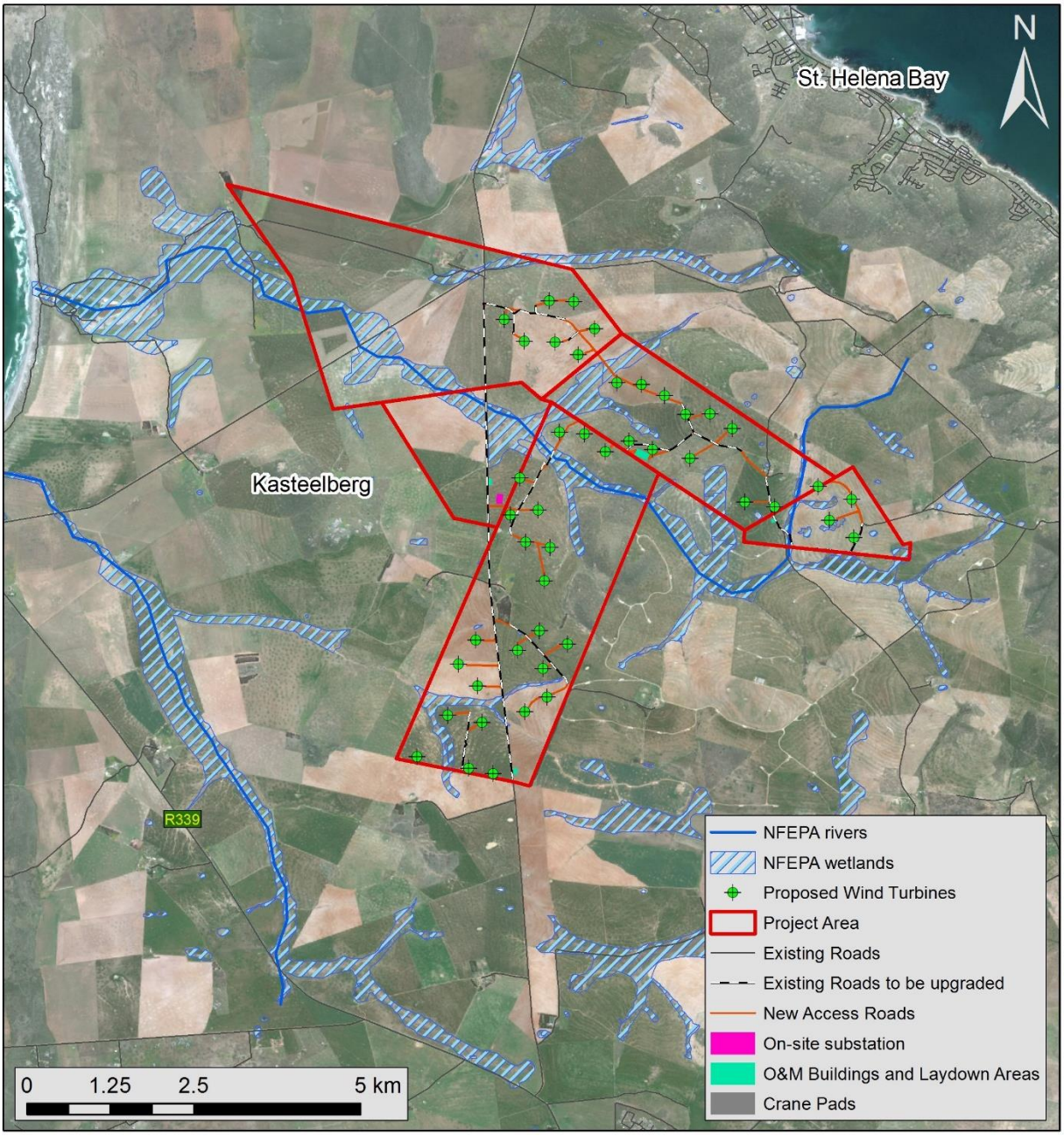

Figure 6-4: Wetland Types, Rivers and Drainage Lines.

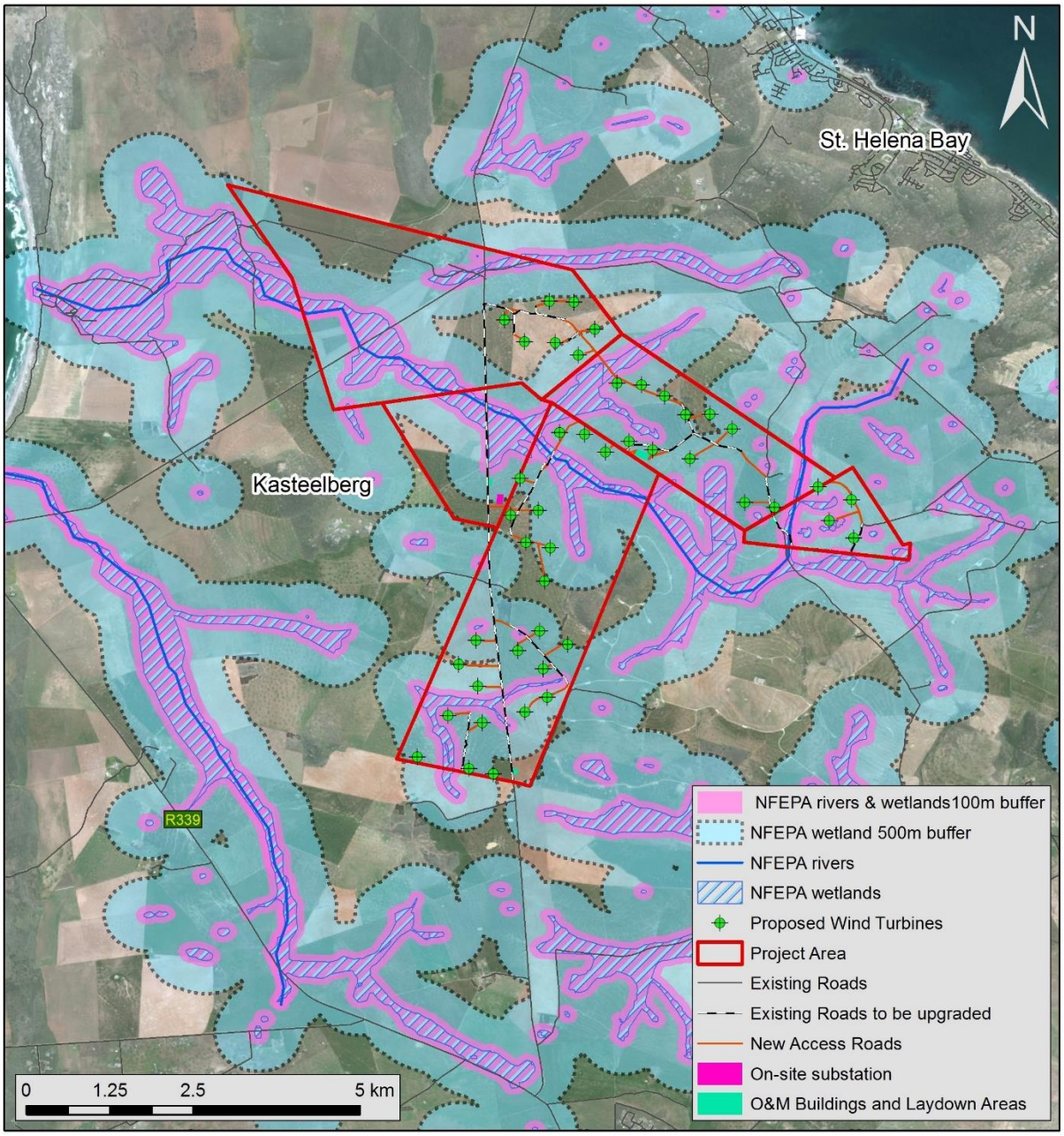

Figure 6-5: Wetland Types, Rivers and Drainage Lines, including regulatory buffers as per the National Water Act.

6.1.5 Soils and Agriculture

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 rocky 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 (possibly 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 6-6):

- A2 – Red and yellow, massive or weakly structured soils with low to medium base status (association of well drained Farrasols, Acrisols and Lixisols).
- E1 – Soils with minimal development, usually shallow on hard weathering rock, with or without intermittent diverse soils (association of Leptosols, Regosols, Calcisols and Durisols).

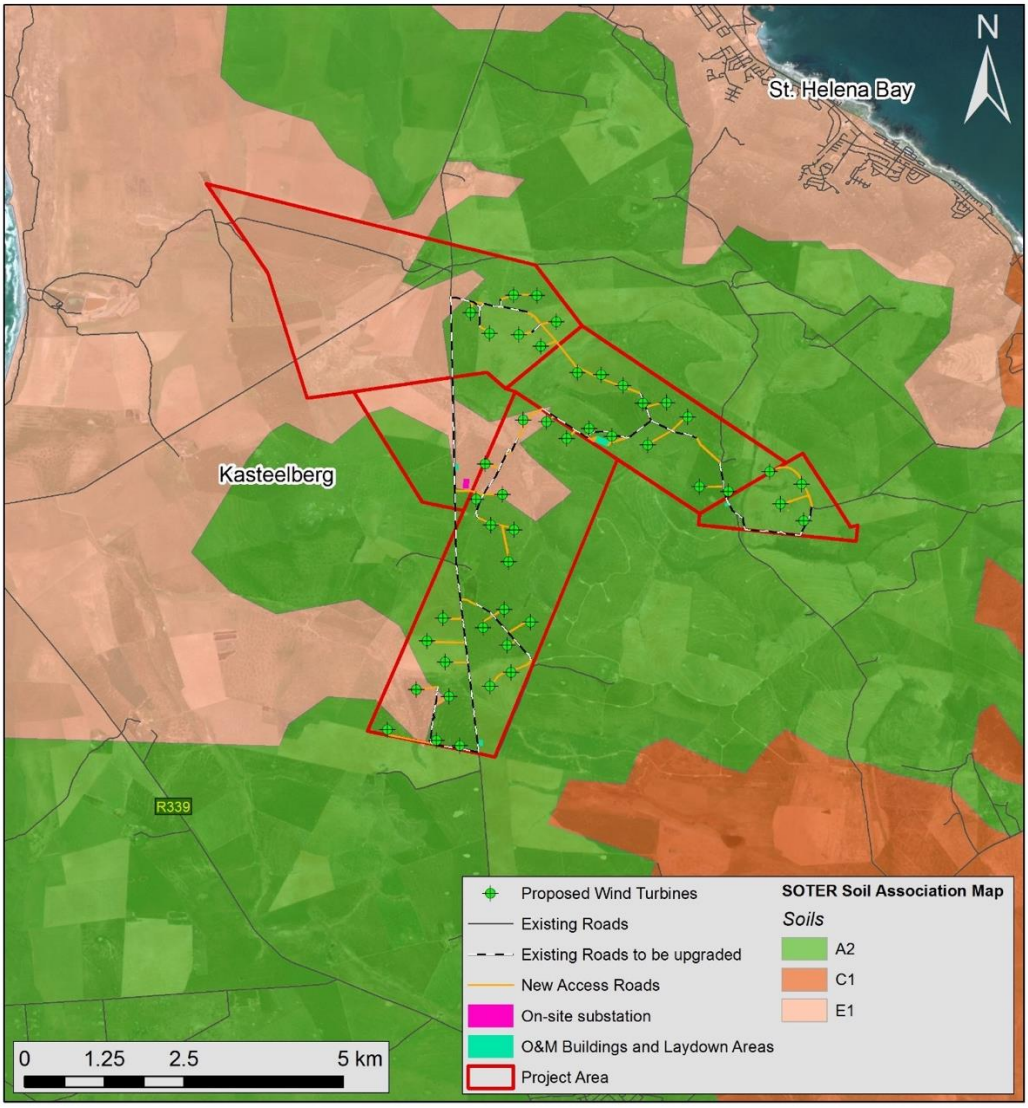

Figure 6-6: Land types associated with the Boulders Wind Farm site.

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.

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.

6.1.6 Vegetation and Floristics

MUCINA & RUTHERFORD

The national vegetation map (Mucina & Rutherford 2012) for the project site is provided in Figure 6-7.

Saldanha Granite Strandveld

The majority of the site falls within the Saldanha Granite Strandveld which occurs on the West Coast of the Western Cape Province. Saldanha Granite Sandveld is associated with 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. The vegetation consists of low to medium shrubland, containing some succulent elements, and alternates with grassy and herb-rich spots supporting a rich geophyte flora.

The vegetation is listed as Endangered and of the original extent of 23 000ha, about 70% has been transformed for cultivation or by urban development. 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. The vegetation type has 45 Red Data Book species and 15 endemic species.

Saldanha Flats Strandveld

Saldanha Flats Strandveld occurs on the western half of the 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. 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. It often has conspicuous displays of geophytes and annual herbaceous flora in spring.

It is listed as Endangered (up-listed from the 2011 assessment of Vulnerable - WCBSP 2017) with 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. Only 48% of the original extent (76 000ha) remains. More than half has already been transformed for cultivation, road building or urban development. It has 26 Red Database species and at least 2 endemic species.

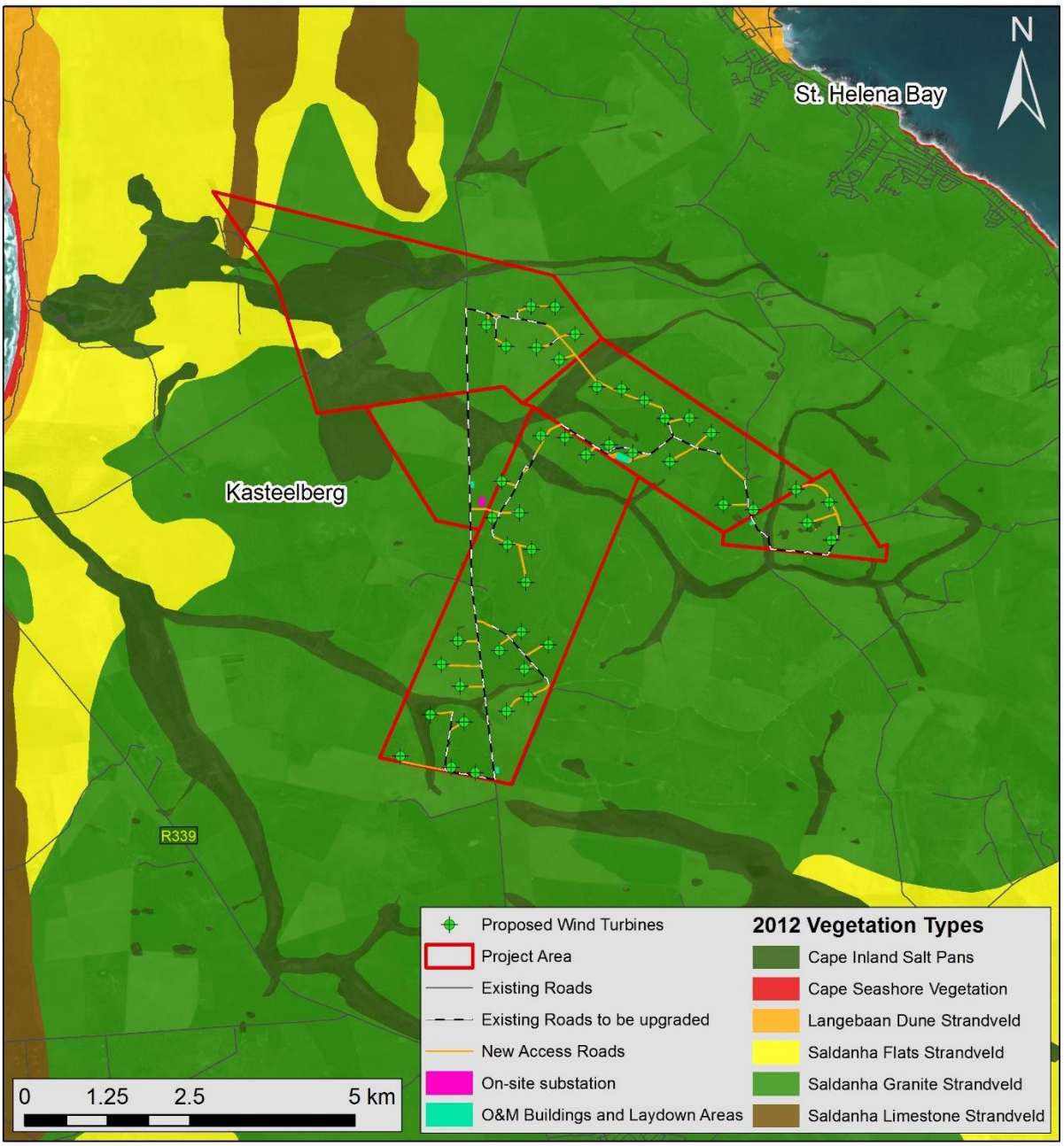

Figure 6-7: Mucina & Rutherford Vegetation Map.

Saldanha Limestone Strandveld

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. 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.

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 but is nevertheless

considered vulnerable to further habitat loss due the high existing level of transformation and fragmentation.

Cape Inland Salt Pans

Cape Inland Salt Pans occupy the low-lying areas and floodplains of the drainage systems on the site. This azonal vegetation type occurs in the Western and Eastern Cape (to smaller extent) Provinces, 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 chenopods and salt-tolerant herbs and grasses.

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

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 are Vulnerable, indicating a very high proportion of species of special concern in the area. Several of these species have been confirmed within the site and these species occurred in both the larger more intact natural-vegetated areas as well as the smaller more degraded fragments.

CRITICAL BIODIVERSITY AREAS AND BROAD-SCALE PROCESSES

The project site lies within the planning domain of the Western Cape Biodiversity Spatial Plan. 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 several CBAs within the project site (Figure 6-8) 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). The Biodiversity Plan also indicates the known presence of plant species of conservation concern within the site, highlighting the potential significance of the intact vegetation fragments. The distribution and functioning of the CBAs are closely associated with the remaining intact areas.

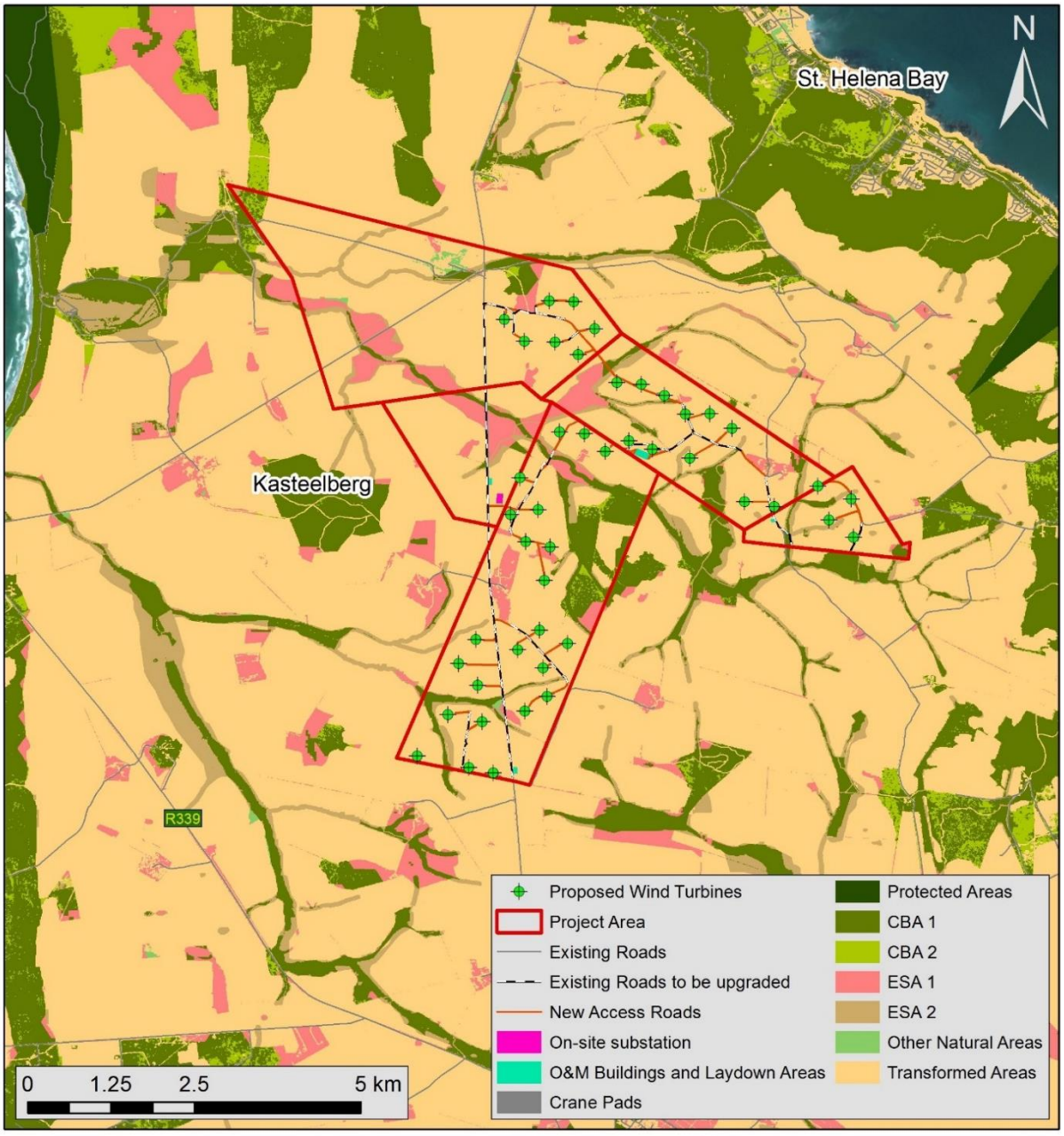

Figure 6-8: Western Cape Biodiversity Spatial Plan.

NATIONAL PROTECTED AREA EXPANSION STRATEGY

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.

BIOSPHERE RESERVES

The project site is also located 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. No core areas of the reserve are located within the site, although it is situated 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 continuity between the core and buffer areas (Figure 6-9).

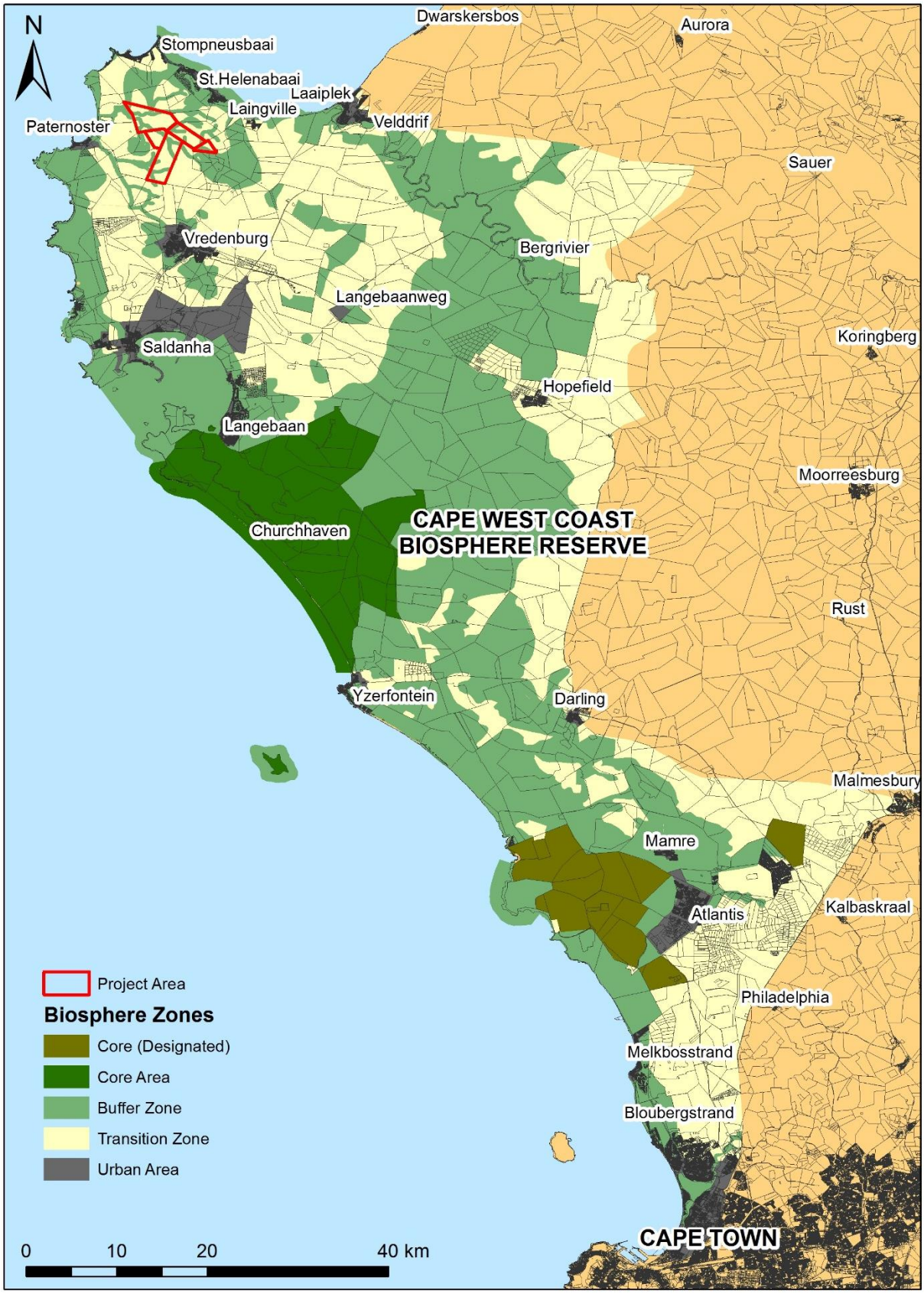

Figure 6-9: Cape West Coast Biosphere Reserve.

6.1.7 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. 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 Hyena *Hyena brunnea* (Near Threatened) and Cape Clawless Otter *Aonyx capensis* (Near Threatened).

The Brown Hyena is observed in the West Coast National Park and it is not likely that there are any resident individuals in the Boulders Wind Farm project site as it is used for farming and has little cover for the species. According to the IUCN page for Grant's Golden Mole, it occurs in the Strandveld and Succulent Karoo. It is known to prefer soft, shifting sands of dune crests but is also present in inter-dune swales with dense vegetation, provided that the sand is not too consolidated. Areas containing scattered clumps of Dune Grass (*Aristida sabulicola*), Ostrich Grass (*Cladoraphis spinosa*) and Long Bushman Grass (*Stipagrostis ciliata*), are the preferred habitats for this species. Based on this description of the preferred habitat, it is highly unlikely that Grant's Golden Mole occurs at the project site, as it contains heavy granite-derived soils.

REPTILES

The project site lies within or near the distribution range of at least 40 reptile species. There are several listed species which could occur at the site. The Cape Dwarf Chameleon *Bradypodion pumilum* (Vulnerable) are likely to be found in restio clumps often near water, the Large-scaled Girdled Lizard *Cordylus macropholis* (Near Threatened) and the Black Girdled Lizard *Cordylus niger* (Near Threatened) are 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 sandy coastal soils which do not occur within the area.

The Black Girdled Lizard has been confirmed at the project site and was observed on the large granite outcrops which are dispersed throughout the project site.

AMPHIBIANS

There are eight amphibians known from the area based on the Avian Demography Unit database. The only listed species which is likely to 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. This species has also been recorded in areas which have shallow sandy habitats and could therefore occur in the inland pan habitat located on the Boulders Wind Farm site. No suitable pans were observed at the project site during the ecological site visit, and the lowlands at the site were generally saline and dominated by salt marsh species such as Sarcocornia.

The only species observed at the site was the Cape River Frog *Amietia fuscigula* which was observed in some rock pools present in one of the rocky outcrops of the site. It is however likely that there are other species which also use these pools for breeding purposes.

6.1.8 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, namely 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/or are restricted in terms of specific biomes or vegetation types.

The closest Important Bird Area (IBA) to the project site, namely the Lower Berg River Wetlands, is located approximately 8km to the east. It is expected that the bird community present within this IBA may commute to and from the site.

A second IBA, namely West Coast National Park and Saldanha Bay Islands located at approximately 30km south, coincident with the West Coast National Park. A potential north-south flyway was noted during the West Coast One Wind Energy Facility pre- and post-construction monitoring campaigns (Jenkins et al. 2017). This could potentially be a flyway for certain water bird species flying between the two IBA's. However, the Boulders Wind Farm avifaunal monitoring campaign did not record high levels of waterbird movements across the site.

The Lower Berg River Wetlands is situated at the Berg River mouth at Laaiplek (BirdLife South Africa, 2014a). Approximately 250 bird species have been recorded using the area, 120 of which are waterbirds. This important estuary offers important habitats such as mudflats and floodplain pans. The area supports large colonies of African Black Oystercatcher (*Haematopus moquini*), Common Tern (*Sterna hirundo*), Sandwich tern (*Sterna sandvicensis*), Swift Tern (*Sterna bergii*), Greater Flamingo (*Phonicopterus roseus*), Lesser Flamingo (*Phoeniconaias minor*), Chesnut-banded Plover (*Charadrius pallidus*), Hartlaub's Gull (*Larus hartlaubii*) and Great White Pellican (*Pelecanus onocrotalus*) among others.

The Tern roosting site is a Coordinated Waterbird Counts (CWAC) registered site (Berg River 17) and is regularly monitored. On average approximately 1100 individual Sandwich Terns, 200 Swift Terns and 100 Common Terns are recorded at this site. One other CWAC site (Berg River 16) is known to serve as a major night roost for various waterbirds, including very large numbers of Cape Cormorant (up to 15 000 birds). Raptors, such as the African Marsh Harrier (*Circus ranivorus*) and the African Fish Eagle (*Haliaeetus vocifer*) breed in the area as well.

The West Coast National Park and Saldanha Bay Island include the Langebaan Lagoon, the coastal zone, Postberg Nature Reserve and several islands (BirdLife South Africa 2014b). The park therefore supports important communities of waterbirds and is considered to be the most important wetland for waders in South Africa. Species such as Grey Plover (*Pluvialis squatarola*), Curlew Sandpiper (*Calidris ferruginea*), Sanderling (*Calidris alba*), Red Knot (*Calidris canutus*), Ruddy Turnstone (*Arenaria interpres*), Chestnut-banded Plover (*Charadrius pallidus*), White-fronted Plover (*Charadrius marginatus*) and Kittlitz's Plover (*Charadrius pecularius*) are important components of such communities.

Figure 6-10 below provides an indication of the project site in relation to the identified Important Bird and Biodiversity Areas (IBA).

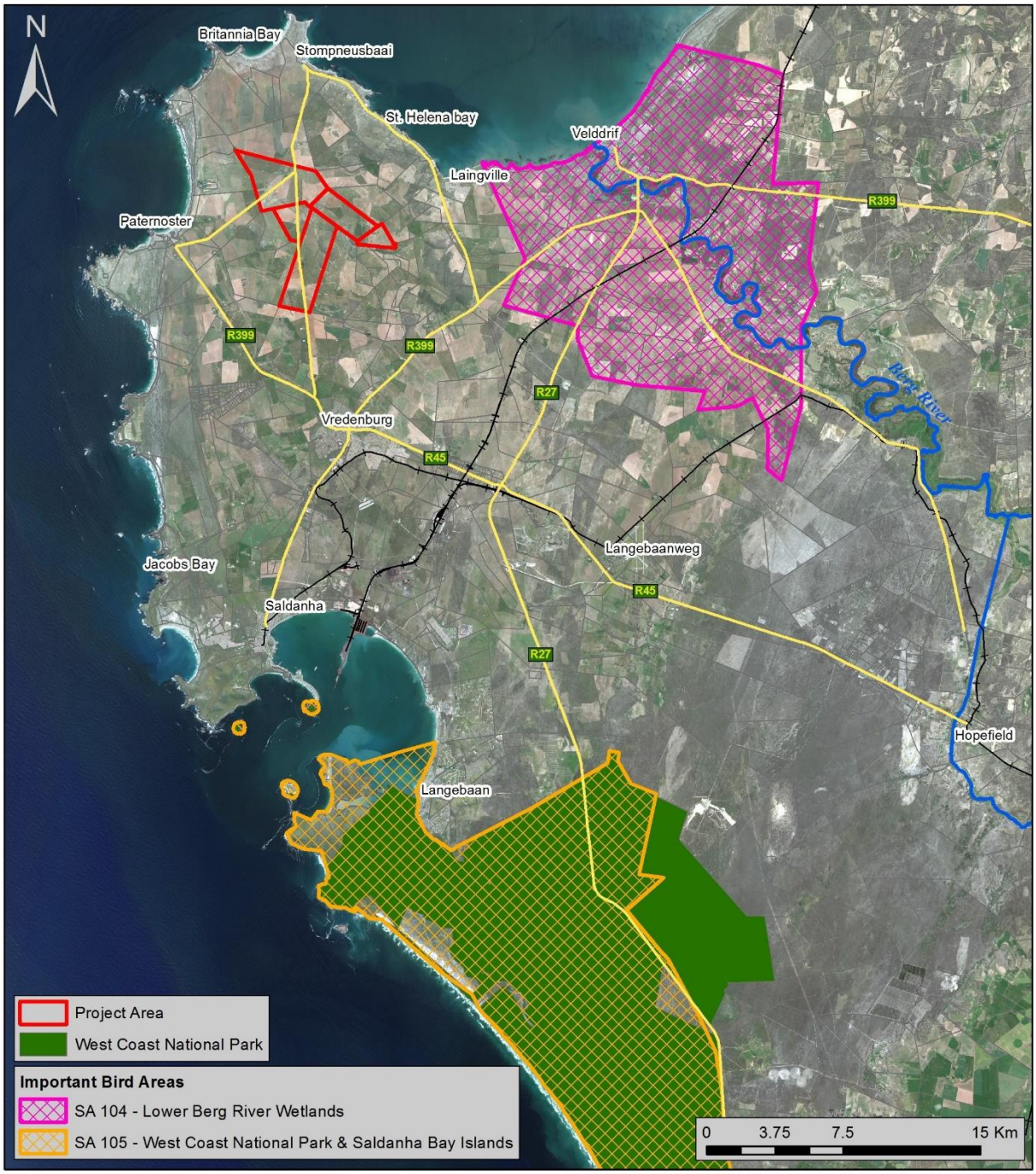

Figure 6-10: Lower Berg River Wetlands IBA & West Coast National Park and Saldanha Bay Islands IBA.

AVIFAUNA MICRO-HABITATS

The main habitat types within the project 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:

Pastures

Pasture areas often attract bird species due to food and water supplements given to cattle and sheep. Affected species groups include geese, cranes, storks, egrets and herons. In addition to the species attracted to livestock feed and water, insect eaters (including raptors) are also attracted to these areas due to the presence of insects associated with livestock.

Cereal cropland

Highly seasonal, these transformed habitats, dominated by wheat crops in the project site, may attract seed eaters such as the Blue Crane, and foraging raptors due to the presence of rodents. 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 had cereal. These different stages attract different bird species to the area, depending on their biotope preferences.

Drainage Lines

The project site contains limited small farm dams and pans which, depending on their intrinsic characteristics, can be important for some bird species. In addition, several drainage lines likely to carry water during the winter season traverse the project site in the central, northern 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, 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 scrub, is not very attractive for most bird species, especially passerines. It is however suitable habitat for some endemic bird species such as the Cape Long-billed Lark, the Southern Black Korhaan and the Black Harrier. However, the site is considered highly transformed due to its current agricultural land-use and the natural vegetation is only present within strips of land and close to drainage lines.

Coastline and Oceanic Waters

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

Roads

Raptors and other aerial species are known to be found adjacent to roads due to the presence of perches (electric and/or telephone lines) or due to prey availability (i.e. roadkill). Some bird species may even use roads as landscape marks to travel through the area.

Waterbodies

The project site contains several small farm dams which, depending on its characteristics, may be important for some bird species. These features may define the general composition of the communities of large birds, which are likely to use them as steppingstones during their movements, or as feeding or roosting areas, depending on water levels, availability of food, etc. These points may also attract predatory birds which feed on water birds. 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 are therefore likely to 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 species, are stands of trees. In the project site trees are usually associated with homesteads and farm buildings. These locations provide perching, roosting and/or nesting locations for raptor species as well as refuge for smaller passerine species, such as Secretarybird (*Sagittarius serpentarius*), African Sacred Ibis (*Threskiornis aethiopicus*), Sickle-winged Chat (*Cercomela sinuate*), and Cloud Cisticola (*Cisticola textrix*).

BIRD COMMUNITY CONFIRMED WITHIN THE PROJECT SITE

The bird community located within the project site has been confirmed through an avifauna pre-construction monitoring campaign, as well as a radar monitoring campaign. The data collected at the site indicated that the most abundant groups of birds recorded were water birds and Cranes (Blue Crane being the only Crane species recorded). Other than the Blue Crane, twelve species with a conservation status of concern (considered as "Near Threatened", "Vulnerable" or "Endangered" by the South Africa Red List of Conservation Status) were recorded. These 12 species are Black Harrier, Martial Eagle, Verreauxs' Eagle, Secretary bird, Lanner Falcon, Cape Cormorant, Greater and Lesser Flamingo, Great White Pelican, Caspian Tern, Ludwig's Bustard and Southern Black Korhaan.

Due to its abundance and conservation status, the Blue Crane (Vulnerable) is a species of concern. Blue Cranes were mostly observed close to drainage lines and the associated habitats in the southern section of the project site, in large flocks, feeding or resting on the ground. However, flight heights of the species were generally very low (less than 10m height) and short distanced.

The presence of thirteen collision sensitive raptors were confirmed. Four of them have a sensitive conservation status, namely Black Harrier (Endangered), Martial Eagle (Vulnerable), Lanner Falcon (Vulnerable) and Secretary bird (Vulnerable). Black Harrier, Lanner Falcon and Secretary bird seldom flew at rotor height, and Martial Eagle was only observed perched on the ground. Nonetheless as a group, raptors were frequently observed flying at rotor swept height (average 25% of contacts).

The occurrence of several passerine species that may potentially be affected by collision was confirmed, especially endemic and/or range restricted larks, such as Cape Clapper Lark, Cape Long-billed Lark, Karoo Lark and Large-billed Lark. These are all considered to have a "Least Concern" conservation status. Larks are among the more common and widespread species in the area, especially considering their endemicity. The estimated number of individuals (based on density estimation) indicated that this group of species was very abundant. As they were widespread throughout the area, no definite association with a specific type of biotope was observed.

Regarding especially sensitive features, some water features within the project site harboured groups of Greater Flamingos – making these locations important for the bird community. An important water body was identified 2.5km west of the site, consisting of a water treatment impoundment where more than 200 birds were observed, including Greater Flamingos (Near Threatened), Lesser Flamingos (Near Threatened), Blue Crane (Vulnerable) and African Black Oystercatcher (Least Concern).

Five nests and several other owl boxes were identified at or in the broader region of the site, of which two are confirmed nests of sensitive species: Verreauxs' Eagle and Secretary bird. The Verreauxs' Eagle nest is located at a considerable distance, approximately 25 km south of the project site. An active Secretary bird nest was found to the northwest of the Boulders Wind Farm project site. The closest turbine to this is Turbine 41 at a distance of 1.4km.

6.1.9 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, 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 6-1 below provides the details of the bat 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 roofs as a roost. The presence of *Laephotis namibensis* on site was confirmed, although this species is likely a forager 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 only have been foraging in the area.

IMPORTANT BAT HABITATS

Waterbodies

Waterbodies 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 waterbodies and watercourses 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. 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 waterbodies (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 waterbodies 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 with both drinking opportunities and 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.

The bat pre-construction monitoring data has indicated that the bat activity at the Boulders Wind Farm project site is variable between locations. Very high levels of bat activity were recorded at some of the monitoring stations, with peaks in activity during spring and autumn. It was identified that these peaks in the data represent bat migration across the site, with autumn migration being more concentrated in the eastern section of the site. The pre-construction monitoring data has also indicated that although much of the land in the development footprint has been transformed for agricultural use, there are habitat features within the project site which may promote bat activity. Activity was closely associate with natural vegetation and water features, with lower activity on cultivated land. Bat species, including *M. natalensis*, *N. capensis* and *T. aegyptiaca*, were confirmed on the site. It is also possible that *Rousettus aegyptiacus* may migrate over the project site in low numbers, although this has not been substantiated.

The pre-construction monitoring data also confirmed that the bat activity at the site is correlated with wind speed, temperature and rainfall. It was confirmed that bats are more active at the project site during lower wind speeds and high temperatures and when rainfall is low. It appears that most of the bats recorded on site do not roost there, but numerous night roosts and suitable roosting locations were documented on site. There are also a number of features within the development footprint which may support bats.

Table 6-1: Bat Species Likely to be Present at 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

Family	Species	Common Name	Probability of Occurrence	Roosting Requirements	Likelihood of Risk	Relative Status	Conservation Status	
							RSA	Global
	Laephotis namibensis	Namibian long-eared bat	**Confirmed***	Rock crevices	**Low**	Restricted distributions	Least Concern	Least Concern
	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

6.2 SOCIO-ECONOMIC PROFILE

The broader study area and the project site proposed for the development of the Boulders Wind Farm is located within the Cape West Coast Peninsula in the Western Cape Province. The project site is located within Ward 11 of the Saldanha Bay Local Municipality, a Category-B municipality, and within the greater West Coast District Municipality, a Category-C 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. Vredenburg is the administrative centre of the local municipality and the West Coast's commercial hub for the surrounding rural communities of wheat, sheep, and dairy farmers; it also has a number of fish factories and outlets. Vredenburg is the closest major town to the proposed project and 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.

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, predominantly Vredenburg and Saldanha. Other, smaller settlements include Paternoster and Jacobsbaai.

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 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 wildflower 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 and 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 Britannia Bay / St Helena Bay area. As a result, the traditional fishing village sense of place associated with these small, coastal towns has been modified.

6.2.1 Municipal Background

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, finance and business services; wholesale and retail trade; and catering and accommodation. Key tourism attractions include the coastal areas, nature reserves and the natural visual aesthetic of the region. In addition, golf estates, beauty spas and parks 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 the Port of Saldanha Bay, which hosts an iron ore terminal from where iron ore mined at Kumba Iron Ore is exported. ArcelorMittal is one of the major 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 the 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, while the unemployed labour was about 10 587. This results in an unemployment rate of 23%.

6.2.2 Population Statistics

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 proportion (97%) of the population resides in urban areas, followed by 3% on farmland, 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.

6.2.3 Tourism

Historically, tourism has been a great driving force behind the economic development in this region of the Western Cape. In essence, the local tourism sector has deep roots in the region and has engrossed itself in almost every aspect of the local populace. Key tourism attractions for this area include the beach fronts hosting numerous aquatic species, the nature reserves, a wind farm and the natural visual aesthetic of the area. Catering facilities, golf estates, beauty spas and parks drive the attraction of tourists into the area and contributes to the local tourism economy. Therefore, in support of these, accommodation and catering business continuously thrive. In the August and September period, the wildflower season attracts numerous tourists into the region.

Although Vredenburg is located inland, it is ideally situated as a base for day trips to the surrounding West Coast towns and attractions. West Coast Fossil Park; the beaches of Paternoster; the Cape

Columbine Nature Reserve; Langebaan; the West Coast National Park; Jacobsbaai and St Helena Bay are all situated within close proximity of Vredenburg.

According to the Cape West Coast visitor trends, as published by WESGRO, Paternoster was one of the busiest towns in the region with an increase in tourist flow recorded by the tourism offices in 2016. The main tourism activities in Paternoster include whale watching and a visit to the Cape Columbine Nature Reserve. This reserve boasts the last manually controlled lighthouse to be built in South Africa. It is characterised by a specific style of architecture that offers a picturesque view of the residential area. 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 (33%) was made up of mostly Germans (46%) and tourists from the United Kingdom (21%).

St Helena Bay is one of the world's principal fishing centres. 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, who make up a relatively small number of tourists in the area (6%), were predominantly from Germany and Namibia.

The tourism offerings receive a large number of customers annually, mostly during peak seasons. The peak seasons include the Christmas holiday season, Easter holidays, public school holidays and the wildflower season (between August and September). The rest of the year (April to August and November) are relatively quiet seasons for the tourism industry.

6.2.4 Property Composition

The areas surrounding the Boulders Wind Farm project site are largely characterised by residential property. The residential property in the area is largely comprised of private housing followed by holiday homes which include Bed and Breakfast (B&B) accommodation. Commercial property is also prevalent and includes, amongst others, hotels, office buildings and fish factories. Paternoster, however, is largely comprised of holiday home offerings (in support of this town being one of the busiest tourism towns in the region), whereas Vredenburg, St Helena Bay and Britannica Heights are dominated by private residential homes, with a smaller portion of retirement homes in these towns. A segment of private residences have also been converted to holiday accommodation. The rest is used as a primary residence.

In recent years, new developments have consisted of medium-sized hotels, holiday homes and private residential property estates. Significant holiday home developments took place in Paternoster, while limited tourism expansion took place in St Helena Bay due to regulation of a major regional growth centre set by the local municipality and homeowners association. A number of large residential estates were established in St Helena Bay and Britannica Heights 10 to 15 years ago, but occupancy levels remain low, with the majority of erven remaining undeveloped. Paternoster inversely had limited private home development as the area is largely tourism oriented.

St Helena Bay is a relatively new area in terms of investment given that Langebaan is now developed to capacity, therefore new developments are common. This is attributed to the high land availability and low land prices. Inherently, upgrades and renovations are limited due to the relatively new property stock. Britannica Heights similarly has a concentration of new development. In contrast, Vredenburg has experienced limited property investment. This area is largely occupied by long-term residents.

6.2.5 Heritage: Culture, History and Archaeology

Historical records reveal that the Cape West Coast 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.

The cultural landscape of the Cape West Coast Peninsula comprises several elements that are layered such that they constitute separate units, which are also inextricably enmeshed to create the landscape as it is seen and perceived. The cultural landscape of the development footprint can be understood to be an organically evolved landscape, which has resulted from "an initial social, economic, administrative, and/or religious imperative and has developed its present form by association with and in response to its natural environment" (UNESCO 2008). This environment includes the relict, or fossil landscape, which is formed by processes that are no longer underway, but which remain visible (i.e. palaeontology and archaeology) and the continuing landscape which is both current and shows evolution through time (i.e. the wheat fields and agricultural/rural landscape). As such, the linked features in the affected cultural landscape include natural landscapes, predominantly occurring along the western coast of the Peninsula that remain as reminders of the past beauty of the region. 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 area. To a degree, there also remains a maritime cultural landscape, centred on the Saldanha Bay area that reflects the area's long record of exploitation of marine resources, extending back into the archaeological past at Kasteelberg. The maritime cultural landscape, per se, is sufficiently distant from this development that it will not be affected by the wind farm.

The project site contains no proclaimed heritage sites in the form of either Provincial or National Heritage Sites, and there are no scenic routes proclaimed in the wider region. Kasteelberg koppie, however, retains very high significance in the landscape as the focus of human activity since the Middle Stone Age, and for religious, spiritual and symbolic purposes over the past 2000 years. Further to this archaeological significance, it holds scientific significance for its potential to yield information about hunter-herder interaction, as well as about the development of pastoralism in the Western Cape. While much of the koppie retains its relatively intact natural vegetation and unaltered state, contrasted with the highly transformed wheat fields that surround it, recent development on the koppie has served to detract from its pristine state. Most significantly, two telecommunication towers have been erected on the koppie, and these are visually prominent and out of keeping with the heritage sensitivity of the site.

Rampant recent development on the Cape West Coast Peninsula has reduced the prevalence and significance of extant cultural landscapes within the wider project site, negatively impacting the quality of the rural cultural landscape. This includes the development and expansion of towns and residential areas located in the surrounding areas of the project site (including Paternoster, Britannica Heights and St. Helena Bay). The existing turbines of West Coast One Wind Energy Facility represent a substantial portion of this intrusion and have irrevocably changed the cultural landscape in the vicinity. Given the constantly evolving nature of continuing cultural landscapes, however, they should also be considered as constituting a further layering in the rural landscape.

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 Cape West Coast 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 hand axes, 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 Cape West Coast Peninsula (and arguably in South Africa) found to date is that of Kasteelberg, located on the farm Rooiheuwel (located directly southeast of the Boulders Wind Farm 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 2 000 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 to date this process has not been successful.

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 are 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, by providing shelter from the south easterly winds and occasionally pools of water trapped in rock depressions (waterbakke) or in crevasses between the rocks.

The majority of the 33 identified archaeological occurrences are Late Stone age (LSA) sites (please refer to the Heritage Impact Assessment Report, Appendix D). These are usually identified by varying quantities of marine shell residues sometimes with associated stone artefacts and pottery. Stone artefacts are generally non-formal, except for grindstones and hammerstones. Cores and occasional scrapers are noted but are not common. A single site (2011/327) appears to date to the Middle Stone Age. As with the Historical sites, LSA sites are sometimes associated with "waterbakke".

Of the 33 identified archaeological occurrences in the project site, 4 contain built environment remains. 2011/306 is the foundation of a ruined structure on a granite outcrop, approximately 15m long (3 rooms) with an associated dump containing 19th Century ceramics, glass and bone. Marine shells were also noted. Sites 2011/307 and 2011/308 are associated ruinous foundations of small structures where 19th Century artefacts were also scattered about. All are associated with natural water reservoirs in the granite outcrop ("waterbakke"). 2011/326 is a ruined vernacular farm building.

A single small farm cemetery with formal graves (2011/329) was identified under a stand of bluegum trees on Portion 1 of Farm Het Schuytje 21, while a number of informal calcrete "arrangements" representing possible historical graves (2011/309) was observed on Portion 3 of Farm Schuitjes Klip 22.

The family graveyard contains two formal graves with marble headstones. Both graves contain 2 persons. Only one grave is walled, while the cemetery is fenced, although neglected.

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 Cape West Coast 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.

6.2.6 Traffic Conditions

Currently there are approximately 200 vehicles per day travelling along the DR2160 (Stompneus Bay Secondary Road) with less than 50 vehicles per hour in the peak hour. Of the total traffic volume, approximately 10 vehicles are heavy vehicles. These volumes are relatively low.

The following roadways are associated with the surrounding areas of the project site:

- R27 Provincial Trunk Road TR77/1: The R27 is a two lane road with one lane per direction of travel, with a posted speed limit of 120km/h with shoulders on both sides of the road. The typical cross section consists of 3.7m wide lanes with 2m wide shoulders.
- R45 Provincial Trunk Road TR21/2: The R45 is a two lane road with one lane per direction of travel, with a posted speed limit of 120km/h. The typical cross section consists of 3.4m wide lanes and 1.5m paved shoulders.
- St Helena Bay Provincial Main Road MR533: MR533 is a two lane road with one lane per direction of travel, with a posted speed limit of 100km/h. The typical cross section consists of 3.4m wide lanes with 1.5m paved shoulders.
- R399 Provincial Main Road MR240: MR240 is a two lane road with one lane per direction of travel, with a posted speed limit of 90km/h. The typical cross section consists of 3.4m wide lanes with gravel shoulders.
- Stompneus Bay Road Provincial Divisional Road DR2160 (Stompneus Bay Secondary gravel road): DR2160 is a gravel road approximately 8m wide. This road is traverses the project site.
- Provincial Divisional Road DR2164: DR2160 is a gravel road approximately 8m wide.

6.2.7 Consideration of the Boulders Wind Farm Project Site within the Regional Setting

The project site is situated ~12km northeast of Vredenburg, between the towns of Paternoster (~7km west) and St. Helena Bay (~7km northeast). The project site is zoned for agricultural use. 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. Kasteelberg is a hill and is part of a granite batholith. A number of smaller towns occur along the Atlantic seaboard and in the surrounding areas of the project site and include Paternoster and St. Helena Bay.

Paternoster is small settlement located along the West Coast. The settlement originated around fishing and cray-fishing and the associated processing activities. Paternoster and its economy are closely linked to tourism and lifestyle residential land uses. Paternoster can be accessed via the regional road, R399. The views of Paternoster are towards the ocean and Kasteelberg. The town's sense of place can be described as that of a relatively undisturbed West Coast fishing village located adjacent to and within a west coast wheat farming area. The area also attracts visitors to the annual spring flower displays.

St. Helena Bay comprises the stretch of coastal settlements extending along the coast from Laingville in the south to Duyker Eiland in the north. This stretch includes the settlements of St Helena Bay, Sandy Point, Britannica Heights, Stompneusbaai, Shelley Point, Golden Mile, Britannia Bay and Cape St Martin. With the exception of the houses located along the top of Britannica Heights, all of the areas are screened from the existing West Coast One Wind Energy Facility. All of the suburbs are primarily accessed off the St Helena Bay coastal road. The town includes tourism activities, fishing factories and

residential areas. The primary view of the town (excluding Britannica Heights) is towards the ocean located in the northeast. Views towards the southwest are not possible due to elevated topography.

Britannica Heights is located directly adjacent to the north-eastern boundary of the project site. This residential area consists of 126 residential erven located on the north-facing slopes and crest of the range of coastal hills to the west of the St Helena Bay coastline. There are currently around 40 developed erven. The majority of owners reside permanently on their properties and a few also provide guest accommodation facilities. Britannica Heights can be accessed via St. Helena Bay. The main view of the residential area is to the southwest towards Paternoster.

Farmsteads are scattered within, and within the surrounding areas, of the project site. The West Coast One Wind Energy Facility is located directly adjacent to the Boulders Wind Farm project site, which includes 47 operational wind turbines located in the undulating landscape. The development of this existing wind energy facility has altered the landscape and has introduced a different type of development to the area. Several powerlines including the Fransvlei-Aurora 132kV powerline and the Fisheries-Stompneus 66kV powerline traverse the study area. The Eskom Aurora Substation is located 35km southeast of 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 Port of Saldanha and Langebaan are located 27km and 35km to the southwest of the project site respectively.

The indigenous vegetation of the project site 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. There is also an existing lawful land use on the farm Schuitjes Klip 1/22, which forms part of the project site which relates to a prospecting right for the proposed Duyker Eiland Phosphate Project that is a planning a phosphate mine and fertilizer operation. 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. 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 project site. The West Coast National Park is located approximately 45km southeast of the site.

The Regional road (R399) is the main road providing access to the general area within which the project site is located. Direct access to the project site is provided by the Vredenburg to Stompneus Bay secondary road that 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). 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 smaller rural holiday towns located in the direct vicinity of the project site include St. Helena Bay, Paternoster and with smaller residential extensions located along the coastline (including Duyker Eiland, the Golden Mile, Britannia Bay and Shelley Point). The function of these small towns and residential areas mainly relate to the provision of tourism services and residential accommodation. These small towns also offer catering services (i.e. restaurants etc.). Another sector of the smaller towns is fishing (including fish factories), with fishing communities located within the towns.

6.2.8 Consideration of the Boulders Wind Farm Development Footprint within the Regional Setting

The entire project site was considered as part of the Scoping Phase and a preferred development footprint (i.e. a designed facility layout) was provided by the Applicant for assessment through the EIA. The development footprint is fully located within the southern portion of the project site. Of the ten properties comprising the project site, five properties comprise the development footprint, and include:

- 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

The development footprint, located within the project site, 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. The landowners affected by the proposed development footprint have indicated that the current farming activities will persist following the development of the Boulders Wind Farm. The development of the Boulders Wind Farm will therefore not eliminate any of the existing land-uses currently being undertaken within the project site. The development footprint also includes existing farm tracks which will be upgraded for use during construction and operation of the Boulders Wind Farm.

The existing land-uses associated with the directly adjacent farm portions include:

- The existing operational West Coast One Wind Energy Facility,
- Tourism activities; and
- Cultivation and other agricultural activities.

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 powerlines are located within the northern section of the project site.

Viewer Incidence

The viewer incidence of the area is relatively low within a 5km radius of the Boulders Wind Farm. However, the area has a high tourism value and inherent sense of place based on its location along the Atlantic seaboard and cultural/historical character. Viewer incidence is considered to be the highest along the arterial and secondary roads within the project site and the surrounding areas. Residents and visitors to this area are therefore seen as sensitive visual receptors. Within a 10km radius, viewer incidence increases with the presence of larger towns such as Vredenburg, Laingville, Paternoster, St Helena Bay, Stompneus Bay and Britannia Bay, most of which are holiday destinations.

Figure 6.11 below shows the distance from Paternoster to the closest turbine which is in the region of over 7 kms. Als refer to Figure 6-12 which provides an indication of the proximity analysis and potential visual sensitive receptors associated with the Boulders Wind Farm.

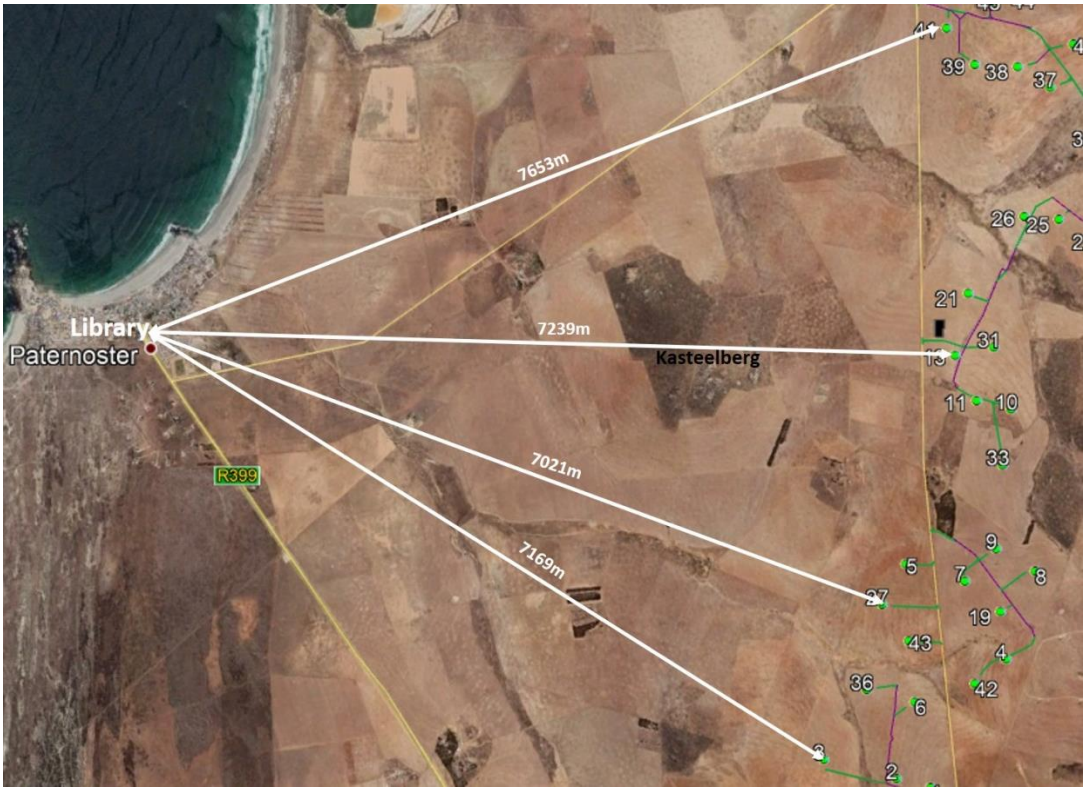

Figure 6-11: Distance between Paternoster and nearest wind turbines.

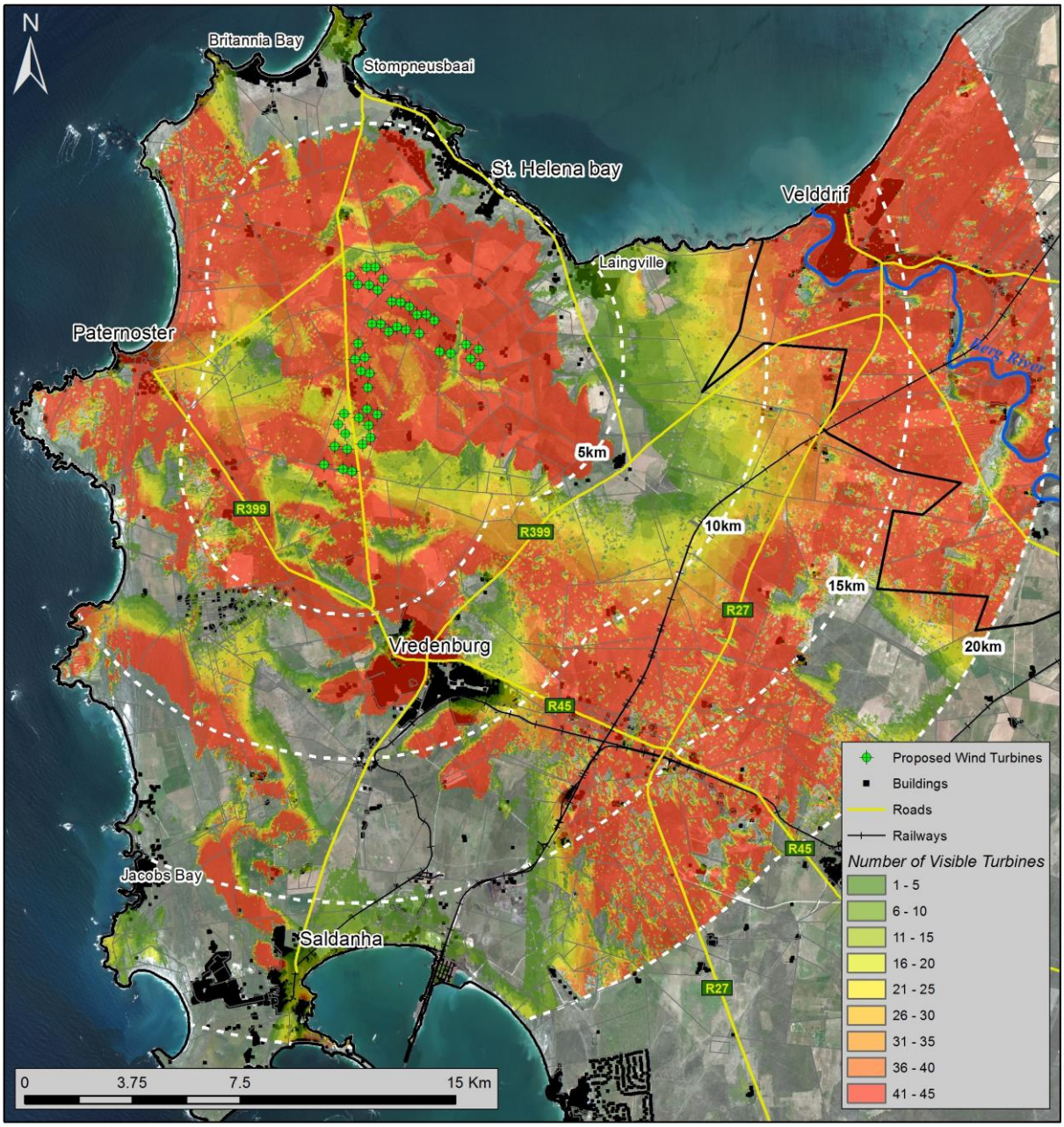

Figure 6-12: Viewshed of the Proposed Boulders Wind Farm.

Visual Absorption Capacity

Overall, the Visual Absorption Capacity (VAC) of the receiving environment, particularly the area in close proximity to the Boulders Wind Farm, is deemed low by virtue of the nature of the vegetation and the low occurrence of urban development. Where homesteads and settlements occur, some more significant vegetation and trees have been planted, which would contribute to visual absorption. Within the built-up areas of Vredenburg, Laingville, Paternoster, St Helena Bay, Stompneus Bay and Britannia Bay VAC will be of relevance, due to the presence of buildings and structures, referred to as visual clutter. In this respect, the presence of the built-up environment will provide more absorption in terms of visual changes.

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. 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 northeast 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 (measured from the centre of the project site).

Noise-Sensitive Developments

There are a number of noise-sensitive developments (including residential developments) that occur in the surrounding area and the project site. Noise-sensitive developments are existing developments which are considered to be sensitive to the generation of noise related to the proposed wind farm.

7. APPROACH TO THE ENVIRONMENTAL IMPACT ASSESSMENT

GOVERNMENT NOTICE 982, ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS, 2014 (AS AMENDED 2017). APPENDIX 3: SCOPE OF ASSESSMENT AND CONTENT OF ENVIRONMENTAL IMPACT ASSESSMENT REPORTS

3. An environmental impact assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include–

(h) A full description of the process followed to reach the proposed development footprint within the approved site, including:

(v) The impacts and risks identified including the nature, significance, consequences, extent, duration and probability of the 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.

(vi) The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;

(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;

(viii) The possible mitigation measures that could be applied and level of residual risk;

(i) A full description of the process undertaken to identify, assess and rank the impacts of the activity and associated structures and infrastructure will impose on the preferred location through the life of the activity, including–

(i) A description of all environmental issues and risks that were identified during the environmental impact assessment process; and

(ii) An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.

(j) An assessment of each identified potentially significant impact and risk, including–

(i) Cumulative impacts;

(ii) The nature, significance and consequences of the impact and risk;

(iii) The extent and duration of the impact and risk;

(iv) The probability of the impact and risk occurring;

(v) The degree to which the impact and risk can be reversed;

(vi) The degree to which the impact and risk may cause irreplaceable loss of resources; and

(vii) The degree to which the impact and risk can be mitigated.

7.1 GENERAL IMPACT ASSESSMENT

A general impact assessment was conducted based on site visits and information relating to the construction and operation of the wind energy facility provided by Vredenburg Windfarm (Pty) Ltd for the proposed Boulders Wind Farm.

7.2 SPECIALIST IMPACT ASSESSMENTS

A series of specialist studies were conducted during the EIA and the outcomes are summarised in this EIR. The team of specialists that conducted the studies were required to assess the foreseeable impacts of the proposed project within their specialised field, and to also address the issues raised by I&APs. This was achieved by gathering baseline information and identifying the possible impacts related to the

proposed project (based on the Draft Layout). This information was then used to inform the Final Layout (reflected in this report) after seven (7) turbines were relocated from the west to the east of the Vredenburg-Paternoster Road. Specialist were also required to provide mitigation measures for impacts. The detailed specialist studies have been compiled into Appendix D of this report.

7.3 METHODOLOGY FOR ASSESSING IMPACTS AND ALTERNATIVES

Identified impacts will be assessed against the following criteria:

- Temporal scale
- Spatial scale
- Risk or likelihood
- Degree of confidence or certainty
- Severity or benefits
- Significance

The relationship of the issue to the temporal scale, spatial scale and the severity are combined to describe the overall importance rating, namely the significance.

7.3.1 Description of criteria

Table 7-1: Significance Rating Table

SIGNIFICANCE RATING TABLE	
Temporal Scale *(The duration of the impact)*	
Short term	Less than 5 years (Many construction phase impacts are of a short duration).
Medium term	Between 5 and 20 years.
Long term	Between 20 and 40 years (From a human perspective almost permanent).
Permanent	Over 40 years or resulting in a permanent and lasting change that will always be there.
Spatial Scale *(The area in which any impact will have an affect)*	
Individual	Impacts affect an individual.
Localised	Impacts affect a small area of a few hectares in extent. Often only a portion of the project area.
Project Level	Impacts affect the entire project area.
Surrounding Areas	Impacts that affect the area surrounding the development
Municipal	Impacts affect either the local municipality, or any towns within them.
Regional	Impacts affect the wider district municipality or the province as a whole.
National	Impacts affect the entire country.
International/Global	Impacts affect other countries or have a global influence.
Degree of Confidence or Certainty *(The confidence with which one has predicted the significance of an impact)*	
Definite	More than 90% sure of a particular fact. Should have substantial supportive data.
Probable	Over 70% sure of a particular fact, or of the likelihood of that impact occurring.
Possible	Only over 40% sure of a particular fact, or of the likelihood of an impact occurring.
Unlikely	Less than 40% sure of a particular fact, or of the likelihood of an impact occurring.

Table 7-2 Impact Severity Rating

Impact severity *(The severity of negative impacts, or how beneficial positive impacts would be on a particular affected system or affected party)*	
Very severe	**Very beneficial**
An irreversible and permanent change to the affected system(s) or party(ies) which cannot be mitigated. For example, the permanent loss of land.	A permanent and very substantial benefit to the affected system(s) or party(ies), with no real alternative to achieving this benefit. For example, the vast improvement of sewage effluent quality.
Severe	**Beneficial**
Long term impacts on the affected system(s) or party(ies) that could be mitigated. However, this mitigation would be difficult, expensive or time consuming, or some combination of these. For example, the clearing of forest vegetation.	A long-term impact and substantial benefit to the affected system(s) or party(ies). Alternative ways of achieving this benefit would be difficult, expensive or time consuming, or some combination of these. For example, an increase in the local economy.
Moderately severe	**Moderately beneficial**
Medium to long term impacts on the affected system(s) or party (ies), which could be mitigated. For example, constructing the sewage treatment facility where there was vegetation with a low conservation value.	A medium to long term impact of real benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are equally difficult, expensive and time consuming (or some combination of these), as achieving them in this way. For example, a 'slight' improvement in sewage effluent quality.
Slight	**Slightly beneficial**
Medium- or short-term impacts on the affected system(s) or party(ies). Mitigation is very easy, cheap, less time consuming or not necessary. For example, a temporary fluctuation in the water table due to water abstraction.	A short to medium term impact and negligible benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are easier, cheaper and quicker, or some combination of these.
No effect	**Don't know/Can't know**
The system(s) or party(ies) is not affected by the proposed development.	In certain cases, it may not be possible to determine the severity of an impact.

Table 7-3 Overall Significance Rating

Overall Significance *(The combination of all the above criteria as an overall significance)*	
VERY HIGH NEGATIVE	**VERY BENEFICIAL**
These impacts would be considered by society as constituting a major and usually permanent change to the (natural and/or social) environment, and usually result in severe or very severe effects, or beneficial or very beneficial effects. *Example: The loss of a species would be viewed by informed society as being of VERY HIGH significance.* *Example: The establishment of a large amount of infrastructure in a rural area, which previously had very few services, would be regarded by the affected parties as resulting in benefits with VERY HIGH significance.*	
HIGH NEGATIVE	**BENEFICIAL**
These impacts will usually result in long term effects on the social and/or natural environment. Impacts rated as HIGH will need to be considered by society as constituting an important and usually long-term change to the (natural and/or social) environment. Society would probably view these impacts in a serious light. *Example: The loss of a diverse vegetation type, which is fairly common elsewhere, would have a significance rating of HIGH over the long term, as the area could be rehabilitated.* *Example: The change to soil conditions will impact the natural system, and the impact on affected parties (such as people growing crops in the soil) would be HIGH.*	
MODERATE NEGATIVE	**SOME BENEFITS**
These impacts will usually result in medium to long term effects on the social and/or natural environment. Impacts rated as MODERATE will need to be considered by society as constituting a fairly important and usually medium term change to the (natural and/or social) environment. These impacts are real but not substantial. *Example: The loss of a sparse, open vegetation type of low diversity may be regarded as MODERATELY significant*.	
LOW NEGATIVE	**FEW BENEFITS**

These impacts will usually result in medium to short term effects on the social and/or natural environment. Impacts rated as LOW will need to be considered by the public and/or the specialist as constituting a fairly unimportant and usually short term change to the (natural and/or social) environment. These impacts are not substantial and are likely to have little real effect. *Example: The temporary changes in the water table of a wetland habitat, as these systems are adapted to fluctuating water levels.* *Example: The increased earning potential of people employed as a result of a development would only result in benefits of LOW significance to people who live some distance away.*
NO SIGNIFICANCE
There are no primary or secondary effects at all that are important to scientists or the public. *Example: A change to the geology of a particular formation may be regarded as severe from a geological perspective but is of NO significance in the overall context.*
DON'T KNOW
In certain cases, it may not be possible to determine the significance of an impact. For example, the primary or secondary impacts on the social or natural environment given the available information. *Example: The effect of a particular development on people's psychological perspective of the environment.*

8. PUBLIC PARTICIPATION

GOVERNMENT NOTICE 982, ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS, 2014 (AS AMENDED 2017). APPENDIX 3: SCOPE OF ASSESSMENT AND CONTENT OF ENVIRONMENTAL IMPACT ASSESSMENT REPORTS

3. An environmental impact assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include–

(h) A full description of the process followed to reach the proposed development footprint within the approved site, including:

(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;

The Boulders Wind Farm was first proposed by a company called IPD Power (Pty) Ltd (IPD) in 2010 in the early days of Renewable Energy Development in South Africa. IPD investigated and considered numerous sites in the area. Taking into consideration the Civil Aviation Authority (CAA) and environmental restrictions, IPD found the current site to be most favourable for wind development. Thereafter, they procured the services of environmental professionals, Terramanzi, to investigate the environmental impacts of the facility and lodge an application for environmental authorization. Terramanzi completed the Scoping Report and received a Scoping Acceptance from the DEA. However, the EIA legal timelines lapsed under the IPD and Terramanzi leadership, and therefore the project proponents had to restart the EIA Application process.

In mid-2017, due to differences in shareholder strategies related to developing the project, there was a restructuring of the shareholders of the project, and IPD Power was bought out. The current shareholders (ENERCON, EnergieQuelle, and Saertex), took over ownership and management of the project and appointed Savannah Environmental as the EAP for the project. Savannah Environmental began their work on the EIA in mid-2017 and submitted a new Scoping Report to the environmental authorities on 28 February 2018. The DEA issued their Acceptance of the Scoping Report on the 6 June 2018. Thereafter Savannah Environmental and the Specialists continued with the EIA process.

At the end of July 2019, two I&APs lodged written notifications to the DEA of suspected non-compliance by Savannah Environmental, with the EIA Regulation requirements in that it was alleged that they as the EAP had acted with bias. The DEA then sent a letter to Savannah Environmental on the 2 August 2018, notifying them that the EIA process for the proposed BWF was suspended while the allegations of bias and non-compliance with the EIA regulations were investigated. DEA announced the outcome of their investigations and the decision to allow the EIA to continue on the 8 October 2018, stating that there was no evidence found to support such allegations of bias on the part of the EAP. Thereafter, the same I&APs lodged an appeal against the afore mentioned decision on 29 October 2018. The DEA suspended the EIA process again during the appeal process which continued for five and a half months, and during that time the EAP was prohibited from engaging with I&APs.

Although DEA dismissed the allegation, the applicant decided to change the EAP for the final EIA phase of the Environmental Authorization application process. CES were then appointed as the new EAP to conclude the EIA and the application for authorization. The decision on the appeal was made known on the 17th April 2019. The appeal was dismissed and the suspension on the EIA was then lifted. CES then notified all the registered I&APs about the appeal decision and the lifting of the suspension. This notification was sent out via email, SMS and via post to those who had provided no email or mobile phone number. CES then completed the compilation of the Specialist Studies and Draft EIR and EMRr and prepared for the next round of public review.

8.1 OVERVIEW OF THE PUBLIC PARTICIPATION PROCESS FOR THE SCOPING PHASE (DEC 2017- 28 FEB 2018)

The Scoping Phase was undertaken by Savannah Environmental in accordance with the amended EIA Regulations published in terms of NEMA in Government Notice 40772 of 07 April 2017. We have reviewed the Scoping Report and supporting documentation in detail, in view of the fact that it was not compiled by us, and have found that the report meets the requirements of the EIA Regulations and adequately met the objectives of the Scoping Phase in that *inter alia* the key issues and potential impacts were correctly identified to be carried forwarded into the EIA stage of the process. The 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 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 Scoping process.

The tasks above are discussed in further detail below.

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

In terms of GN R779 of 01 July 2016, the National Department of Environmental Affairs (DEA) is the competent authority for activities which relate to the Integrated Resources Plan (IRP) 2010-2030, as well as the updates thereto. The National DEA is 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 during the Scoping Phase 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 A.

8.1.2 Public Participation during the Scoping Phase

Public participation is an essential and regulatory requirement for an Environmental Authorisation Application process as stipulated in Chapter 6 of the EIA Regulations 2014 (as amended in April 2017). This section of the EIR 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 to be 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 8-1 below.

Table 8-1 Summary of Public Participation Process – Scoping Phase

Activity	Date	Objective	Evidence in PPP Appendix
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 Scoping Report
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 Scoping Report
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 payer associations and key stakeholder groups within the broader study area to register on the project database.	Refer to Scoping Report
Distribution of EIA process notification letter, BID and stakeholder reply form via email and	Email distribution: 26 January 2018 Registered Post:	To announce the EIA process, provide information on the project and invite affected and adjacent landowners.	Refer to Scoping Report

Activity	Date	Objective	Evidence in PPP Appendix
registered post.	03 February 2018		
Placement of site notices	05 February 2018	Site notices, announcing the EIA process, were placed at the affected farm properties.	Refer to Scoping Report
Notifications of the availability of the Draft Scoping Report for review to I&APs. Scoping Report was available for download on Savannah Environmental's website.	23 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 Scoping Report
Distribution of the Scoping Report and notification letters to commenting authorities and organs of state via courier.	23 February 2018	To inform commenting authorities and organs of state of the availability of the Scoping Report for review and invite comment thereon during the 30-day review period.	Refer to Scoping Report
Placement of adverts (in both English and Afrikaans) in 2 newspapers (the Weslander and Die Burger)	Weslander: 1 March 2018 Die Burger: 1 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 Scoping Report
30-day review period for the Scoping Report for comment.	23 February 2018 – 26 March 2018	I&APs are afforded the opportunity to submit written comments on the Scoping Report for a 30-day review period.	Refer to Scoping Report
Focus Group Meetings	06 March 2018 – 09 March 2018	To present the outcomes of the Scoping Report to organs of state, key stakeholders, impacted and adjacent landowners and to provide I&APs with an opportunity to raise issues of specific concern relating to the Scoping Report and project in general. The comments raised at these meetings were recorded and included in an updated Comments & Responses Report and informed the	Refer to Scoping Report

Activity	Date	Objective	Evidence in PPP Appendix
		Final Scoping Report.	
Comments and Responses Report	All comments received up until 21 February 2017, two (02) days prior to the release of the DSR, were included and responded to in the Comments and Responses Report. The Comments and Responses Report was updated with comments received on the Scoping Report during the 30-day review period. These comments were responded to and submitted with the 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 were collated into a Comments and Responses Report.	Refer to Scoping Report

I&APs were 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 included 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. The list of stakeholders identified and registered on the database is listed in Table 8-2 below:

Table 8-2: 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
All directly affected landowners and tenants
Neighbouring landowners and tenants

All relevant stakeholder and I&AP information have been recorded in a database of interested and affected parties (refer to Appendix A for a listing of recorded parties). Although I&APs were encouraged to register their interest in the project from the start of the process, the identification and registration of I&APs has been on-going for the duration of the EIA process. Consequently, the I&AP database is updated throughout the EIA process, and acts as a record of the parties involved in the public participation process.

8.1.3 Advertisements, Site Notices and Notifications

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 the PPP section of the Scoping Report. The co-ordinates of the site notices are listed as follows:

Table 8-3 Location of Site Notices for EIA Phase.

Site Notice	South	East
1	32° 49" 17.04'	17° 08"10.04'
2	32° 48"18.08'	17° 15" 09.01'
3	32° 46" 45.01'	17° 58" 07.06'
4	32° 48" 59.08'	18° 00"35.54'
5	32° 48" 05.84'	18° 00" 24.59'
6	32° 48" 13.08'	17° 55" 42.05'
7	32° 48" 57.04'	17° 55" 25.04'
8	32° 46" 07.07'	17° 58" 03.04'
9	32° 44" 59.05'	17° 58" 24.07'
10	32° 46" 18.08'	17° 58" 43.04'

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 identified by Savannah Environmental during the stakeholder identification process (refer to Scoping Report). The written notices informed I&APs, including affected and adjacent landowners, of the proposed project and EIA process and included 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 Scoping Report). 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 the Scoping Report. A land-owners map illustrating the affected and adjacent farm properties is contained in the PPP section of the Scoping Report.

Additional notices notifying the public of the Boulders Wind Farm EIA process were placed at the Vredenburg, St Helena Bay and Paternoster Public Libraries on 07 March 2018. Refer to the Scoping Report 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 A) 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 the 1 March 2018 (Appendix A of Scoping Report).

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 A for recordings of the radio advertisements.

8.1.4 Review Period of Scoping Report

The Scoping Report was made available for a 30-day review period from 1 March 2018 – 3 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 were circulated to

Organs of State via courier at the onset of the review period. Copies of the Scoping Report were 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 was also available for download from the website (www.savannahSA.com).
The evidence of distribution of the Scoping Report was included in the final Scoping Report submitted to the DEA (refer to Appendix A of Scoping Report).

8.1.5 Stakeholder Consultation during Scoping Phase

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 record their issues.

Savannah Environmental (the EAP for the Scoping process) held meetings with key government departments, stakeholders and landowners in February and 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 held are listed as follows:

Table 8-4 I&AP Meetings held during the Scoping Process.

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.
No Wind Farms Paternoster	A community-based organisation which opposes wind farms in the greater Paternoster Region.
Britannica Heights Bay Rate Payers	Elected representatives which represent the interests of the

Organisation	Reason for Engagement
Association & Ward 11 Councillor	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:

Table 8-5 List of additional meetings held during the Scoping Public Review period in March 2018

Organisation	Reason for Engagement
St Helena Bay Community Representatives	I&APs of the local community of St Helena Bay
Coastal Links West Coast Region – representatives of 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.
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.

The minutes of these 14 meeting were provided in Appendix 7 of the Scoping Report. A total of 14 meetings were held with I&APs during the Review of the Scoping Report. At these meetings the EAP presented information about the proposed developments and the findings and recommendations in the Draft Scoping Report. I&APs were then given an opportunity to ask questions and raise issues or concerns and make requests. Many questions were raised and responded to or noted for the process of finalising the Scoping Report. It is important to note that no major complaints or allegations of bias on the part of the EAP were made and no inadequacies in the Scoping process were raised. Mostly I&APs asked specific questions of the EAP and/or the applicant. There were some requests for certain impacts to be investigated further such as the visual impacts and impacts on birds and agriculture. As mentioned in section 8.1.6 below - concerns about whether the development could provide jobs for local residents and invest in the upskilling for local young people were also raised.

It must however be noted that some of the parties who were consulted with in connection with holding a meeting did not feel the need to have a meeting during the Scoping Phase. The following table provides the details of the parties who did not want to meet during the Scoping Phase, as well as the reasons thereof.

Table 8-6 Stakeholders who did not want to meet during the Scoping Public Review period in March 2018

Organisation	Reason for not engaging
BirdLife South Africa	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 were submitted during the scoping phase.
Department of Water and Sanitation (DWS)	Department of Water Sanitation (DWS) indicated that only a pre-application meeting would be required in the EIA phase.

	Comments from DWS were received and were included in the C&R report (Appendix 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 were received and were included in the C&R report (Appendix A).

8.1.6 Identification and Recording of Comments during the Scoping Process

To date, four hundred and forty-six (446) I&APs registered on the project database since the announcement of the commencement of the EIA process in December 2017. This includes persons who made written submissions or who attended public meetings and focus group meetings. Only 104 (23%) formally contacted Savannah Environmental in writing to register, make requests and submit comments or concerns. Many of these did so more than once as a total of 157 contacts were made and reported in the Comments Response Report for the Scoping Process. Sixty percent (60%) of the 104 (which amounts to 62) were I&APs who made submissions about potential impacts of the proposed development. Twenty seven of these I&APs made submissions on impacts more than once, ranging between twice and seven times (as indicated in Table 8-3 below). Amongst these were at least 6 couples who made separate submissions.

Table 8-7: Frequency of I&AP contacts with EAP during Scoping process.

Description	#	%
Number of Registered I&APs	104	
Number of I&AP who raised issues about potential impacts	62	60
I&AP making impact submissions twice	14	13
I&AP making impact submissions three times	5	5
I&AP making impact submissions four times	7	7
I&AP making impact submissions seven times	1	1

Table 8-4 provides a breakdown of the types of I&APs who registered and submitted comments on the EIA. The largest groups of these were residents of Paternoster (44%), followed by residents from Britannica Heights (20%). This is not surprising as these two communities are located in areas where the proposed wind farm would be visible to them. The other significant groups of I&APs comprised representatives from various regulatory departments (16%) and conservation organisations (7%).

Table 8-8: Types of I&APs who registered and submitted comments in Scoping Phase.

Type of I&AP	Count	%
Resident/business person form Paternoster	46	44
Resident of Britannica Heights	21	20
Regulatory Authority	17	16
Local Conservation Organisation	7	7
Energy industry stakeholder	4	4
Direct neighbour (land owner)	2	2
Environmental NGO	2	2
Individual with unknown interest in development	2	2

Type of I&AP	Count	%
Resident of other settlements in the region	1	1
Affected farm owner	1	1
Municipality	1	1
TOTAL	**104**	100

Table 8-5 below provides a summary of the types of queries, requests or submissions made by all I&APs who registered. The total in this table is higher than the number of submissions or contacts (157) due to some I&APs making multiple requests or submissions. The majority of these requests/submissions were related to impacts (31%), followed by those who simply registered as I&APs in the EIA process (18%). 15% said that they were opposed to the proposed development, 4% supported it and 1% said they had no objection. The remainder (21%) make up a variety of requests for information.

Table 8-9: Types of requests or submissions made by I&APs in Scoping Phase.

Category of submission	Values	%
Raising Impacts (sometimes more than once)	62	31
Registration as I&AP	41	18
Opposed to the development	34	15
Query re EIA process	24	11
Request for maps or other info	11	5
Request for access to EIA reports or docs	10	4
Support for the development	9	4
Request for info on I&APs	3	1
No objection	2	1
Recommendations re EMP	1	0
TOTAL	**197**	**100**

There were 62 I&APs (39%) who made written submissions on potential impacts. The numbers and percentage of these I&APs who raised issues about the various potential impacts are listed in Table 8-6. Many I&APs raised a number of different impacts and in some cases more than once (see Table 8-3). To eliminate the bias that could occur due to multiple submissions of the same issue, the data was cleaned to remove the duplications. Once this was done it became clear that 63 I&APs had expressed their views (in the case of benefits) or raised concerns about various impacts. As indicated in the table, the most common impact raised by I&APs who did identify impacts was the visual impact (65%). This was followed by noise impacts (34%), tourism losses (32%), the impact on property values (31%), birds (31%), employment benefits (26%) and ecological impacts (24%), amongst others.

Table 8-10: Frequency of types of impacts raised by I&APs (Total number of I&APs raising impacts was 62) in Scoping Phase.

Types of impacts/issues raised	#	%
Visual	40	65
Noise	21	34
Tourism loss	20	32
Birds	19	31
Property values	19	31
Employment benefits	16	26
Ecological	15	24
Land Use Planning	13	21

Types of impacts/issues raised	#	%
Health	8	13
Heritage impacts	8	13
Social Impacts	8	13
Location of turbines	3	5
Alternatives	3	5
Hydrological	2	3
Cumulative impacts	1	2
Farming benefit	1	2
TOTAL	**197**	

Given the high number of I&APs from Paternoster and Britannica Heights who registered as I&APs and made submissions, and the visibility of the proposed wind farm to these communities, their concerns were grouped and analysed separately, and then compared to the trends for all I&APs (see results in Table 8-7 below). The results show that 50% of the I&APs from Paternoster were concerned about the visual impact, while 59% of the residents from Britannica expressed concerns about the visual impacts. This is to be expected given that the proposed wind farm would be visible in the southern portion of the views of the affected Britannica Heights residents living along the top of the ridge, while the views of most houses in Paternoster are facing the sea and the windfarm is located in the opposite direction.

Table 8-11: Comparison of impacts raised by residents of Paternoster and Britannica Heights and all I&APs in Scoping Phase.

	Paternoster Residents		Britannica Heights Residents		ALL I&APs	
Types of impacts raised	**#**	**%**	**#**	**%**	**#**	**%**
Visual	13	**50**	16	**59**	40	**65**
Noise	8	**31**	9	**33**	21	**34**
Tourism loss	7	**27**	7	**26**	20	**32**
Birds	3	**12**	10	**37**	19	**31**
Property values	6	**23**	9	**33**	19	**31**
Employment benefits	9	**35**	3	**11**	16	**26**
Ecological	3	**12**	5	**19**	15	**24**
Land Use Planning	2	**8**	4	**15**	13	**21**
Health	4	**15**	3	**11**	8	**13**
Heritage impacts	2	**8**	1	**4**	8	**13**
Social Impacts	5	**19**	2	**7**	8	**13**
Location of turbines	2	**8**	1	**4**	3	**5**
Alternatives	0	**0**	1	**4**	3	**5**
Hydrological	0	**0**	0	**0**	2	**3**
Cumulative impacts	0	**0**	0	**0**	1	**2**
Farming benefit	0	**0**	1	**4**	1	**2**
Total number of I&APs who made submissions on impacts	**26**		**27**		**62**	

All I&AP registrations and comments submitted during the Scoping Phase were collated and responded to in the Comments and Responses Report (refer to Appendix A). A summary of the main sectors/groupings from who provided comments 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.

8.1.7 Outcomes of the Scoping Phase Process

The public participation process followed, and the activities undertaken as part of the Scoping Phase were assessed by DEA&DP and considered sufficient and transparent and was found to have provided a balanced view and perception of the Boulders Wind Farm and the EIA process from I&APs, stakeholders and the local communities. The parties consulted were diverse in type, nature and location. An important consideration for the public participation process was to ensure that the views of all the relevant sub-groups within the communities were 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 who 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, 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 parties 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. *The neighbouring farmers* immediately adjacent to the development area.
6. *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 were well canvassed through the Scoping Phase consultation, and every opportunity was afforded to them to raise issues. Both support for and opposition to the project was recorded.

Sixty four percent (64%) of I&APs who submitted written submissions on the Scoping Report were individuals, business and representatives from stakeholder grouping 4 (as described above). The comments predominantly related 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; and
- Negative effect on tourism activities, which are considered to add greatly to the economy of the area.

Seventeen percent (17%) 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; and
- Ensuring consultation with the local communities and members of the fishing sector;
- Impact on the roads network.

The comments raised by the "indigenous locals" of the area related to the following:

- Requests for guarantees 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;
- Questioning the true benefits of the wind farm for the community;
- 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; and
- 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 of particular concern and perceived to be detrimental to property values and the tourism potential for the area.
- Comments from tourism facility owners in Paternoster 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 impacting on local and migrant birds was raised, including specific concerns regarding the diversity and abundance of species using the area.
- A few comments were made regarding experiences gained from the construction and current operation of the existing West Coast Wind Energy Facility. A 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 predominantly related to the permitting of the site, as opposed to its current presence in the landscape.

- The local communities were concerned about current income and unemployment. Benefits of and support for the project predominantly pertained to the need for social upliftment, employment opportunities for 'indigenous locals' and the development of the youth.
- The "indigenous locals" of the area were particularly concerned about the weight of their comments relative to other comments raised during the EIA process. Their fear was that their voices will not be heard and considered (due to the lack of resources within their community) when compared to the organised mobilisation of the other residents and business owners within the area.
- The affected farmers, which form part of the project site, raised concerns regarding their future plans 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.

Following the 30-day review period, the final Scoping Report was submitted to DEA in April 2018. This together with the Plan of Study for the EIA was accepted by the DEA, as the competent authority, in June 2018. In terms of this acceptance, an EIA was required to be undertaken for the proposed project. The acceptance of the Scoping Phase also included specific requirements that needed to be addressed as part of the EIA report.

8.1.8 Appeal against the DEA Decision that the previous EAP was not biased

An appeal was lodged by Kantor Legal Services on behalf of the owner of Erf 1050 of Paternoster (Director Deon Brand) on 29 October 2018. The appeal was lodged in respect of the decision by the DEA on the Scoping Report dated the 8 October 2018. The relevant decision dismissed complaints raised in the written notifications to the DEA of suspected non-compliance by Savannah Environmental, which were submitted by two I&APs on 26 July 2018. The alleged non-compliance was in connection with the EIA Regulation requirements in that it was alleged that they as the EAP had acted with bias. The formal appeal lodged with the DEA included the following as the grounds of appeal:

- That the Chief Director failed to resolve the matter as required by Regulation 14 of the EIA Regulations.
- That there was no rational connection between the Chief Directors reasons for the decision and the decision itself.
- That the EAP had failed to:
  - meet the requirements of independence;
  - perform the work relating to this EIA Application in an objective manner; and
  - disclose to the I&APs and competent authority all material Information in possession of the EAP.
- That the EAP was biased in favour of the developer and neglectful in engaging with the public, and inclined to be dismissive rather than substantive in its responses to the issues and debates raised during the PPP.
- No alternative site(s) were proposed, tabled or examined.
- Biasness in the scoping report with regard to visual, avifauna and other mitigation measures.
- The EAP failed to disclose all relevant information (i.e. The EAPs response to DEA was not copied to the appellant and the EAP did not provide information in the Scoping Report on the previous EIA undertaken by Terremanzi – which included a petition of objection by 88 I&APs.
- Counting the 88 objectors as one I&AP submission (prev. EIA process).
- The EAP placed too much emphasis on the positive impacts of the proposed development and not enough on the negative impacts.

- That the Scoping Report made no recommendation on specialist studies to assess the social impacts, including visual and tourism impacts.
- Tourism impacts were dismissed in the Scoping Report as low and potentially positive and did not take into account recent changes in tourism trends and growth of international visitors, especially in Paternoster.

The decision of the Appeal Board was made known on 17 April 2019. After considering all the submissions and evidence, the presiding appeal officer found that the Scoping Report complied with the legislative requirements and that the acceptance of the Scoping Report by the DEA was not arbitrary. Consequently, the outcome was a dismissal of the appeal and a lifting of the suspension on the EIA process.

8.2 OBJECTIVES OF THE ENVIRONMENTAL IMPACT ASSESSMENT PHASE (JUNE 2018 – AUGUST 2019)

During the EIA phase the potential impacts of the various alternatives of the project have been investigated and assessed by various specialists in much more depth. As part of their assessment, the specialists compared the different alternatives (especially alternative layouts) and provided recommendations on mitigation measures that need to be included in the final EIA and in the Environmental Management Programme (EMPr) for the proposed development. The draft EIR and EMPr are then made available for review by the public and authorities before being finalised and submitted for a decision on the authorisation.

8.2.1 Overview of the PPP process for the EIA Phase

The EIA 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 EIA Phase included:

- Consultation with relevant decision-making and regulating authorities (at National, Provincial and Local levels).
- Undertaking a public participation process during the EIA Phase in accordance with Chapter 6 of Government Notice R326 of 2017 (amended EIA Regulations, 2014) in order to assess 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 an EIA Report and EMPr in accordance with the requirements of Appendix 3 and Appendix 4 of Government Notice No R326 of 2017 (amended EIA Regulations, 2014).
- Preparation of a Comments and Responses Report which includes the comments submitted by I&APs as part of the EIA public review process.

These tasks are discussed in detail below.

8.2.2 Authority Consultation

The following tasks related to Authority Consultation will be undertaken as part of the EIA Phase:

- Submission of the EIA report for review by the competent authority, commenting authority and other relevant Organs of State for a 44-day review period.
- Receipt of comments from the competent authority, commenting authority and other Organs of State on the EIA Report, to be addressed and adequately reflected in the final EIA Report.
- Submission of a final EIA Report to DEA following the 44-day review period which included, considered and addressed all comments received on the EIA report that was made available for public review.

A record of correspondence with the competent authorities and other I&APs is contained in Volume 4 Appendix F-1 of the EIR. A record of authority consultation undertaken with organs of state departments during the EIA Phase is also included within Volume 4 Appendix F-1.

8.2.3 Public Participation Process

The public participation process to be undertaken during the EIA Phase is summarised in Table 8-12 below. A record of correspondence with the I&APs is contained in the CRR in Volume 5. All the registered I&APs were notified via email or SMS about the following:

- The lifting of the suspension of the EIA and the replacement of Savannah Environmental by CES as the EAP;
- The public review period;
- The various focus group meetings (that were relevant to them);
- The immanent close of the public review period; and
- The submission and availability of the Final EIR.

All the PPP related supporting documentation is provided in VOLUME 4 of this Final EIR submission.

Table 8-12: Summary of the Public Participation Process during the EIA Phase.

Activity	Date	Objective	Evidence in PPP Volume 4
Stakeholder identification and compilation of I&AP database	Ongoing	To record the names of people and organisations who are registered as I&APs for this EIA, and all organs of state which have jurisdiction in respect of the activity to which the application relates.	Appendix A of VOLUME 4
I&APs updated on the appeal, the suspension of the EIA and final outcome of appeal.	18 April 2019	I&APs have been notified of the Minister of the DEA's decision on the appeal against the DEA's decision that the previous EAP, Savannah Environmental, was not biased and was notified of the recommencement of the EIA process and the change in EAP to CES.	Appendix B of VOLUME 4
Distribution of notification letters to registered I&APs announcing the availability of the Draft EIA report for a 30-day public review period.	16 May 2019	To inform I&APs of the availability of the EIA report for review and invite comment thereon during the 30-day review period. I&APs have been notified of where the EIA report can be accessed (i.e. Paternoster Public Library and Vredenburg Library), and can downloaded from the CES website (www.cesnet.co.za/boulders-wind-farm-eia)	Appendix B of VOLUME 4
Distribution of the EIA Report and notification letters to commenting authorities / organ of state departments via courier.	16 May 2019	To inform commenting authorities and organs of state departments of the availability of the EIA report for review and invite comment thereon during the 30-day review period.	Appendix B of VOLUME 4
Placement of advertisements (in both English and Afrikaans) in one local and one regional newspaper (the	Weslander: 16 & 30 May 2019 Die Burger: 16 & 30 May 2019	To inform the public of the availability of the EIA Report for a 30-day review period and invite written comment thereon.	Appendix C&D of VOLUME 4

Activity	Date	Objective	Evidence in PPP Volume 4
Weslander and Die Burger) and new site notices.	Cape Times: 16 May 2019		
30-day review period for the EIA report.	16 May – 2 July 2019	I&APs are afforded the opportunity to submit written comments on the EIA report for a 30-day review period.	Appendix B of VOLUME 4
Focus Group Meetings	These took place on June 18-20 and on the 26th June 2019.	To present the outcomes of the EIA Report to organs of state departments and key stakeholders and provide an opportunity to raise issues of specific concern relating to the EIA Report and project in general. The comments raised at these meetings have been recorded and included in an updated Comments and Responses Report, which will inform the final EIA report.	Appendix D of VOLUME 4
Public Open House	19th June 2019	An Open House is described as an event where "Participants stop in when it is convenient for them and visit the information stations of greatest interest to them. They have the opportunity to talk to project staff members, including specialists, and share their individual questions and comments on specific topics. Open Houses provide members of the public and I&APs with an opportunity to comment on the EIA Report, as required in terms of Regulation 40(3) of the EIA Regulations, 2014, as amended. Comments are recorded on Reply Forms and included in the Public Participation Process record.	Appendix E of VOLUME 4
Comments and Responses Report	Released with Final EIR	All comments raised by registered I&APs during the public review period for the Draft EIA will be documented in writing and responded to by the EAP in the Final EIA Report. All comments received will be collated into a Comments and Responses Report and included in the Final EIA.	This is included in the Final EIA report Volume 5.

8.2.4 Identification of I&APs and updating of the I&APs database

The process of identifying and registering all I&APs continued during the EIA phase and all new registrations were added to the I&AP database for the EIA. All relevant stakeholder and I&AP information have been recorded within a database of I&APs (refer to Appendix A for a listing of recorded parties). There are currently 446 I&APs registered on the project's database. 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. All adverts and correspondence that forms part of the public participation process

of the EIA invites interested and affected persons to register and provides information on how they can do this.

8.2.5 Advertisements, Site Notices and Notifications

During the EIA Phase, new site notices were placed on the boundary fences of the project 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). These notices were placed on the 15th May. Eight (8) site notices were placed in total. The photographic evidence that the site notices is provided in Appendix C of Volume 4. The co-ordinates of the site notices are listed as follows:

Table 8-13 Location of the site notices for the EIA Phase.

Site Notice	South	East
1	32 deg 46' 43. 2'' S	17 deg 58 '07.8'' E
2	32 deg 46' 42. 5 '' S	17.58' 08.2'' E
3	32 deg 44' 52, 5 '' S	17 deg 58' 27.2'' E
4	32 deg 48' 09.2'' S	17 deg 58' 27, 2'' E
5	32 deg 49' 53.6''S	17 deg 58' 13.5'' E
6	32 deg 48' 59.0''S	18 deg 00' 33.8'' E
7	32 deg 49' 24.7''S	18 deg, 00' 55.6'' E
8	32 deg 51' 43.1'' S	18 deg 01' 41.3'' E

During the EIA Phase, further advertisements were placed in the Weslander and Die Burger to notify the public of the availability of the EIA Report for review and the locations of where the report can be accessed. The advertisements were placed on 16th and 30th May 2019. Copies of the adverts in the Newspapers will be included in the final EIA report as part of Appendix C of Volume 4.

8.2.6 Review Period of the EIA Report

The Draft EIA Report was made available for the 44 -day review period from 16 May 2019 – 2 July 2019. Notifications regarding the availability of the EIA Report for review and comment were circulated to I&APs at the commencement of the review period. I&APs were encouraged to view the EIA Report and submit written comments. CD and hard copy versions of the EIA Report were circulated to Organs of State via courier at the onset of the review period. Copies of the EIA Report were made available at the following locations:

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

The evidence of distribution of the EIA Report is included in appendix 8.6 in the final EIA Report submitted to the DEA.

8.2.7 Stakeholder Consultation

In order to accommodate the varying needs of stakeholders and I&APs within the study area, as well as capture their comments on the EIA report, various opportunities were provided to I&APs to submitt their comments.

Focus group meetings were held by the previous EAP with key stakeholders in July 2018, prior to the suspension of the EIA process due to the appeal. The purpose of these meetings was to provide specific key stakeholders with the opportunity to raise comments on the specific relevant specialist reports in order to ensure that once the EIA Report is made available for review the relevant specialist studies and the EIA Report already considers the comments raised during these meetings. Refer to Table 8-9 below.

Table 8-14: Focus Group Meetings held on 18 July 2018 with key stakeholders

Organisation	Reason for Engagement
BirdLife South Africa	Provides comments on avifaunal and wind farm interactions regarding Birds and Renewable Energy
CapeNature	Commenting authority which provides comment on ecology, biodiversity and conservation in the Western Cape Province.
Western Cape Department of Environmental Affairs and Development Planning	Commenting authority on matters relating to the environment in the Western Cape Province.

Additional Focus Group meetings with various I&APs will be held during the public review period for the Draft EIR. These are listed in the table below.

Table 8-15 Details of Focus Group Meetings Held during the EIA Public Review Period.

#	Organisation / Department	Meeting Objectives	Meeting Details
1.	Meeting with Local residents of St Helena Bay Fishing village - Local Disadvantaged Community	Presentation of Draft EIR findings and project and soliciting questions and comments from I&APs	Date: 18 June 2019 Time: 11:30 – 12:30 Address: St Helena Bay Municipal Library, 2 Albatros St, Sandy Point, St Helena Bay, 7382
2.	Meeting with Local residents of Paternoster Fishing village - Local Disadvantaged Community	Presentation of Draft EIR findings and project and soliciting questions and comments from I&APs	Date: 18 June 2019 Time: 14:30 – 15:30 Address: Paternoster Library Hall (we will have to ask locals where this is)
3.	Mtg with Affected and Neighbouring farmers/land owners	Presentation of Draft EIR findings and project and soliciting questions and comments from I&APs	Date: 19 June 2019 Time: 10:30 – 11:30 Venue: Pierre Heydenrych's farm house
4.	Britannica Heights Residents Representatives of the adjacent landowners in Britannica Heights	Presentation of Draft EIR findings and project and soliciting questions and comments from I&APs	Date: 19 June 2019 Time: 01:00 – 02:00 Venue: Hilltop Hideaway at 26 Columbine Crescent, Britannica Heights
5.	Open Day at Paternoster Hotel	Presentation of Posters on Draft EIR findings, dialogue with I&APs and soliciting questions and comments from I&APs	Date: Wed 19th June 2019 Time: 16:00 – 20:00 Paternoster Hotel St Augustine Rd, Paternoster, 7381
6.	Mtg with Local and District Municipal Authorities, Veldrift	Presentation of Draft EIR findings and project and soliciting questions and comments from I&APs	Date: 20 June 2019 Time: 10:30 – 11:30 Address: Veldrif Library at 134 Voortrekker Street, Velddrif, (Berg River Mouth)
7.	Mtg with local conservation and tourism representatives or business owners	Presentation of Draft EIR findings and project and soliciting questions and comments from I&APs	Date: 20th June 2019 Time: 02:00 – 03:00 Venue: Paternoster Lodge, 64 St Augustine Rd, Paternoster, 7381
8.	Meeting with Local residents of Paternoster	Presentation of Draft EIR findings and project and	Date: 26 June 2019 Time: 3pm

#	Organisation / Department	Meeting Objectives	Meeting Details
	Fishing village - Local Disadvantaged Community	soliciting questions and comments from I&APs	Venue: Paternoster Hotel
9.	Meeting with Local residents of St Helena Bay fishing village - Local Disadvantaged Community	Presentation of Draft EIR findings and project and soliciting questions and comments from I&APs	Date: 26 June 2019 Time: 6pm Venue: Steenburg Cove Community Hall, St Helena Bay

In addition to the focus group meeting, an Open House was held on the 19th July 2019 from 4pm till 8pm at the Paternoster Hotel.

Records of all consultation undertaken during the public review period are provided in Appendix E of Volume 4. These comments and queries are also included in and responded to in the Comments & Responses Report (see Volume 5) of the Final EIA Report.

Identification and Recording of Comments Summary of the Submissions Received and Concerns/Views Raised.

The full comments received from each I&APs are included in Volume 5 (CRR). The written submitted comments, together with the issues raised during the FGMs are recorded and responded to in the Comments & Responses Report (CRR) will form Volume 5 of the Final EIA Report.

Comments on the Draft EIR were submitted by 48 individual I&APs. Eleven of those were from various regulatory authorities, 1 from a conservation organisation, 9 from Paternoster I&APs, 14 from Britannica Heights I&APs, 5 from St Helena Bay, 2 from local farmers/land-owners around the proposed development, and three other I&APs. In addition to these, three petitions objecting to the BWF were received. The names, numbers of signatories and descriptions are summarised in the table below. CES did not do a thorough cross check these petitions to see if there were any I&APs who signed or participated in more than one petition, but a quick scan indicated that many of the people who made individual submissions raising concerns about the BWF also participated in these petitions, in some cases in more than one. There were also duplicate names/email addresses in the Roon Aksie list of 114 email addresses. While these petitions do indicate that there is significant opposition to the proposed development, it would not be accurate to add the signatories to all these petitions up and conclude that 289 people (or businesses) objected to the BWF.

One of the I&APs, Mr Pickford, who was the appellant in the case against the Scoping process for the Boulders Wind farm, states that he is did not make submissions as an individual but as a representative of three different property owning associations along the coastline, namely the Cape Columbine Conservancy (18 members), Groot Paternoster Nature Reserve (18 members) and the Shelley Point Home Owners Association (1207 members). He further states that he got their financial support to commission two specialists, Dr Andre Jenkins (Avifaunal expert) and Mr Andre van der Spuy, to provide their own reviews of the Draft EIR documents on behalf of Mr Pickford and his associates.

Table 8-16 Details of Petitions Received during the public review period for the BWF EIR.

#	Petition Name	# of Signatories	Comments
1	No to Boulders Wind Farm – Email petition	31	This was a duplicate email petition whose participants were mostly residents and property owners around the peninsula, but also included some visitors.

#	Petition Name	# of Signatories	Comments
2	Roon Aksie	114 +38 =152	There is no signatory proof for the 114 (just a list of email addresses) and no indication on either of the petition lists of the date or the area the signatories come from (or their interest). A quick scan of the email address list indicated that some of the most active objectors in BH and Paternoster participated in this one, along with the third petition listed below, and in some cases had their emails entered twice).
3	Petition to DEA re BWF	106	Signed petition from people in various of the settlement in the SBLM, including most of I&APs who made individual submissions from BH. One page of 25 signatures did not have any heading or statement at the top of the page indicating what they were agreeing with.

There was a complaint raised by some I&APs that the petitions had previously been entered in the Scoping Comment/Response Report (CRR) (see Volume 5 of the EIR) as single entries and that this did not provide a true reflection of the extent of the objections to the proposed development compared to the number of supporters. To address this concern, CES has indicated in the CRR for the Final EIR, where comments were made as parts of petitions and how many participants/signatories there were (or were claimed to be). It was not practical to enter each of the petition participants in as separate but duplicate individual comments as this would have made the already extremely large and long CRR document completely unmanageable and user unfriendly.

It is also important to recognise that there is also local and regional support for the proposed development. While there were only nine supporters who submitted emails confirming their support, there were 77 local residents from the fishing villages of Paternoster and St Helena Bay who attended Focus group meetings on the Draft EIR on the 26th June, who were largely supportive of the proposed development. Many of these residents do not speak English well and have limited access to emails and cell phones and did not make written submissions. In these cases, the minutes of these focus group meetings serve as the main vehicle for the recording of their comments, concerns and questions. These have also been included in the CRR.

The issues, questions and concerns that I&APs raised have all been included and responded to in the Comment Response Report (CRR) (see Volume 5). Many people submitted comments, views and questions on a number of different issues. There were also many people who raised the same issue. To organise the comments and facilitate effective responses to these, and to collate the relevant comments and concerns for each of the Specialists to respond to – the CRR has been divided up into a number of sections listed in Table 8-17 below. The submissions received that covered a number of topics were divided up and each issue placed in the relevant section of the CRR. Note that not all the specialist studies have their own section as some only received minor comments or questions that were added to the "Other" section (number 12).

Table 8-17 Location of the site notices for the EIA Phase.
Sections of the Comments Responses Report for the Final BWF EIR (Volume 5).

#	CRR Section Title
1	Requests for maps, pics, information, documents and clarification during the PPP period.
2	EIA Process
3	Objections
4	Support
5	Alternatives

6	Bats & Birds
7	Ecological
8	Heritage
9	Visual
10	Tourism & Property
11	Services and Compliance
12	Other Issues

The most common comments were related to the high visual impact and the anticipated impact this would have on tourism and property values, with many arguing that this was a fatal flaw, particularly people involved in the local tourism industry and the affected residents along the top of Britannica Heights. Most of the comments on the Heritage impacts were relate to the visual impact and sense of place. Many objectors also raised concerns about the noise impacts and particularly the impact of low frequency noise (including the submission of some papers or articles on such impacts associated with wind farms). There were also many I&APs who expressed concern that the proposed site was not suitable and either arguing that the development should be placed in other 'more suitable' areas or other sites should be investigated, or asking what alternative sites were investigated. There were also many comments on the EIA process, which included the following:

- Allegations of the EAP being biased in favour of the developer and subjective, and fails to take the local context adequately into account;
- That the public review process was just a tick box exercise, and was rash and fast track;
- Requests for extensions of the public review period;
- Demands for access to the radar data;
- Demands for an additional public review period for the Final EIR;
- Requests for who and where they can lodge an appeal against the EIR;
- Why letters of support were included in the Draft EIR and objections were not;
- Why they were not given the opportunity to engage with the Specialists during their research work;
- Complaints about having separate focus group meetings for different categories of I&APs;
- Complaints about fast-tracking renewable energy developments at the expense of the environment;
- Impacts that are non-location specific and location specific not adequately acknowledged;
- Questions with regard to DEA's decision on the appeal of the Scoping decision;
- Questioning which individual (not company) is the EAP and for proof of this;
- Questioning the impact rating methodology and a lack of standardisation between the different studies;
- Missing information – EAP identify, radar report – represents fatal flaw;
- Non-compliance with Plan of Study due to additional CES Visual Impact Assessment being undertaken;
- The negative impacts (numerically) outweigh the benefits of the proposed projects;
- Complaints that No-Go option was inadequately analysed and compared to other alternatives;
- Visual impacts are fatal flaw;
- Non-implementation of all mitigation measures;
- The failure to include compensation as a mitigation measure; and
- Complaint about objectors delaying and trying to prevent this development from proceeding.

A large number of concerns about the impacts on birds (and to a lesser extent bats) were raised, including the submission of a review by Dr Andrew Jenkins who is an Avifaunal specialist who was involved in the assessment of the West Coast One windfarm and the initial post-construction monitoring. He was commissioned by Mr Pickford and his associates to provide this review. Very few

other comments were received on the ecological impacts and most of these were from the conservation authorities who did not have major concerns but some requests for additional maps and commitments from the developers that they would comply with the mitigation measures in the EMPr.

9. KEY FINDINGS OF THE SPECIALIST STUDIES

GOVERNMENT NOTICE 982, ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS, 2014 (AS AMENDED 2017). APPENDIX 3: SCOPE OF ASSESSMENT AND CONTENT OF ENVIRONMENTAL IMPACT ASSESSMENT REPORTS

4. An environmental impact assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include–

(k) Where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report;

Appropriately qualified and experienced specialists were appointed to undertake the various assessments identified as being necessary. Specialists gathered baseline information relevant to the study and assessed impacts associated with the Boulders Wind Farm. Specialists have also made recommendations to mitigate negative impacts and enhance benefits. The resulting information has been synthesised in the section below, whilst the full specialist reports have been attached to the EIR as a Specialist Report section in **VOLUME 2 – SPECIALIST REPORTS.**

The following specialist studies have been completed for the EIA Phase:

- Agricultural and Soils Impact Assessment;
- Avifaunal Impact Assessment;
- Bat Impact Assessment;
- Ecological Impact Assessment;
- Economic Impact Assessment;
- Freshwater Impact Assessment;
- Heritage, Archaeological and Paleontological Impact Assessment;
- Noise Impact Assessment;
- Social Impact Assessment;
- Traffic Impact Assessment;
- Property Evaluation Assessment; and
- Visual Impact Assessment.

NOTE:
It should be noted that the following specialist studies were updated from the Draft EIR phase mainly in response to issues and requests for clarifications raised by I&APs with respect to the draft EIR.

- Bat Impact Assessment;
- Economic Impact Assessment;
- Heritage, Archaeological and Paleontological Impact Assessment;
- Noise Impact Assessment;
- Property Evaluation Assessment; and
- Visual Impact Assessment.

Approach
All specialists were provided with a Draft Layout to assess. The specialists used various sampling techniques (site visits, desktop analyses, long-term monitoring, short-term monitoring, etc.) in order to assess the Draft Layout. The results gathered from each of the specialists were then assessed by the

developer in order to inform the Final Layout. This section summarises the key findings (Draft Layout) and their opinion on the response of the developer to these findings (Final Layout). The sensitivity analysis, which includes the sensitive areas highlighted by the specialists, is illustrated and assessed in Chapter 11 of this report.

9.1 AGRICULTURE AND SOILS IMPACT ASSESSMENT

9.1.1 Conclusion & Specialist Statement

The Draft Layout and the Final Layout (after the relocation of 7 turbines) of the proposed Boulders Wind Farm have the same agricultural impacts and the change in layout does not change the impacts or rating of the Agriculture Impact Assessment Report. The two negative impacts can be mitigated to a LOW significance. The only potential negative impact of real concern is erosion, but this can be mitigated. It is also noted that the proposed development will have a positive economic impact on the two directly affected farms through improved income security.

COMPARISON OF OVERALL IMPACT RATINGS (POST MITIGATION) OF THE DRAFT LAYOUT VERSUS THE FINAL LAYOUT (IN RESPONSE TO SPECIALIST RECOMMENDATIONS)

Agriculture & Soils Impact Assessment Overall Significance (Draft Layout): **LOW (+)**
Agriculture & Soils Impact Assessment Overall Significance (Final Layout): **LOW (+)**

9.2 AVIFAUNAL IMPACT ASSESSMENT

9.2.1 Conclusion & Specialist Statement

According to the Avifaunal Impact Assessment, the proposed Boulders Wind Farm is acceptable for development and presents no fatal flaws, provided that all mitigation measures recommended are adhered to. It is recommended that the minimum height of rotor swept area is not lower than 55m. Additionally, as larger rotor swept areas are likely to have a higher impact on bird fatalities than smaller rotor swept areas (assuming the same number of turbines), it is recommended that the rotor diameter should preferably be 120m or less.

The previous layout and the current layout (after the relocation of 7 turbines) are the same in terms of overall impact and the amendments to the layout do not change the overall impact rating of the Avifaunal Impact Assessment Report.

COMPARISON OF OVERALL IMPACT RATINGS (POST MITIGATION) OF THE DRAFT LAYOUT VERSUS THE FINAL LAYOUT (IN RESPONSE TO SPECIALIST RECOMMENDATIONS)

Avifaunal Impact Assessment Overall Significance (Draft Layout): **MODERATE (-)**
Avifaunal Impact Assessment Overall Significance (Final Layout): **MODERATE (-)**

9.3 BAT IMPACT ASSESSMENT

9.3.1 Conclusion & Specialist Statement

According to the Bat Impact Assessment, the proposed Boulders Wind Farm is acceptable for development and presents no fatal flaws, provided that all mitigation measures recommended are adhered to and specifically:

- Sensitive areas for bats are avoided;
- Bat activity continues to be monitored at selected turbine sites;
- Bat mortality is monitored and curtailment is implemented when a threshold is reached; and
- All existing structures within 1km of any turbines and all new structures must be bat-proofed.

Although the cumulative impacts of multiple wind farms in the region is a HIGH risk, post-construction bat activity and fatality monitoring will be vital to monitor the effect of the Boulders Wind Farm and other wind farms in the region, on bats. Should fatality exceed the allocated threshold for the ecoregion, mitigation, through curtailment, should be enacted.

The previous layout and the current layout (after the relocation of 7 turbines) are the same in terms of overall impact and the amendments to the layout do not change the overall impact rating of the Bat Impact Assessment Report.

COMPARISON OF OVERALL IMPACT RATINGS (POST MITIGATION) OF THE DRAFT LAYOUT VERSUS THE FINAL LAYOUT (IN RESPONSE TO SPECIALIST RECOMMENDATIONS)

Bat Impact Assessment Overall Significance (Draft Layout): **MODERATE (-)**
Bat Impact Assessment Overall Significance (Final Layout): **MODERATE (-)**

9.4 ECOLOGICAL IMPACT ASSESSMENT

9.4.1 Conclusion & Specialist Statement

According to the Ecological Impact Assessment, although the majority of the site is of low sensitivity and presents an opportunity for the development of the Boulders Wind Farm, there are also some very high sensitivity ecosystems present at the site which are considered to represent no-go areas from a development perspective. Numerous species of conservation concern were confirmed present in these areas, even in the smaller degraded areas. Under the layout alternatives assessed, there are no turbines or access roads through the high sensitivity areas and these have been well avoided by the development.

Cumulative impacts as well as impacts on CBAs as a result of the development are likely to be low as the footprint of the development would be largely restricted to already transformed areas and operational impacts on terrestrial ecology within such areas would be very low. As the development is almost entirely restricted to transformed habitats, the contribution of the development to cumulative impacts would be low and is considered acceptable.

The final revised layout (after the relocation of 7 turbines) is considered to have similar ecological impacts to the original layout and no additional mitigation or avoidance recommendations are associated with the changes to the layout.

COMPARISON OF OVERALL IMPACT RATINGS (POST MITIGATION) OF THE DRAFT LAYOUT VERSUS THE FINAL LAYOUT (IN RESPONSE TO SPECIALIST RECOMMENDATIONS)

Ecological Impact Assessment Overall Significance (Draft Layout): **LOW (-)**
Ecological Impact Assessment Overall Significance (Final Layout): **LOW (-)**

9.5 PROPERTY VALUES, TOURISM AND ECONOMIC ISSUES ASSESSMENT

9.5.1 Conclusion & Specialist Statement

The Property Price, Tourism and Economic Issues Assessment concludes the following:

9.5.2 Property Prices and Tourism

While the possibility of negative impacts on property prices and tourism cannot be ruled out completely, research shows that that if any, the impacts on tourism will be marginal while the effect on property prices will dissolve once the wind farm is developed. Based on the experience of WC1 and wind farms in the Cape St Francis and Jeffry's Bay area, and other research, there is no clear correlation between property price dynamics (positive or negative) and the development of wind farms.

9.5.3 Local economy

It is concluded that the proposed development will have a number of positive low to medium economic impacts on the local and regional economy, particularly during the two-year construction phase, leading to the creation of over 900 jobs, and up to 60 jobs in the operational phase. This is considered beneficial for local job seekers and businesses, particularly in the context of high unemployment, considerable poverty and the decline of the historical fishing industry in this area. The developers will also be investing over R9 million per annum in local socio-economic and enterprise development initiatives.

The Draft Layout and the Final Layout (after the relocation of 7 turbines) of the proposed Boulders Wind Farm have very similar overall economic impacts and the change in layout does not change the overall impacts or rating of the Economic Impact Assessment Report.

COMPARISON OF OVERALL IMPACT RATINGS (POST MITIGATION) OF THE DRAFT LAYOUT VERSUS THE FINAL LAYOUT (IN RESPONSE TO SPECIALIST RECOMMENDATIONS)

Property Price, Tourism and Economic *Impact Assessment Overall Significance (Draft Layout):* **MODERATE (+)**

Property Price, Tourism and Economic *Impact Assessment Overall Significance (Final Layout):* **MODERATE (+)**

9.6 FRESHWATER IMPACT ASSESSMENT

9.6.1 Conclusion & Specialist Statement

According to the Freshwater Impact Assessment, the proposed Boulders Wind Farm development will have an overall 'low' impact on the freshwater habitat and ecology, ecological and socio-cultural service provision and on hydrological function and sediment balance, both during construction and operational phases of the development, provided that impacts are managed through the implementation of the recommendations of the freshwater assessment study.

The previous layout and the current layout (after the relocation of 7 turbines) are the same in terms of overall impact and the amendments to the layout do not change the overall impact rating of the Freshwater Impact Assessment Report.

COMPARISON OF OVERALL IMPACT RATINGS (POST MITIGATION) OF THE DRAFT LAYOUT VERSUS THE FINAL LAYOUT (IN RESPONSE TO SPECIALIST RECOMMENDATIONS)

Freshwater Impact Assessment Overall Significance (Draft Layout): **LOW (-)**

Freshwater Impact Assessment Overall Significance (Final Layout): **LOW (-)**

9.7 HERITAGE, ARCHAEOLOGICAL AND PALEONTOLOGICAL IMPACT ASSESSMENT

9.7.1 Conclusion & Specialist Statement

It is the opinions of these specialist that, provided the recommended mitigation measures are implemented and incorporated into the EMPr, that Environmental Authorisation for this project should be awarded.

The Draft Layout (Alternative 1) and the Final Layout (Alternative 2) (after the relocation of 7 turbines) of the proposed Boulders Wind Farm have the same archaeological and paleontological impacts and impacts on physical built heritage resources – all of which are low.

The visual impacts of the Boulders Wind Farm will have an impact on the sense of place of the region particularly the rural cultural landscape, and to a lesser extent, the historical coastal towns. Due to the clustering of the wind farm with West Coast 1 and the relocation of seven turbines to the east of the Vredenburg-Stompneus Bay road, the overall impact is considered MODERATE and within acceptable limits.

However, the cumulative impact of multiple wind farms in the region is assessed to be a negatively HIGH impact. While the removal of all 13 turbines west of the Vredenburg-Stompneus Bay road is preferable, the relocation of the seven turbines north of Kasteelberg koppie is an acceptable recommendation.

It is the overall opinion of the HIA specialist that, provided the recommendations are implemented and incorporated into the EMPr, that Environmental Authorisation for the project should be awarded. Two important recommendations relating to the visual impacts on heritage resources include:

- At the minimum, the seven wind turbines west of the Vredenburg-Stompneus Bay road should be removed or relocated (Turbines 15, 19, 21, 27, 31, 33 and 43) – Layout Alternative 2; and
- The viability of reducing the turbine size to match that of the West Coast 1 turbines should be investigated.

COMPARISON OF OVERALL IMPACT RATINGS (POST MITIGATION) OF THE DRAFT LAYOUT VERSUS THE FINAL LAYOUT (IN RESPONSE TO SPECIALIST RECOMMENDATIONS)

Archaeological & Paleontological Impact Assessment Overall Significance (Draft Layout): **LOW (-)**
Archaeological & Paleontological Impact Assessment Overall Significance (Final Layout): **LOW (-)**

Heritage Resource Impact Assessment Overall Significance (Draft Layout): **MODERATE (-)**
Heritage Resource Impact Assessment Overall Significance (Final Layout): **MODERATE (-)**

9.8 NOISE IMPACT ASSESSMENT

9.8.1 Conclusion & Specialist Statement

Original Layout

The Noise Impact Assessment (ENIA) concludes that, with the implementation of the recommended mitigation measures:

- The significance of the noise impact relating to the development of the access roads during the day will be low.
- The significance of the noise impact relating to the development of the access roads during the night will be medium at NSDs 07 and 09. This can be mitigated by only constructing the access road during the day.
- The significance of the noise impact from increased daytime construction traffic will be low.
- The significance of the noise impact from increased night-time construction traffic will be low.
- The significance of the noise impact relating to daytime construction of the wind turbine generators will be low.
- The significance of the noise impact relating to night-time construction of the wind turbine generators will be low.
- The significance of the operational daytime noises will be low.
- The significance of the operational night-time noises may be medium. This is a precautious rating considering the projected noise levels at NSDs 07, 08, 09 and 10 as well as the existing ambient sound levels.

Revised Final Layout

It is concluded that, due to the change in layout (after the relocation of seven turbines), that:

- The significance of the operational daytime noises will be low.
- The significance of the operational night-time noises may be medium. This is a precautious rating considering the projected noise levels at NSDs 07, 08, 09 and 10 as well as the existing ambient sound levels.

The ENIA indicates that the development of the Boulders WF could have a potential noise impact on the surrounding environment. However, the potential noise impacts can be mitigated to a low significance through the implementation of the proposed mitigation measures. The noises from the operational WTGs may increase the ambient sound levels and may increase the annoyance levels of receptors that experience higher noise levels. Mitigation is available to reduce the potential noise levels for the construction and operation phases of the Boulders Wind Farm.

Therefore, considering the findings of this assessment, the increase in noise levels is not considered to be a fatal flaw and the development of the Boulders WF can be authorised from a noise perspective, subject to the implementation of the recommended mitigation measures.

COMPARISON OF OVERALL IMPACT RATINGS (POST MITIGATION) OF THE DRAFT LAYOUT VERSUS THE FINAL LAYOUT (IN RESPONSE TO SPECIALIST RECOMMENDATIONS)

Environmental Noise Impact Assessment Overall Significance (Draft Layout): **LOW (-)**
Environmental Noise Impact Assessment Overall Significance (Final Layout): **LOW (-)**

9.9 SOCIAL IMPACT ASSESSMENT

9.9.1 Conclusion & Specialist Statement

The Social Impact Assessment takes cognisance of the visual and heritage and sense of place impacts associated with the proposed Boulders Wind Farm and recommends that Alternative 1 not be supported but Alternative 2 (after the relocation of 7 turbines) should be supported in order to minimize any impacts of views from Britannica Heights towards Kasteelberg and Paternoster. It notes that while Alternative 2 does not fully address all the original recommendations of the Heritage and

Visual assessments (namely the removal of all thirteen (13) wind turbines located to the west of the Vredenburg-Stompneus Bay Road), full compliance with those recommendations may make the project financially unviable and result in the loss of the much needed socio-economic benefits associated with the proposed development for local communities in Paternoster and St Helena Bay.

COMPARISON OF OVERALL IMPACT RATINGS (POST MITIGATION) OF THE DRAFT LAYOUT VERSUS THE FINAL LAYOUT (IN RESPONSE TO SPECIALIST RECOMMENDATIONS)

Social (Negative Impacts) Impact Assessment Overall Significance (Draft Layout): **LOW (-)**
Social (Negative Impacts) Impact Assessment Overall Significance (Final Layout): **LOW (-)**

Social (Positive Impacts) Impact Assessment Overall Significance (Draft Layout): **MODERATE (+)**
Social (Positive Impacts) Impact Assessment Overall Significance (Final Layout): **MODERATE (+)**

9.10 TRAFFIC IMPACT ASSESSMENT

9.10.1 Conclusion & Specialist Statement

Since the total number of wind turbines remains the same with the revised layout (after the relocation of 7 turbines) and the transport impact on the public road network will remain similar than what is reported for the previous layout.

COMPARISON OF OVERALL IMPACT RATINGS (POST MITIGATION) OF THE DRAFT LAYOUT VERSUS THE FINAL LAYOUT (IN RESPONSE TO SPECIALIST RECOMMENDATIONS)

Traffic Impact Assessment Overall Significance (Draft Layout): **LOW (-)**
Traffic Impact Assessment Overall Significance (Final Layout): **LOW (-)**

9.11 VISUAL IMPACT ASSESSMENT

The visual impacts of the proposed Boulders Wind Farm on the landscape was identified as a significant environmental issue during the scoping phase of the EIA process. Logis (Mr Lourens Du Plessis) were, therefore, appointed to conduct the Visual Impact Assessment (VIA) for the proposed Boulders Wind Farm. The final VIA was completed in November 2018.

It should be noted that an initial VIA was concluded based on an initial turbine layout and the VIA was updated in November 2018 based on a revised turbine layout (after the relocation of 7 turbines). The impacts and conclusion sections have been updated based on the revised turbine layout.

An additional VIA was conducted by CES to verify the findings of the Logis VIA. This study was consistent with the Logis study. Both VIAs can be found as appendices to this report in the Specialist Report section.

9.11.1 Conclusion & Specialist Statement

Cumulative Impact

The VIA indicates that if mitigation is considered, the potential cumulative impact may be within acceptable limits. This would include, as a minimum requirement, the removal or relocation of the wind turbines west of the Vredenburg-Stompneus Bay road and an investigation into the potential overall

reduction in the wind turbine size, in order to match the dimensions of the West Coast 1 wind turbines.

Kasteelberg hill and Vredenburg-Stompneus Bay road
This relates to the potential visual impact on Kasteelberg hill, including the cultural landscape and sense of place to the west of the Vredenburg-Stompneus Bay road.

The VIA indicates that mitigation of this impact is possible and entails the relocation of the wind turbines (13 in total) to the east of the road (or outright removal of the wind turbines in the event that they cannot be accommodated to the east of the road). However, the post mitigation visual impact is expected to be of MODERATE significance with respect to impacts on Kasteelberg hill.

Overall, the visual impacts of the proposed Boulders Wind Farm remain HIGH after the implementation of the limited mitigation options. This includes the cumulative impact of multiple wind farms in the region. The wind farm will undoubtedly be imposing and dominate the visual landscape for those in close proximity. However, based on the assessment of significance in the VIA, it is concluded that the potential losses of scenic resources are not sufficiently significant to present a fatal flaw to the proposed project given the following:

- The superstructures are technically removable on decommissioning;
- Certain mitigation recommendations in this report;
- An understanding that although there are local losses, there are also other local, regional and national environmental, social and economic gains;
- Authentic efforts to ensure certain benefits accrue to those in close proximity to the development in terms of socio-economic development initiatives; and
- That turbine structures are not a new feature to this particular landscape.

The Draft Layout and the Final Layout (after the relocation of 7 turbines) are of the same overall visual impact and the change in layout does not change the overall impact rating of the VIA Report.

COMPARISON OF OVERALL IMPACT RATINGS (POST MITIGATION) OF THE DRAFT LAYOUT VERSUS THE FINAL LAYOUT (IN RESPONSE TO SPECIALIST RECOMMENDATIONS)

Visual Impact Assessment Overall Significance (Draft Layout): **HIGH (-)**
Visual Impact Assessment Overall Significance (Final Layout): **HIGH (-)**

10.ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT

The impact assessment for the proposed Boulders Wind Farm was conducted in two parts; a general impact assessment, and various specialist impact assessments. The impact assessment identified and assessed impacts across four phases of development:

- Planning & Design Phase
- Construction Phase
- Operational Phase
- Decommissioning Phase

The general impact assessment covered issues such as:

- General construction impacts
- Access roads
- Underground electrical connections
- Stormwater
- Electromagnetic Interference

10.1 SUMMARY OF FINDINGS AND COMPARATIVE ASSESSMENT OF IMPACTS

A detailed impact assessment of all the identified impacts is provided in Appendix B 1&2. A breakdown of the assessments and mitigation measure, presented in Tables 10-1 and 10-2 below, provide insight into the key issues of all phases of the proposed development.

Table 10-1: Summary of Impacts and Key Mitigation Measures: General Impacts

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
PLANNING & DESIGN PHASE - GENERAL				
GENERAL IMPACTS				
TRAFFIC & TRANSPORT	Inadequate planning for the transportation of turbine parts and specialist construction equipment to the site by long and/or slow-moving vehicles could cause traffic congestion, especially if temporary road closures are required.	**MODERATE -**	*Project planning must include a plan for traffic control that will be implemented, especially during the construction phase of the development. Consultation with the local Road Traffic Unit in this regard should be done early in the planning phase. The necessary road traffic permits should be obtained for transporting parts, containers, materials and construction equipment to the site.*	**LOW -**
	The integrity of existing highway infrastructure such as bridges and barriers may be compromised by the heavy vehicle traffic delivering components to the site.	**LOW -**	*Careful planning of the routes taken by heavy vehicles must highlight areas of road that may need to be upgraded in order to accommodate these vehicles. Once identified, these areas must be upgraded if necessary.*	**LOW -**
	Inappropriate planning for road construction can increase the risk of surface water run-off, loss of biodiversity, soil erosion, etc.	**HIGH -**	*All access roads should be suitably gravelled, not tarred, in order to allow for movement of water into the ground.* *Suitable soil erosion prevention measures such as concrete v-drains should be used in areas where soil may be eroded into surrounding watercourses.*	**LOW -**
	Road modifications which may be necessary to allow for the delivery of components to site via heavy vehicles could have long lasting traffic benefits.	**LOW +**	*If roads are upgraded, this should improve the conditions for all users of the roads.*	**LOW +**
STORAGE OF HAZARDOUS SUBSTANCES	Inappropriate planning for the storage of hazardous substances such as diesel, paint, pesticides, etc, tools and equipment used on site could lead to surface and ground water pollution e.g. due to oil leaks, spillage of diesel etc. In addition, these hazardous substances could be	**MODERATE -**	*All hazardous substances such as paints, diesel and cement must be stored in a secure bunded area with an impermeable surface beneath them.* *Concrete and cement mixing must be conducted at a single location which should be centrally located, where practical. This mixing must take place on an*	**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
	washed off into nearby drainage lines. The mixing of concrete and cement on site could result in ground water contamination from compounds in the cement. In addition, a large number of cement mixing stations on site could increase the presence of impermeable areas which in turn could increase rates of run-off and thereby increase the risk of localized flooding, soil erosion, silting, gully formation, etc.		*impermeable surface, and dried waste concrete and cement must be disposed of with building rubble.*	
ENVIRONMENTAL LEGAL AND POLICY COMPLIANCE	Failure to adhere to existing policies and legal obligations could lead to the project conflicting with local, provincial and national policies, guidelines and legislation. This could result in lack of institutional support for the project, overall project failure and undue disturbance to the natural environment.	**HIGH -**	*The developer must ensure that all relevant legislation and policy is consulted and further ensure that the project is compliant with such legislation and policy.* *These should include (but not restricted to):* o *Local and District Spatial Development Frameworks.* o *Local Municipal bylaws.* *In addition, planning for the construction and operation of the proposed wind farm should consider available best practice guidelines.*	**LOW -**
STORMWATER MANAGEMENT AND EROSION	The introduction of roads and impermeable areas could increase rates of run-off and therefore the risk of localised flooding.	**HIGH -**	*All structures must be located at least 32m away from identified drainage lines.* *A Stormwater Management Plan must be developed and implemented to ensure maximum water seepage at the source of water flow.* *The plan must also include management mitigation measures for water pollution, wastewater management and the management of surface erosion e.g. by considering the applicability of contouring, etc.*	**LOW -**
	Inappropriate storm water management will lead to damage, pollution and potential flooding of the site.	**HIGH -**	*A Stormwater Management Plan must be developed and implemented.*	**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
MANAGEMENT OF GENERAL WASTE	Inappropriate planning for management and disposal of waste e.g. storage disposal could result in surface and ground water contamination.	**HIGH -**	*A Waste Management Plan for handling on site waste must be developed and implemented.* *An appropriate area must be designated where waste can be stored before disposal.*	**LOW -**
ELECTROMAGNETIC INTERFERENCE (EMI)	WEFs can cause television, radio and microwave interference by blocking and / or causing part of the signal to be delayed.	**MODERATE -**	*While accurate siting of wind turbines in the planning and design phase has reduced the effects of EMI, if complaints are received from surrounding landowners regarding this issue, the developer must investigate and mitigate these issues to the best of their abilities.*	**LOW -**
CHANGES TO FLUVIAL GEOMORPHOLOGY	Incorrect placement and/or design of bridge pilings or culverts may result in scouring of the riverbed in the areas immediately surrounding the pilings or culverts	**MODERATE -**	*Scour countermeasures must be incorporated into the design of all bridge structures.*	**LOW -**
	Insufficient planning for erosion prevention along the banks of the streams alongside the water crossing structures will result in erosion that may eventually impair the safety of the structure.	**HIGH -**	*Adequate bank stabilization measures must be incorporated into the design of the crossing structure.*	**MODERATE -**
CONSTRUCTION PHASE - GENERAL				
GENERAL IMPACTS				
GENERAL CONSTRUCTION ACTIVITES	General construction activities associated with the construction of wind farms and associated infrastructure, can have a wide range of short term environmental impacts.	**MODERATE -**	*The various additional general mitigation measures associated with construction activities that are included in the EMPr, must also be adopted in addition to those described below, including:* ○ *Site clearing establishment,* ○ *Health & safety,* ○ *Waste management,* ○ *Pollution control from hazardous chemicals,* ○ *Fire, noise, erosion and dust control,* ○ *Security and access control,* ○ *Etc.*	**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
SCHEDULING OF CONSTRUCTION	Construction scheduling that does not consider the seasonal requirements of the aquatic environment, e.g. allowing for unimpeded flood events, could lead to short-term (and potentially long-term) impacts such as excessive sediment mobilization, etc.	**MODERATE -**	*Wherever possible, construction activities must be undertaken during the driest part of the year to minimize downstream sedimentation due to excavation, etc.* *When not possible, suitable stream diversions structures must be used to ensure that rivers/streams are not negatively impacted by construction activity.*	**LOW -**
NUISANCE DUST	Dust is likely to be a potential nuisance due to the construction activities.	**LOW -**	*Fugitive/nuisance dust should be managed by implementing the following: ·* *o Damping down of un-surfaced and un-vegetated areas;* *o Retention of vegetation where possible;* *o Excavations and other clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighbouring areas;* *o A speed limit of 40km/h must not be exceeded on dirt roads;* *Any complaints or claims resulting from poor dust control should be attended to immediately by the Contractor.*	**LOW -**
CONSTRUCTION CAMP	Unnecessary disturbance of vegetation due to sprawl of campsite can cause loss of biodiversity.	**MODERATE -**	*The construction camp must be sited on an already degraded area.* *The ECO must assist in the siting of structures and supervise any bush clearing (although this is not anticipated) for the construction camp which should also be fenced to avoid sprawl.*	**LOW -**
ACCESS ROADS	Unnecessary disturbance of habitats during road construction could cause loss of biodiversity.	**MODERATE -**	*Construction vehicles and machinery should only access the site using existing tarred roads to minimise disturbance on the receiving environment.*	**LOW -**
FIRE	Risk of runaway fires from burning of waste and	**VERY HIGH -**	*There must be no burning of construction waste or*	**MODERATE -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
	other debris might lead to the burning of surrounding vegetation.		*debris onsite.*	
STORMWATER MANAGEMENT	Sediment is likely to be created during construction. This could be washed off into the nearby drainage line e.g. during the excavation of foundations, the laying of access roads within the site, digging of cable runs and soil stripping and stockpiling to create foundations and temporary areas of hard-standing, such as the construction camp.	**MODERATE -**	*The recommendations of the Stormwater Management Plan must be implemented to avoid soil erosion and siltation of drainage line.*	**LOW -**
DEGRADATION OF DRAINAGE LINES FROM EARTHWORKS	Unplanned construction activities or earthworks that occur close to onsite drainage lines could cause adverse impacts such as soil erosion, siltation, and blockage of the drainage line.	**HIGH -**	*There must be no earthworks within 32m of the drainage lines so as to avoid contamination of water sources.*	**LOW -**
SOIL EROSION	Soil could wash out of bare slopes before natural revegetation has established.	**MODERATE -**	*Vegetation must be retained where possible to avoid soil erosion.* *If slopes are cleared during construction, these must be rehabilitated as soon as possible to minimize soil erosion losses.*	**LOW -**
MANAGEMENT OF GENERAL WASTE	Littering by construction workers could cause surface and ground water pollution.	**MODERATE -**	*Littering must be avoided, and litter bins must be made available at various strategic points on site. Refuse from the construction site must be collected on a regular basis and deposited at an appropriate landfill.*	**LOW -**
HAZARDOUS SUBSTANCES	Onsite maintenance of construction vehicles/machinery and equipment could result in oil, diesel and other hazardous chemicals contaminating surface and ground water. Surface and ground water pollution could arise from the spillage or leaking of diesel, lubricants and cement during construction activities.	**MODERATE -**	*The storage of fuels and hazardous materials must be located away from sensitive water resources.* *All hazardous substances (e.g. diesel, oil drums, etc.) must be stored in a secure bunded area.* *The recommendations of the Stormwater Management Plan must be implemented during construction to limit the risk of pollution of water resources.*	**LOW -**
MANAGEMENT OF CONSTRUCTION	Waste from construction activities e.g. excess concrete and cement mixture, empty paint	**MODERATE -**	*A Waste Management Plan for the project must be developed and implemented in the construction*	**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
WASTE	containers, oil containers, etc., could cause pollution of ground and surface water when they come into contact with run-off water.		*phase.* - *All waste must be disposed of at an appropriately licensed landfill site.* - *All construction materials must be stored in a central and secure location with controlled access with an appropriate impermeable surface.* - *The recommendations of the Stormwater Management Plan must be implemented to mitigate the impacts of run-off water on pollution of water resources.*	
WATER QUALITY	Wet concrete is highly alkaline. This could result in flash kills of macroinvertebrates and fish species in the vicinity.	**MODERATE -**	- *No concrete or cement mixing must take place within 32m of a watercourse.* - *A serviced fire extinguisher must be available on site in the event that wet concrete is accidentally spilled into water courses.*	**LOW -**
	Soil erosion will decrease the quality of the aquatic habitat downstream of the construction activities by silting over exposed rocks, and decreasing the clarity and oxygen saturation of the water.	**MODERATE -**	- *Construction activities must be demarcated and vegetation clearing and topsoil removal (if required) limited to these areas.*	**LOW -**
HYDROLOGY	Coffer dams have the potential to permanently change the flow dynamics in a river, exacerbating scour and enhancing sedimentation. Both of these changes can impact negatively on the aquatic ecosystem.	**HIGH -**	- *Coffer dams must not be left in place for longer than 30 days.* - *All work within a watercourse should preferably be completed during the dry season, when flows are at their lowest.* - *Water in the streams must be allowed to pass downstream of the construction. If necessary, this should be achieved via a temporary diversion – this should not be in place for more than 30 days.*	**MODERATE -**
INFILLING/ EXCAVATION IN A WATERCOURSE	Excavated material stockpiles may increase sediment loads in watercourses during rainfall events	**LOW -**	- *Stockpiled excavated material must not be stored within 32m of a watercourse.* - *Stockpile areas must be suitably bunded to prevent Waterborne erosion of exposed soils where there is a likelihood that the soils will be washed into a*	**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
			watercourse.	
	Materials used for the infilling of watercourses in order to construct watercrossings may not be compatible with the surrounding bed/banks, etc., which could change the characteristics of the watercourse	**LOW -**	*Materials used for infilling must be suitably stabilized to ensure that scour and erosion of the existing bed/banks is exacerbated.*	**LOW -**
DISPOSAL OF SPOIL MATERIAL	Incorrect disposal of subsoil/spoil material could result in significant loss of a useful resource.	**MODERATE -**	*Soil spoil material should not be disposed of onsite without the appropriate Waste License in terms of the NEMA: Waste Act.* *Spoil material should be used to rehabilitate open borrow pits or erosion features.* *Disposal of spoil material in a landfill should be the last option.* *No spoil stockpiles should be allowed to remain onsite once construction activities have ceased.*	**LOW -**
OPERATIONAL PHASE - GENERAL				
GENERAL IMPACTS				
AIR QUALITY CLIMATE CHANGE	The electricity generated by the development will displace some of that produced by fossil fuel-based forms of electricity generation. The scheme, over its lifetime, will therefore avoid the production of a significant amount of CO_2, SO_2 and NO_2 that would otherwise be emitted to the atmosphere. The carbon equivalent emission reductions amount to about 400,000 tons per annum or 8 million tons over the 20 year life of the project.	**VERY HIGH +**	*No mitigation necessary.*	**VERY HIGH +**
LIGHTING	The facility may be lit at night during operation. This could have adverse impacts on the landscape character and sense of place due to long-term visibility of land.	**HIGH -**	*Night lighting impacts should be reduced by using shaded lighting and using lights at low levels.* *If surrounding landowners complain of shadow flicker-related issues, these must be investigated and mitigated to the best of the developers' ability.*	**LOW -**
ARCHITECTURE OF	Control buildings, toilet facilities and other	**MODERATE -**	*All project structures and buildings visible to the*	**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
ANCILLARY INFRASTRUCTURE	ancillary infrastructure could cause negative visual intrusion if allowed to fall into disrepair and not maintained properly.		*public must be properly maintained.*	
HAZARDOUS CHEMICAL STORAGE	Inappropriate storage of chemical, herbicides, diesel and other hazardous substances on site could result in soil and water contamination and also pose a high accident danger risk.	**HIGH -**	*All hazardous substances must be stored in appropriately secure bunded locations.*	**MODERATE -**
OPERATING EQUIPMENT	Noise could be generated by transformers from the process of power conversion. The operation of auxiliary equipment needed to cool the transformers, including cooling fans and oil pumps could also generate some noise.	**MODERATE -**	*Noise emission levels from inverters and transformers should be reduced by housing them in enclosed structures.*	**LOW -**
INCREASED STORMWATER RUN-OFF	Failure to maintain the storm water system could increase the risk of surface water damage to the landscape and vegetation from increased rates of run-off and therefore the risk of localised flooding and increased sheet erosion downstream due to the presence of roads and impermeable areas of hard standing.	**MODERATE -**	*Recommendations of the Stormwater Management Plan must be implemented.*	**LOW -**
WASTE MANAGEMENT	There could be littering by maintenance workers and security personnel on site.	**MODERATE -**	*A Waste Management Plan incorporating recycling and waste minimisation must be implemented and explained to all employees as part of the environmental induction training.*	**LOW -**
DECOMMISSIONING PHASE - GENERAL				
GENERAL IMPACTS				
POLLUTION	Littering by construction workers could cause surface and ground water pollution.	**MODERATE -**	*Littering must be prohibited and litter bins should be made available at various strategic points on site.* *Refuse from the construction site should be collected on a regular basis and deposited at an appropriate landfill.*	**LOW -**
	Onsite maintenance of construction vehicles/machinery and equipment could result in oil, diesel and other hazardous chemicals	**MODERATE -**	*Fuels and hazardous materials must not be stored near sensitive water resources. All hazardous substances (e.g. diesel, oil drums, etc.) to be stored*	**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
	contaminating surface and ground water. Surface and ground water pollution could arise from the spillage or leaking of diesel, lubricants and cement during construction activities.		*in a secure bunded area.*	
DUST	Dust is likely to be a potential nuisance due to the decommissioning activities.	**LOW -**	⅄ *Fugitive/nuisance dust should be reduced by implementing the following:* ○ *Damping down of un-surfaced and un-vegetated areas;* ○ *Retention of vegetation where possible; Demolitions and other clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighbouring areas;* ○ *A speed limit of 30km/h must not be exceeded on dirt roads.* ⅄ *Any complaints or claims emanating from poor dust control must be attended to immediately by the Contractor.*	**LOW -**
TRAFFIC & TRANSPORT	A high number of heavy vehicle movements will occur during the decommissioning phase. This may have a detrimental effect on sensitive receptors, especially on existing vegetation.	**MODERATE -**	⅄ *Deconstruction vehicles and machinery should make use of existing infrastructure such as roads as far as possible to minimise disturbance on the receiving environment. There must be no unnecessary disturbance of extant vegetation.*	**LOW -**
SOIL EROSION	After the removal of all wind turbine related structures, the disturbed soils could become exposed, unstable and prone to erosion.	**MODERATE -**	⅄ *After the removal of all wind turbine-related structures, the disturbed soils must be re-vegetated to avoid unnecessary soil erosion.*	**LOW -**
LAND-USE	Land previously unavailable for certain types of land use will now be available for those uses.	**LOW +**	⅄ *No mitigation necessary.*	**LOW +**

Table 10-2: Summary of Impacts and Key Mitigation Measures: Specialist Impacts

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
PLANNING & DESIGN PHASE - SPECIALISTS				
AGRICULTURE & SOILS IMPACT ASSESSMENT				
PLACEMENT OF TURBINES	To evaluate the placing of turbines and the lay-out thereof (mainly on turbine footprints and new roads anticipated) on existing agricultural land given the natural resource (soil, terrain and climate) circumstances unique to the area. Water erosion was determined as the most important factor in the area. Evaluation included suggested mitigation measures against water erosion for lay-down areas and water run-off lanes along new roads planned. Assessment also focused on areas where roads will cross existing contours.	**HIGH -**	⅄ *For lay-down areas, water run-off lanes along roads and where contours are crossed, appropriate structures must be implemented to make sure they are still functioning well and to prevent any further activity that may be responsible for new water erosion to take place.* ⅄ *Details of mitigation measures to take into consideration per turbine placing are given in Annexure 1, Tables 6.1 and 6.2 of the Agriculture & Soils Impact Assessment report.*	**LOW -**
BAT IMPACT ASSESSMENT				
DESTRUCTION OF BAT ROOSTS	Direct Impacts on rocky outcrops or trees could disturb or destroy roosts used by crevice-roosting bats. Such activities could also directly result in the fatality of bats roosting within such an outcrop / tree. There are many rocky outcrops and trees scattered across the site which provide potential roosts for crevice roosting bats. Cumulative Impacts: This impact would be cumulative with the historical destruction of rocky outcrops and trees for various types of land-use. However, these roosts are not limited in the region and therefore alternative roosts exist for displaced	**LOW -**	⅄ *Turbines must be sited away from important habitat features for bats, as well as bat roosts (as per sensitivity map).*	**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
	bats.			
HERITAGE, ARCHAEOLOGY & PALAEONTOLOGY IMPACT ASSESSMENT				
VISUAL IMPACTS ON HERITAGE RESOURCES	Visual impact on scenic qualities of the Vredenburg-Stompneus Bay Road, the Paternoster-Stompneus Bay Road and the built environment heritage of Rooiheuwel and Boebesakskraal farmsteads.	**MODERATE -**	*At the minimum, the seven wind turbines west of the Vredenburg-Stompneus Bay road should be removed or relocated (Turbines 15, 19, 21, 27, 31, 33 and 43) – Layout Alternative 2.* *Note: In order to mitigate visual impacts, the developer has relocated seven (7) wind turbine, 5 to the east and 2 to the south of the Vredenburg-Paternoster Road resulting in a MODERATE negative impact rating pre and post mitigation.* *The viability of reducing the turbine size to match that of the West Coast 1 turbines should be investigated.* *Where sensitive visual receptors are likely to be affected, the developer should consider entering into negotiations regarding the potential screening of visual impacts at the receptor site. This may entail the planting of vegetation, trees or the construction of screens. Ultimately, visual screening is most effective when placed at the receptor itself.* *Vegetation cover (i.e. either natural or cultivated) must be maintained in all areas outside of the actual development footprint, both during construction and operation of the proposed facility. This will minimise the visual impact as a result of cleared areas, power line servitudes and areas denuded of vegetation.* *Existing roads should be utilised wherever possible. New roads should be planned taking due cognisance of the topography to limit cut and fill requirements.* *Construction/upgrade of roads should be undertaken properly, with adequate drainage*	**MODERATE -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION

			structures in place to forego potential erosion problems.
			- *In terms of onsite ancillary buildings and structures, these should be planned so that clearing of vegetation is minimised. This implies consolidating this infrastructure as much as possible and making use of already disturbed areas rather than undisturbed sites wherever possible.*
			- *Lighting impacts should be reduced through:*
			  - *Limiting aircraft warning lights to the perimeter turbines;*
			  - *Investigate aircraft warning lights with proximity sensors*
			  - *Limit mounting heights of lighting fixtures, use footlights or bollard level lights;*
			  - *Use down-lighters or shielded fixtures*
			  - *Use motion sensors on security lighting*
			- *Significant heritage resources (buffers, no-go areas, etc.) around farm buildings and graveyards, archaeological sites or complexes should be avoided.*	

CUMULATIVE VISUAL HERITAGE RESOURCES	Visual impact on the historic farmsteads, observers on local roads with scenic qualities, the rural cultural landscape and the archaeological site of Kasteelberg resulting from the densification of wind turbines and expansion of area under wind farm infrastructure.	**HIGH -**	- *The proposed mitigation is the relocation or removal of certain turbines. However, in order to mitigate visual impacts, the developer has relocated seven (7) wind turbines, 5 to the east and 2 to the south of the Vredenburg-Paternoster Road resulting in the cumulative impact remaining HIGH post-mitigation.*	**HIGH -**
VISUAL IMPACT ASSESSMENT				
CLOSE PROXIMITY RESIDENTS & VISITORS - OPERATIONAL	Visual impact on observers (residents at homesteads and visitors/tourists) in close proximity (i.e. within 5km) to the wind turbine structures.	**HIGH -**	- *Natural vegetation must be retained/re-established and maintained in all areas outside of the development footprint/servitude.* - *Existing roads must be used wherever possible and*	**HIGH -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
ROAD USERS	Visual impact on observers travelling along the roads in close proximity (i.e. within 5km) to the wind turbine structures.	**HIGH -**	*the layout and construction of roads and infrastructure must be planned with due cognisance of the topography to limit cut and fill requirements.* *All roads, ancillary buildings and ancillary infrastructure must be planned in such a way that clearing of vegetation is minimised.* *Infrastructure should be consolidated where feasible, and already disturbed sites used rather than undisturbed areas.*	**HIGH -**
MODERATE PROXIMITY RESIDENTS & VISITORS	Visual impact on observers (residents at homesteads and visitors/tourists) in close proximity (i.e. within 5km – 10km) to the wind turbine structures.	**HIGH -**		**HIGH -**
CLOSE PROXIMITY RESIDENTS & VISITORS – CONSTRUCTION PLANNING	Visual impact relating to the planning for construction activities on sensitive visual receptors in close proximity to the proposed BWF.	**MODERATE -**		**LOW -**
KASTEELBERG HILL	Visual impact of wind turbines (west of the Vredenburg-Stompneus Bay road) obstructing views of the Kasteelberg hill and Atlantic seaboard at Paternoster (from this road).	**HIGH -**	*All wind turbines west of the Vredenburg-Stompneus Bay road (13 in total) must be relocated east of the road.* *Note: In order to mitigate visual impacts, the developer has relocated seven (7) wind turbines, 5 to the east and 2 to the south of the Vredenburg-Paternoster Road resulting in a MODERATE negative impact rating after mitigation from HIGH pre-mitigation per the Heritage assessment. We assume the same here.*	**MODERATE -**
LIGHTING - PLANNING	Impact table summarising the significance of visual impact of lighting at night on visual receptors in close to medium proximity to the proposed BWF. Cumulative impacts: The construction of an additional WF may potentially increase the visual impacts associated with light pollution within an otherwise rural setting.	**HIGH -**	*A lighting engineer should be engaged for the to design and planning of the lighting to ensure the correct specification and placement of lighting and light fixtures for the WF and the ancillary infrastructure. The following is recommended:* ○ *Aircraft warning lights to the turbines must be limited to the perimeter of the wind farm according to CAA requirements, thereby reducing the overall impact.* ○ *Aircraft warning lights that only activate when the presence of an aircraft is detected, should be investigated.* ○ *Sources of light should be shielded by*	**MODERATE -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
			physical barriers (walls, vegetation, or the structure itself). ○ *The mounting heights of lighting fixtures should be limited, or alternatively footlights or bollard level lights used.* ○ *Minimum lumen or wattage in fixtures should be used.* ○ *Down-lighters, or shielded fixtures should be used.* ○ *Low Pressure Sodium lighting or other types of low impact lighting should be used.* ○ *Motion detectors on security lighting should be used. This must allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.*	
ANCILLARY INFRASTRUCTURE	Visual impact of the ancillary infrastructure on observers in close proximity to the structures.	**LOW -**	⅄ *Natural vegetation must be retained/re-established and maintained in all areas outside of the development footprint/servitude.*	**LOW -**
SENSE OF PLACE	The potential impact on the sense of place of the region.	**MODERATE -**	⅄ *Natural vegetation must be retained/re-established and maintained in all areas outside of the development footprint/servitude.*	**MODERATE -**
VISUAL QUALITY OF THE LANDSCAPE	The potential cumulative visual impact of the wind farms on the visual quality of the landscape.	**HIGH -**	⅄ *All wind turbines west of the Vredenburg-Stompneus Bay road (13 in total) must be relocated east of the road.* ⅄ *Note: In order to mitigate visual impacts, the*	**HIGH -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
			developer has relocated seven (7) wind turbines, 5 to the east and 2 to the south of the Vredenburg-Paternoster Road but the impact remains HIGH post mitigation.	
CONSTRUCTION PHASE - SPECIALITS				
AVIFAUNAL IMPACT ASSESSMENT				
HABITAT LOSS	Destruction of natural vegetation areas due to platform construction, workstation and substation construction, internal access roads construction, and turbines, underground cabling and overhead power lines installation	**MODERATE -**	*Bird habitat loss should be minimised during construction through the avoidance of infrastructure siting, especially turbines, in the no-go areas, in the layout planning phase, or through the minimisation of the affected areas as far as possible in the activities of clearance and removal of vegetation.* *Existing roads and infrastructure should be used in order to minimise landscape changes. If large portions of no-go areas are affected through the construction of roads etc. (the construction of wind turbines is not possible in these areas), measures should be taken to restore vegetation as soon as possible after construction is completed.* *Movements of machinery, vehicles and persons should be restricted to the existing roads and avoid the existing natural areas.*	**LOW -**
DISTURBANCE / DISPLACEMENT EFFECTS	Disturbance and/or displacement effects due to construction works, noise, human presence and machinery movements	**LOW -**	*Bird disturbance and displacement should be minimised during construction through certain measures, such as avoiding the presence of people and vehicles in the no-go areas as far as possible; whenever possible schedule activities in order to avoid disturbance during the breeding season if any confirmed nests are identified within the study area – the breeding season interruption must be adjusted to the species ecology; lower the levels of noise whenever possible and avoid the destruction*	**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
			or disturbance of identified important features, including waterbodies and/or nests. - *In terms of the Secretary bird nest, 500m around this nest must be considered as a NO-GO area for wind turbine placement. A 2000m buffer should also be considered as a medium sensitive zone around this nest. This requires monitoring (by an ECO) during the construction period (within the buffered area) to identify whether or not the nest is in fact still is use. If confirmed to be in use, then risk situations should be identified that would warrant the reduction of construction operations within the buffered area, temporarily.*	
BAT IMPACT ASSESSMENT				
DISTURBANCE DURING 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 by blasting and the production of dust and noise 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. There are many natural bat roost locations on site which do not provide extensive buffering against noise and dust, such as trees and rock crevices.	**LOW -**	- *The layout of turbines must adhere to the bat assessed layout or consult with a bat specialist regarding any changes.* - *Rocky outcrops and stands of tall trees must be avoided.* - *Blasting must be minimised, as far as possible.* - *Turbines must be sited away from areas of natural vegetation, as far as possible.* - *Data must be collected on bat activity throughout the construction period by a bat specialist.*	**LOW -**
DESTRUCTION OF BAT ROOSTS	Direct Impacts on rocky outcrops or trees could disturb or destroy roosts used by crevice-roosting bats. Such activities could also directly	**LOW -**	*As above*	**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
	result in the fatality of bats roosting within such an outcrop / tree. There are many rocky outcrops and trees scattered across the site which provide potential roosts for crevice roosting bats. Cumulative Impacts: This impact would be cumulative with the historical destruction of rocky outcrops and trees for various types of land use, however, these roosts are not limited in the region and therefore alternative roosts exist for displaced bats.			
LOSS OF HABITAT	Removal of natural vegetation during the construction phase will alter the foraging habitat of local insectivorous bats, as patches of natural vegetation between agricultural lands are important foraging areas for these bats. 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 (Russ & Montgomery, 2002; Cleveland et al., 2006; Sirami et al., 2013). This impact is possible at all patches of natural vegetation, which are scattered across the site. Cumulative Impacts: As the land in the area surrounding the proposed site is highly disturbed and altered (due to agricultural and residential use), the remaining patches of natural vegetation may	**MODERATE -**	*As above*	**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
	be disproportionately important foraging areas for bats (as compared to their relative size) in the region. Therefore, the loss of these important foraging areas would be cumulative with the historical habitat loss due to land use in the area.			
INADVERTENT PROVISION OF NEW BAT ROOSTS	The construction of new buildings and possibly the turbine towers may provide additional roost sites for those species of bat that roost in man-made structures. This may promote bat activity within the WEF and in close proximity to wind turbines, which may, in turn, put bats at risk of turbine-induced mortality (see below). This impact is possible at all locations of newly constructed windfarm buildings. Cumulative Impacts: There are many buildings in the region which may provide roost sites for bats that roost in man-made structures. Increasing the concentration of such structures within the proposed WEF may encourage bat activity at the WEF, and thus increase the risk of fatality. However, the cumulative effect of this impact is low, as bat roosts in man-made structures are not limited in the area.	**LOW -**	⅄ *All new structures, and existing structures within 1km of the turbines, must be bat proofed during the construction period.*	**LOW -**
ECOLOGICAL IMPACT ASSESSMENT				
DESTRUCTION / DISTURBANCE OF INTACT VEGETATION	Impacts on vegetation could occur due to disturbance and vegetation clearing associated with the construction of the facility. Although the footprint largely avoids intact areas, some parts of the development are in close proximity to intact areas and some impact could potentially occur.	**LOW -**	⅄ *No infrastructure such as new roads must traverse intact strandveld patches. Where there are existing roads through these areas, these are likely to be acceptable, but should be confirmed as not impacting any species of concern during the preconstruction walk-through of the facility.* ⅄ *The final layout including roads and underground*	**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
			cables should be subject to a preconstruction walk-through before construction commences and adjusted where required. - *All intact fragments should be considered no-go areas for vehicles as well as personnel during construction.* - *All construction vehicles should adhere to clearly defined and demarcated roads. No off-road driving is to be allowed.* - *Temporary laydown areas should be located within previously transformed areas or areas that have been identified as being of low sensitivity (as is currently the case for the assessed layout).*	
	Disturbance, transformation and loss of habitat will have a negative effect on resident fauna during construction. Due to noise and operation of heavy machinery, faunal disturbance will extend well beyond the footprint and extend into adjacent intact areas, even though there will be no direct habitat loss in these areas. This will be transient and restricted to the construction phase.	**LOW -**	- *Site access should be controlled, and no unauthorised persons should be allowed onto the site.* - *All intact strandveld patches should be considered no-go areas for vehicles and personnel.* - *Any fauna directly threatened by the construction activities should be removed to a safe location by the ECO or other suitably qualified person.* - *The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. Personnel should not be allowed to wander off the demarcated construction site.* - *Fires should not be allowed on site.* - *All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.* - *All construction vehicles should adhere to a low speed limit (30km/h max) to avoid collisions with susceptible species such as snakes and tortoises.*	**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
			If any parts of the facility are to be fenced, then no electrified strands should be placed within 30cm of the ground as some species such as tortoises are susceptible to electrocution from electric fences as they do not move away when electrocuted but rather adopt defensive behaviour and are killed by repeated shocks.	
PROPERTY VALUES, TOURISM & ECONOMIC IMPACT ASSESSMENT				
IMPACTS ON LOCAL PROPERTY PRICES, TOURSIM & ECONOMY	Increase in economic activity during construction. Cumulative impact: Development of the local economy.	**MODERATE +**	*To enhance impacts on the local economy during construction, the project developer should:* ○ *Undertake an audit of local SMMEs that could be used to provide selected services and goods during construction.* ○ *Contract as many local SMMEs as possible, without jeopardising the viability of the project.*	**MODERATE +**
	Creation of temporary employment opportunities during construction.	**MODERATE +**	*To enhance local employment opportunities during construction, the project developer should:* ○ *Employ labour-intensive methods in construction, where feasible, to increase the number of unskilled and low skilled people benefitting from the project's development.* ○ *Undertake a skills audit in the nearby towns of Paternoster, St Helena Bay and Vredenburg and identify the local skills that could be used during the construction phase.* ○ *Employ the local labour, based on their skills and capabilities, as far as feasible.*	**MODERATE +**
	Increased household income and living standards for a temporary period (construction	**MODERATE +**	*To increase household income during construction, the project developer should:*	**MODERATE +**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
	phase).		○ *Identify potential candidates from the local labour pool during construction and train them in-time for the start of operations.* ○ *Employ the local labour, based on their skills and capabilities, as far as feasible.*	
	Effect on government revenue due to initial investment into the project.	**MODERATE +**	⅄ *To enhance government revenue, the project developer should:* ○ *Increase procurement of goods and services from within South Africa as far as feasible (local content).*	**MODERATE +**
	Impact on tourism activities as a result of the wind farm construction phase and increased business tourism in the area. Cumulative impacts: Continued strengthening and support of the local tourism industry.	**LOW +**	⅄ *To enhance tourism during construction, the project developer should:* ○ *Procure local accommodation for out-of-town construction and engineering crew.* ○ *Consider contracting local catering facilities for the provision of catering services.*	**LOW +**
FRESHWATER IMPACT ASSESSMENT				
HABITAT AND ECOLOGICAL STRUCTURE LOSS	FLOODPLAIN WETLAND ⅄ Site clearing and the removal of freshwater habitat. ⅄ Compaction of soils, specifically within gravel roads and the proposed crane pads. ⅄ Site clearing and disturbance of soils, especially due to the high erodibility of soils identified within the CVBWs. ⅄ Potential indiscriminate movement of construction vehicles within the freshwater features. ⅄ Potential disposal of waste and construction material within the freshwater features.	**MODERATE -**	⅄ *All freshwater features should be demarcated as a no-go area, unless at authorised crossing points.* ⅄ *An alien vegetation management plan must be compiled during the planning phase and implemented concurrently with the commencement of construction.* ⅄ *Construction vehicles must be confined to designated roadways and the indiscriminate movement of construction vehicles through terrestrial or wetland habitat falling outside of the construction footprint must be strictly prohibited. This is specifically true for the floodplain wetland where various faunal species have been identified.* ⅄ *Storage of equipment and materials must remain*	**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
	⅄ Potential proliferation of alien and invasive species within the freshwater features.		*within the designated construction areas and may not be left in unauthorised areas.*	
	CHANNELLED VALLEY BOTTOM WETLAND As described above	**MODERATE -**	⅄ *Where crossings are required, they should cross the system at right angles, as far as possible to minimise impacts on the receiving environment, and any areas where bank failure is observed due to the effects of such crossings should be immediately repaired by reducing the gradient of the banks to a 1:3 slope and where necessary, installing support structures. This should only be necessary if existing access roads are not utilised. Construction of these road should follow the design criteria as presented in Appendix E (see Freshwater Impact Assessment report).* ⅄ *During the construction of the new road crossing, a buffer of no more than 5m on either side of the proposed road reserve may be impacted. This area must be cordoned off and no vehicles or personnel are permitted outside of the authorised construction area.* ⅄ *Any exposed soils, specifically where the slope is steeper must be protected by means of covering with a geotextile such as hessian sheeting or Geojute, and/ or stabilised with sandbags.* ⅄ *Regular spraying of non-potable water or, given the current drought conditions, using chemical dust suppressants to reduce dust must be considered mandatory so as to ensure no smothering of wetland vegetation occurs from excessive dust settling.* ⅄ *Any stockpiling of materials should not exceed two (2) metres in height so as to reduce materials being blown away during high wind velocity events.* ⅄ *All alien and invasive vegetation should be removed. Any vegetation removed should be taken*	**LOW -**
	IMPAIRED HILLSLOPE SEEP As described above.	**LOW -**		**LOW -**
	INTACT HILLSLOPE SEEP As described above.	**LOW -**		**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
			to a registered landfill site so as to prevent proliferation of alien and invasive species. • *Unnecessary site clearing/vegetation clearing must be avoided as much as possible.* • *All exposed soils should be revegetated as soon as possible in order to prevent erosion and loss of topsoil.* • *Any cement or concrete mixing must be done within the designated batching area only and must not be mixed within or near any freshwater features or within the 32m zone of regulation.* • *Measures must be put in place to control illegal dumping of construction waste as this may result in the pollution of surface water run-off. Furthermore, no pollution of groundwater resources may occur.* • *Concurrent rehabilitation of the freshwater areas impacted by the proposed wind farm must take place and footprint areas must be minimised as far as possible.*	
ECOLOGICAL & SOCIO-CULTURAL SERVICE PROVISION	FLOODPLAIN WETLAND • Site clearing and further vegetation removal impacting on the biodiversity maintenance of the freshwater environment, the sediment balance and ability to control erosion. • Potential alteration of the hydrological regime, specifically with proposed road crossings, thereby impacting on flood attenuation and streamflow regulation capabilities. • Potential loss of phosphate, nitrate and toxicant removal due to vegetation clearing. • Loss of vegetation resulting in a reduction in breeding and foraging habitat for faunal	**MODERATE -**	• *During normal rainfall conditions the floodplain wetland was observed to have surface water, therefore to prevent upstream ponding as a result of road crossings and to prevent large construction vehicles from getting stuck it is recommended that box culverts should be utilised to cross the watercourse with culverts spanning the entire width if the watercourse in order to ensure the spreading of flow and recharge across the width of the HGM Unit. This is considered essential for the road crossing proposed between turbines 35 and 37.* • *All alien and invasive species must be cleared from the freshwater features as part of the wind farm development. This clearing should focus on the greater freshwater network and not only selective areas.*	**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
	species. • Potential changes to water quality as a result of oil spillage from construction vehicles or concrete spills.			
	CHANNELLED VALLEY BOTTOM WETLAND As described above.	**MODERATE -**		**LOW -**
	IMPAIRED HILLSLOPE SEEP As described above.	**LOW -**		**LOW -**
	INTACT HILLSLOPE SEEP As described above.	**LOW -**		**LOW -**
HYDROLOGICAL FUNCTION & SEDIMENT BALANCE	FLOODPLAIN WETLAND • Site clearing and further removal of vegetation resulting in increased runoff which leads to erosion and alteration of the geomorphology of the freshwater resources. • Excavations of the highly erodible soils, leading to canalization of the freshwater resources, sheet erosion and gully formation. • Movement of construction vehicles within the freshwater environments resulting in soil compaction. • Topsoil stockpiling adjacent to the freshwater resources and runoff from stockpiles leading to sedimentation of the system. • Streamflow diversion and draining water from the freshwater resources resulting in the alteration of hydrological zones.	**MODERATE -**	• *As described in the two sections above* • *Since the floodplain wetlands and channelled valley bottom wetlands are likely to convey more water during the wet winter months, it is imperative that the construction of the proposed new gravel roads must be prioritised during the drier summer months.* • *All existing roads crossings over the wetland features must be assessed and culverts upgraded where necessary to improve the hydrological functioning of the systems within the larger project area.* • *Various road crossings were identified during the site visit where only pipe culverts were utilised. Box culverts are preferred as this allows for water dispersion across the HGM unit while pipe culverts often result in erosion and gully formation due to concentrated flows and insufficient energy dissipation downgradient.*	**LOW -**
	CHANNELLED VALLEY BOTTOM WETLAND As described above.	**MODERATE -**		**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
	IMPAIRED HILLSLOPE SEEP As described above.	**LOW -**		**LOW -**
	INTACT HILLSLOPE SEEP As described above.	**LOW -**		**LOW -**
HERITAGE, ARCHAEOLOGY & PALAEONTOLOGY IMPACT ASSESSMENT				
PALEONTOLOGICAL RESOURCES	Excavations into the bedrock may expose and destroy paleontological resources of scientific value. Impacts to palaeontology are not expected as the proposed layout has been designed to avoid areas considered to be of a high paleontological value.	**LOW -**	⅄ *Given the proximity of potentially fossiliferous deposits to the development footprint and the consequent possibility of fossils being encountered during construction activity, a Chance Fossil Finds Procedure must be implemented and included in the EMPr.*	**LOW -**
PHYSICAL ARCHAEOLOGICAL RESOURCES	Impacts on physical archaeological sites during the construction of the Boulders Wind Farm and associated infrastructure. Impacts on archaeology are not expected as the proposed layout has been designed to avoid sensitive areas.	**LOW -**	⅄ *Accidental archaeological finds during construction must be reported to an archaeologist/ Heritage Western Cape for assessment and action and reported to the appointed archaeologist for assessment and possible action.* ⅄ *Accidently discovered human remains must immediately be reported to the Provincial Heritage Authority in terms of section 36 of the National Heritage Resources Act. The finds should also be reported to the appointed archaeologist for assessment and possible action;* ⅄ *The ECO should be informed of any chance finds.* ⅄ *Some monitoring of the construction activities must be conducted by the archaeologist to determine the effectiveness of the mitigation. This will be at earthmoving stage to ensure that there are not significant buried archaeological resources being exposed.*	**LOW -**
PHYSICAL BUILT ENVIRONMENT HERITAGE RESOURCES	Impacts on the physical built environment heritage resources during the construction of the Boulders Wind Farm and associated infrastructure. Impacts to the built	**LOW -**	⅄ *While every effort has been made to design the layout to avoid the sensitive built environment, accidental impacts during construction are possible, in which case the issue must be reported to an*	**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
	environment are not expected as the proposed layout has been designed to avoid sensitive areas.		*archaeologist/Heritage Western Cape.*	
KNOWN CEMETRIES AND GRAVES	Impacts on known cemeteries and graves during the construction of the Boulders Wind Farm and associated infrastructure. Impacts to graves and cemeteries are not expected as the proposed layout has been designed to avoid the sensitive areas.	**LOW -**	*Every effort has been made to design the layout to avoid known graves. However, the new access road proposed near the Lombard and Pienaar graveyard should be moved west to avoid impacts resulting from the construction and use of the road.*	**LOW -**
CUMULATIVE PALAEONTOLOGICAL RESOURCES	Cumulative impacts to palaeontology are expected to be low as the proposed layout has been designed to avoid sensitive areas	**LOW -**	*Areas with high palaeontological sensitivity should be avoided wherever possible, and appropriate monitoring procedures must be implemented where this is not possible.* *Further, Chance Finds Protocols should be implemented and included in the EMPr to ensure that any fossils encountered during construction activities are reported and managed effectively.*	**LOW -**
CUMULATIEVE ARCHAEOLOGICAL RESOURCES	Cumulative impacts to archaeological and built environment resources, cemeteries and graves are not expected as the proposed layout has been designed to avoid sensitive areas.	**LOW -**	*Pre-screening, site survey and later micro-siting of turbines and infrastructure must be conducted to assist with the identification of significant heritage resources and allow for a responsive layout design and infrastructure placement such that these can be avoided wherever possible.* *Where heritage resources cannot be avoided, and/or infrastructure cannot be repositioned, appropriate mitigation measures should be implemented to ensure the resources are recorded, protected and/or recovered before destruction.*	**LOW -**
NOISE IMPACT ASSESSMENT				
DAY-TIME CONSTRUCTION OF ACCESS ROADS	Increase in ambient sound levels that can raise the ambient sound level with more than 7 dB or daytime noise levels higher than 52 dBA. The proposed access roads must be constructed around 50 m from NSD07 and 70 m from	**LOW -**	*Best practice noise abatement measures must be implemented during the day-time construction of roads.*	**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
	NSD09. The projected noise levels could be as high as 58 Dba when construction activities take place close to the houses, but this impact will be very temporary.			
NIGHT-TIME CONSTRUCTION OF ACCESS ROADS	Increase in ambient sound levels that can raise the ambient sound level with more than 7 dB or night-time noise levels higher than 42 dBA. The proposed access road must be constructed around 50 m from NSD07 and 70 m from NSD09. The projected noise levels could be as high as 58 dBA when construction activities take place close to the houses, but this impact will be very temporary.	**MODERATE -**	⅄ *If the access roads must be constructed during the night-time period, these activities should be limited to areas further than 340m from potential noise-sensitive receptors.* ⅄ *A line of communication should be established to notify all stakeholders and NSDs of the means of registering any issues, complaints or comments.* ⅄ *Potentially sensitive receptors should be notified about work to take place at least 2 days before the activity commences in the vicinity (within 500m) of the NSD. Following information to be presented in writing:* ○ *Description of Activity to take place;* ○ *Estimated duration of activity;* ○ *Working hours;* ○ *Contact details of responsible party.* ⅄ *All equipment must be maintained and fitted with the required noise abatement equipment.* ⅄ *When any valid and reasonable noise complaints are received, noise monitoring should be conducted at the complainant, followed by feedback regarding noise levels measured. A valid and reasonable complaint would be from a receptor staying no further than 2,000m from the closest WTG.* ⅄ *The construction crew must abide by the local by-laws regarding noise.* ⅄ *Construction activities should be minimised when operating within 500m from a potential noise-sensitive receptor.* ⅄ *Where possible construction work should be undertaken during normal working hours (06H00 –*	**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
			22H00), from Monday to Saturday. If agreements can be reached (in writing) with all the surrounding (within a 1,000 distance) potentially sensitive receptors, these working hours can be extended. *Further mitigation options are highlighted in section 11.1.1 of the Noise Impact Assessment report for the developer to consider during the future planning stages to ensure that the significance of the noise impact remain low should roads be constructed during the night-time.*	
DAY-TIME CONSTRUCTION TRAFFIC	Increase in ambient sound levels that can raise the ambient sound level with more than 7 dB or daytime noise levels higher than 52 dBA. Construction traffic can pass around 50 m from NSD07 and 70 m from NSD09. Projected daytime noise levels would be higher than 45 dBA at these receptors. The increased noise levels would last for the duration of the construction period.	**LOW -**	*Significance of noise impact is low for the scenario as conceptualized and mitigation is not required due to the low significance of the impact.*	**LOW -**
NIGHT-TIME CONSTRUCTION TRAFFIC	Increase in ambient sound levels that can raise the ambient sound level with more than 7 dB or night-time noise levels higher than 42 dBA. Construction traffic can pass around 50 m from NSD07 and 70 m from NSD09. Projected night-time noise levels could be as high as 46 dBA at these receptors and could increase potential noise levels higher than 42 dBA at all receptors living closer than around 140m from the access roads. The increased noise levels would last for the duration of the construction period.	**LOW -**	*Significance of noise impact is low for the scenario as conceptualized and mitigation is not required due to the low significance of the impact.*	**LOW -**
DAY-TIME CONSTRUCTION OF WIND TURBINES	Increase in ambient sound levels that can raise the ambient sound level with more than 7 dB or daytime noise levels higher than 52 dBA. The proposed wind turbines will be constructed	**LOW -**	*While the significance of noise impact is low for construction of turbines during the daytime, and mitigation is not required, the activity must be undertaken in a responsible manner.*	**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
	further than 500m from the identified receptors. Projected daytime noise levels could be as high as 45 dBA for a portion of the construction period at NSDs 10 and 07. This is because of cumulative noises from various activities taking place at more than one location close to these receptors.			
NIGHT-TIME CONSTRUCTION OF WIND TURBINES	Increase in ambient sound levels that can raise the ambient sound level with more than 7 dB or night-time noise levels higher than 42 dBA. The proposed wind turbines will be constructed further than 500m from the receptors. Construction activities closer than 340m from receptors will result in noise levels higher than 42 dBA and the sounds may be highly audible during quiet times (including the night-time). Due to cumulative effects (numerous equipment operating simultaneously), noise levels could be as high as 45 dBA at NSDs 10 and 07. While temporary, very high noise levels (especially when it contains impulsive noises) at night could be disturbing and could impact on the quality of sleep of the closest receptors.	**LOW -**	*While the significance of noise impact is low for construction of turbines during the night-time, and mitigation is not critically required, due to multiple construction activities taking place at night at more than one WTG site the impact of nigh-time noise should be reduced by limiting night-time construction activities at one WTG site at a time.* *Further mitigation options are highlighted in section 11.1.1 of the Noise Impact Assessment report for the developer to consider during the future planning stages to ensure that the significance of the noise impact remain low.*	**LOW -**
SOCIAL IMPACT ASSESSMENT				
EMPLOYMENT	Creation of employment, training and business opportunities during the construction phase.	**MODERATE +**	*Where reasonable and practical the proponent must appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. The focus should be on creating employment opportunities for community members from Paternoster and the St Helena Bay area. Due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area;*	**MODERATE +**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
			Where feasible, every effort must be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria; *Before the construction phase commences the proponent must meet with representatives from the local community in Paternoster and St Helena Bay and the SBLM to establish the existence of a skills database for the area. If such as database exists, it must be made available to the contractors appointed for the construction phase;* *The local authorities, relevant community representatives and local farmers should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project.* *A training and skills development programme for suitably qualified local community members must be initiated prior to the initiation of the construction phase. As indicated above, the focus should be on community members from Paternoster and the St Helena Bay area;* *The recruitment selection process must seek to promote gender equality and the employment of women wherever possible.* *The proponent must liaise with the WCDM and SBLM and local small businesses with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g. construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for*	

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
			construction contractors. These companies should be notified of the tender process and invited to bid for project-related work; • *Where possible, the proponent must assist local BBBEE companies to complete and submit the required tender forms and associated information;* • *The WCDM and SBLM, in conjunction with the local business sector and representatives from the local hospitality industry, should identify strategies aimed at maximising the potential benefits associated with the project.*	
PRESENCE OF CONTRUCTION WORKERS	Potential impacts on family structures and social networks associated with the presence of construction workers • An increase in alcohol and drug use; • An increase in crime levels; • The loss of girlfriends and/or wives to construction workers; • An increase in teenage and unwanted pregnancies; • An increase in prostitution; • An increase in sexually transmitted diseases (STDs), including HIV.	**LOW -**	• *The proponent must consider the need for establishing a Monitoring Forum (MF) in order to monitor the construction phase and the implementation of the recommended mitigation measures. The MF must be established before the construction phase commences, and should include key stakeholders, including representatives from the WCDM and SBLM, farmers and the contractor(s). The MF must also be briefed on the potential risks to the local community and farm workers associated with construction workers;* • *The proponent and the contractor(s) must, in consultation with representatives from the MF, develop a code of conduct for the construction phase. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be dismissed. All dismissals must comply with the South African labour legislation;* • *The proponent and contractor (s) must implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase;* • *The contractor must provide transport to and from*	**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
			the site on a daily basis for low and semi-skilled construction workers. This must enable the contractor to effectively manage and monitor the movement of construction workers on and off the site; *Where necessary, the contractors must make the necessary arrangements to enable low and semi-skilled workers from outside the area to return home over weekends and/ or on a regular basis. This would reduce the risk posed to local family structures and social networks;* *No construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.*	
INFLUX OF JOB SEEKERS	Potential impacts on family structures, social networks and community services associated with the influx of job seekers.	**LOW -**	*The proponent should implement a "locals first" policy, specifically with regard to unskilled and low skilled opportunities. The focus should be in communities in Paternoster and St Helena Bay;* *The proponent should implement a training and skills development programme for local community members. The focus should be in communities in Paternoster and St Helena Bay.*	**LOW -**
SAFETY	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 site.	**MODERATE -**	*The proponent must enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase that can be linked to construction activities must be compensated for. The agreement should be signed before the construction phase commences;* *Contractors appointed by the proponent must provide daily transport for workers to and from the site. This would reduce the potential risk of trespassing on the remainder of the farm and adjacent properties;*	**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
			The proponent must hold contractors liable for compensating farmers in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This must be contained in the Code of Conduct to be signed between the proponent, the contractors and neighbouring landowners. The agreement must also cover loses and costs associated with fires caused by construction workers or construction related activities (see below); *Contractors appointed by the proponent must ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.* *Contractors appointed by the proponent must ensure that construction workers who are found guilty of trespassing, stealing livestock and/or damaging farm infrastructure are dismissed and charged. This must be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation;* *The proponent must enter into an agreement with local farmers in the area whereby losses associated with fires that can be proven to be due to construction activities for the Boulders Wind Farm must be compensated for. The agreement must be signed before the construction phase commences;* *Contractor must ensure that open fires on the site for cooking or heating are not allowed except in designated areas;* *No smoking must be permitted on site, except in designated areas;* *Contractor must ensure that construction related*	

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
			activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high risk dry, windy summer months; - *Contractor to provide adequate fire-fighting equipment on-site;* - *Contractor to provide fire-fighting training to selected construction staff.*	
FIRE RISK	Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of fires.	**MODERATE -**	- *The proponent should enter into an agreement with local farmers in the area whereby losses associated with fires that can be proven to be due to construction activities for the WF will be compensated for. The agreement should be signed before the construction phase commences;* - *Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas;* - *No smoking should be permitted on site, except in designated areas;* - *The contractor should ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high risk dry, windy summer months;* - *The contractor must provide adequate fire-fighting equipment on-site;* - *The contractor must provide fire-fighting training to*	**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
			selected construction staff; - *No construction staff, with the exception of security staff, must be accommodated on site over night;* - *As per the conditions of the Code of Conduct, in the event of a fire proven to be caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the fire-fighting costs borne by farmers and local authorities.*	
CONSTRUCTION VEHICLES	Potential safety, dust etc. and damage to road surfaces associated with movement of construction related traffic to and from the site.	**MODERATE -**	- *As far as possible, the transport of components to the site along the N7, R45 and R27 must be planned to avoid weekends and holiday periods, including the spring flower season (August-September);* - *Movement of construction traffic must be limited to weekdays. In addition, the movement of heavy vehicles on the local roads, specifically the Paternoster Road (MR240), must not be permitted after 13h00 on Friday afternoons and before 09h00 on Monday mornings as these are times that are likely to impact on weekend visitors to Paternoster who are either travelling to or leaving Paternoster;* - *The contractor must inform local farmers and representatives from the Vredenburg and Paternoster Local Authority and Tourism Sector of dates and times when abnormal loads must be undertaken;* - *The contractor must ensure that damage caused by construction related traffic to local farm roads is repaired on a regular basis throughout the construction phase. The costs associated with the repair must be borne by the contractor;* - *Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis, adhering to speed limits and*	**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
			ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers; - *All vehicles must be road-worthy, and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits;* - *The Contractor must ensure that workers are informed that no waste can be thrown out of the windows while being transported to and from the site. Workers who throw waste out windows should be fined;* - *The Contractor must be required to collect waste along the road reserve on a weekly basis;* - *Waste generated during the construction phase must be transported to the local registered landfill site.*	
LOSS OF AGRICULTURAL LAND	The activities associated with the construction phase, such as establishment of access/haul roads, the movement of heavy vehicles, the establishment of lay-down areas and foundations for the wind turbines, substations and power lines will potentially damage topsoil and vegetation and result in damage to productive soils.	**MODERATE -**	- *The location of wind turbines, access roads, laydown areas etc. should be informed by the findings of a soil study;* - *The developer should consult with affected property owners in order to enable them to factor construction activities into their rotational land use schedules;* - *The location of wind turbines, access roads, laydown areas etc. should be discussed with the locally affected landowner in the finalisation process and inputs provided should be implemented in the layout as best as possible;* - *The footprint areas for the establishment of individual wind turbines should be clearly demarcated prior to commencement of construction activities. All construction related activities should be confined to the demarcated area and minimised where possible;* - *An Environmental Control Officer (ECO) should be*	**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
			appointed to monitor the establishment phase of the construction phase; - *All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop area etc., should be rehabilitated at the end of the construction phase. The rehabilitation plan should be informed by input from the soil scientist and discussed with the local farmer;* - *The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed. The specifications for the rehabilitation programme should be drawn up the Environmental Consultants appointed to undertake the EIA;* - *The implementation of the Rehabilitation Programme should be monitored by the ECO;* - *All workers should receive training/ briefing on the reasons for and importance of not driving in undesignated areas;* - *EMP measures (and penalties) should be implemented to strictly limit all vehicle traffic to designated roads and construction areas. Under no circumstances should vehicles be allowed to drive into the veld;* - *Disturbance footprints should be reduced to the minimum.* - *Compensation should be paid by the developer to farmers that suffer a permanent loss of land due to the establishment of the WF. Compensation should be based on accepted land values for the area.*	
TRAFFIC IMPACT ASSESSMENT				
TRAFFIC FROM CONSTRUCTION	Gravel loss and damage to the road layer works as a result of additional truck traffic and heavy	**LOW -**	- *Sections along DR2160 should be resurfaced if/where required and regular road maintenance*	**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
VEHICLES	load truck traffic during the construction phase.		*along DR2160 during the construction phase.*	
VISUAL IMPACT ASSESSMENT				
CLOSE PROXIMITY RESIDENTS & VISITORS - CONSTRUCTION	Visual impact of construction activities on sensitive visual receptors in close proximity to the proposed BWF.	**MODERATE -**	*Vegetation must not be unnecessarily removed during the construction period.* *The construction period should be reduced as much as possible through careful logistical planning and productive implementation of resources.* *The placement of lay-down areas and temporary construction equipment camps must be planned in order to minimise vegetation clearing (i.e. in already disturbed areas) where possible.* *The activities and movement of construction workers and vehicles must be restricted to the immediate construction site and existing access roads.* *Rubble, litter, and disused construction materials must be a appropriately stored (if not removed daily) and then disposed of regularly at licensed waste facilities.* *Construction dust should be reduced and controlled using approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).* *Construction activities should be restricted to daylight hours whenever possible in order to reduce lighting impacts.* *All disturbed areas must be rehabilitated immediately after the completion of construction works.*	**LOW -**
OPERATIONAL PHASE - SPECIALITS				

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
AGRICULTURE & SOILS IMPACT ASSESSMENT				
AGRICULTURAL PRODUCTION	Impacts of the BWF on agricultural production potential for either of the two turbine layouts (i.e. the on-farm impacts).	**LOW -**	*Stabilizing of lay-down areas, water run-off lanes along roads and where contours are crossed, appropriate structures must be implemented to make sure they are still functioning well and to prevent any further activity that may be responsible for new water erosion to take place.* *Details of mitigation measures to take into consideration per turbine placing are given in Annexure 1, Tables 6.1 and 6.2 of the Agriculture & Soils Impact Assessment report.*	**LOW +**
AVIFAUNAL IMPACT ASSESSMENT				
COLLISION FATALITIES	Fatalities due to collision with operating wind turbines	**HIGH**	*Bird fatalities should be minimized during operations through the avoidance of infrastructure siting, especially turbines, in the no-go areas (refer to section 3.1 of Avifaunal Impact Assessment report), during the layout planning phase (noting that in terms of the current proposed layout, there are no turbines in no-go areas. Since turbines fall in areas with a medium level of sensitivity to birds, some mitigations measures should be implemented, as well as a monitoring plan during the operational phase - to mitigate fatality. Also, considering the bird movements observed, it is recommended that turbine minimum height of the rotor swept area is not lower than 55m and that rotor diameter does not exceed 120m.* *A bird operational monitoring programme must be developed and implemented to determine the necessity of additional mitigation measures. In terms of additional mitigation to prevent potential fatalities due to collision, current findings do not provide sufficient evidence to implement these additional measures at this stage. However, it is*	**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
			highly recommended that an adaptive management approach is followed during the post-construction monitoring campaign. If any significant fatalities are observed, then it will be important to implement certain measures (designed by the avifaunal specialist), so that these impacts can be reduced. • *Mitigation measures to consider should include: habitat management, and/or turbine shut-down on demand technology, and/or the installation of deter -rence systems.*	
DISTURBANCE / DISPLACEMENT EFFECTS	Disturbance and/or displacement effects due to human presence during maintenance activities	**LOW -**	• *Bird disturbance and displacement should be minimised through implementing certain measures, such as avoid the presence of people and vehicles in the no-go areas as far as possible especially during the breeding season; lower the levels of noise whenever possible and avoid the destruction or disturbance of identified important features, including waterbodies and/or nests.*	**LOW -**
BAT IMPACT ASSESSMENT				
BAT FATALITIES AT OPERATIONAL WIND FARMS	The turning blades of wind turbines may result in bat fatality. This has been attributed to direct collisions with the turbine blades and barotrauma (Baerwald et al. 2008). Consequence: Potential significant declines in local bat populations of species which fly at rotor-sweep height. Currently locally abundant bat species may become locally threatened.	**HIGH -**	• *Bat fatalities must be minimised by siting turbines away from important habitat features for bats, as well as bat roosts (noting that this has already been incorporated into the current proposed layout).* • *Bat fatality data collection and impacts assessment must be conducted during the operational phase in line with relevant good practice guidelines.* • *Further impacts should be mitigated by curtailment plans (once a threshold of fatality is reached): increasing the cut-in speed for specific turbines with high bat fatality rates at specific times of night, under specific environmental conditions when fatality is greatest.*	**MODERATE -**
CUMULATIVE IMPACT	Bat mortality at operating wind turbines: the	**HIGH -**	• *The cumulative impact on bat populations must be*	**HIGH -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
OF MULTIPLE WEF'S IN THE REGION	turning blades of wind turbines may result in bat fatality. This has been attributed to direct collisions with the turbine blades and barotrauma (Baerwald et al. 2008). Consequence: Potential significant declines in local bat populations of species which fly at rotor-sweep height. Currently locally abundant bat species may become locally threatened.		*minimised by siting turbines away from important habitat features for bats, as well as bat roosts.* - *Further impacts should be mitigated by curtailment plans: increasing the cut-in speed for specific turbines with high bat fatality rates at specific times of night, under specific environmental conditions when fatality is greatest.* - *If based on monitoring results the impact is determined to be HIGH, this impact could be reduced to an acceptable level of there is a plan is implemented among the various wind farms to coordinate curtailment measures.*	
ECOLOGICAL IMPACT ASSESSMENT				
DISTURBANCE / DISPLACEMENT EFFECTS	The operation and presence of the facility may lead to disturbance or persecution of fauna within or adjacent to the facility.	**LOW -**	- *No unauthorised persons must be allowed onto the site.* - *Any potentially dangerous fauna such snakes or fauna threatened by the maintenance and operational activities should be removed to a safe location.* - *The collection, hunting or harvesting of any plants or animals at the site or in the surrounding areas must be strictly forbidden.* - *If the site must be lit at night for security purposes, this should be done with low-UV type lights (such as most LEDs), which do not attract insects.* - *All hazardous materials must be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.* - *All vehicles accessing the site should adhere to a low speed limit (40km/h max) to avoid collisions with susceptible species such as snakes and*	**LOW**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
			tortoises.	
BROAD-SCALE ECOLOGICAL PROCESSES	Development of the wind farm may impact CBAs and broad-scale ecological processes such as the ability of fauna to disperse between strandveld patches.	**LOW -**	*An open space management plan should be developed for the site, which should include management of biodiversity within the affected areas, as well as that in the adjacent intact strandveld.*	**LOW -**
CUMULATIVE HABITAT LOSS	The development of the Boulders Wind Farm will potentially contribute to cumulative habitat loss and other cumulative impacts in the greater Vredenburg peninsula area.	**LOW -**	*Further habitat loss and degradation of any intact vegetation fragments must be avoided.* *Sustainable land use practices must be promoted in the area and especially on wind farm properties to improve the quality of the habitat for fauna and flora. Reducing grazing pressure on intact remnants is identified as a particularly important mitigation measure to improve habitat quality.* *Alien species of flora as well as fauna must be managed to ensure that they do not have a broadly negative impact.*	**LOW -**
PROPERTY VALUES, TOURISM & ECONOMIC IMPACT ASSESSMENT				
IMPACTS ON LOCAL PROPERTY PRICES, TOURSIM & ECONOMY	Potential loss of tourists as a result of the wind farm development and changes in the value of scenery. Cumulative impacts: Extension of product offerings in the area and the attraction of new visitors.	**LOW -**	*To mitigate impacts on tourism during operations, the project developer should:* ○ *Work with the local tourism attractions and local tourism association to develop new forms of tourism such as "energy tourism" that appeals to domestic tourists with younger children or young population as well as those who are pro-active supporters of green and clean energy.* ○ *Set-up a world-class visitors' centre to create an additional attraction in the area targeting young population and families with children during public holidays (and the months associated with low visitation numbers – March/April and June/July).*	**LOW -**
	Effect on property prices due to the perceived	**LOW -**	*To mitigate impacts on property prices during*	**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
	negative impact of the wind farm development.		*operations, the project developer should:* ○ *Devise and implement awareness campaigns around impacts of wind farms on property values* ○ *Organise information sharing forums/talks for property owners and interested property investors attended by property specialists and real estate agents.* ○ *Share information on other studies conducted globally with specific focus of impact of wind farms on property values.*	
	Contribution to the growth of the local and provincial economies for the duration of the Boulders Wind Farm operation phase.	**MODERATE +**	⅄ *To enhance impacts on the local economy during operations, the project developer should:* ○ *Undertake an audit of local SMMEs that could be used to provide selected services and goods during operation (i.e. security, transportation, land clearance and road maintenance, etc.).* ○ *Contract local SMMEs for on-site related non-technical activities.*	
	Stimulate local economic development in the communities within a 50km radius. Cumulative impact: Development of the local economy.	**MODERATE +**	⅄ *To enhance impacts on the local economy during operations, the project developer should:* ○ *Develop a detailed three-year with a clear outline of the projects that are to be supported or invested in during that period; the plan, though needs to eb reviewed annually and updated.* ○ *When deciding on the projects to be included in the annual plans, consideration needs to be given to projects located in Paternoster and in St Helena and Britannica Heights to ensure that benefits are more equally distrusted among the*	**MODERATE +**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
			affected parties. ○ *Any project identified to be included in the plan needs to be consulted about and approved by the community from the area where the project is to be implemented. Moreover, the community should be engaged with during the project identification and planning stage to ensure that is responds to their most prominent needs and receives a buy-in.*	
	Creation of sustainable employment opportunities during operations.	**MODERATE +**	⅄ *To enhance impacts on the local economy during operations, the project developer should:* ○ *Employ from the local labour pool as far as feasible.* ○ *Identify potential candidates from the local labour pool during construction and train them in-time for the start of operations.* ○ *Increase procurement of goods and services from within South Africa as far as feasible (local content).*	**MODERATE +**
	Improved household income and living standards during operation.	**MODERATE +**		**MODERATE +**
HERITAGE, ARCHAEOLOGY & PALAEONTOLOGY IMPACT ASSESSMENT				
VISUAL IMPACTS ON HERITAGE RESOURCES	Visual impact on scenic qualities of the Vredenburg-Stompneus Bay Road, the Paternoster-Stompneus Bay Road and the built environment heritage of Rooiheuwel and Boebesakskraal farmsteads.	**MODERATE -**	⅄ *The general appearance of the facility as a whole must be maintained.* ⅄ *Note: In order to mitigate visual impacts, the developer has relocated seven (7) wind turbines, 5 to the east and 2 to the south of the Vredenburg-Paternoster Road resulting in a MODERATE negative impact rating pre and post mitigation.*	**MODERATE -**
NOISE IMPACT ASSESSMENT				
DAY-TIME OPERATION OF WIND TURBINES	Increase in ambient sound levels that can raise the ambient sound level with more than 7 dB or daytime noise levels higher than 52 dBA. The proposed wind turbines are located further than 500m from the structures identified as	**LOW -**	⅄ *No mitigation proposed.*	**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
	possible houses, but cumulative effects due to numerous wind turbines operating within 1,000m these dwellings would increase noise levels. Ambient sound level measurements highlighted average daytime sound levels of more than 50 dBA.			
NIGHT-TIME OPERATION OF WIND TURBINES	Increase in ambient sound levels that can raise the ambient sound level with more than 7 dB or night-time noise levels higher than 42 dBA. The proposed wind turbines are located further than 500m from the receptors, but cumulative effects due to numerous wind turbines operating simultaneously within 2,000m from a receptor would increase noise levels. Without mitigation: In the unmitigated scenario, noise rating levels could be as high as 45 dBA at NSDs 07 (45 dBA), 08 (44.4 dBA), 09 (44.4 dBA) and 10 (44.6 dBA). This is a cumulative effect due to multiple WTG operating within 2,000m from these receptors. The change in ambient sound levels may be higher than 7 dB between wind speeds of 5 and 7 m/s. Ambient sound level measurements highlighted average night-time sound levels of more than 45 dBA. With mitigation: Projected noise rating levels will be less than 45 dBA at all receptors. Cumulative noise impacts from the WCO may change the modelled noise levels up to 1 dB, but this may result in noise levels higher than 45 dBA at NSD07 and 10.	**MODERATE -**	⅄ *No structures located within the 45dBA noise rating level contour should be used for residential use.* ⅄ *Further mitigation is available and highlighted in section 11.2.1 of the Noise Impact Assessment Report, with the relocation of WEC 16 recommended (further than 800m from these NSD). However, the developer commits to investigate whether the receptors at 7, 8, 9 and 10 are permanently used for nighttime inhabitation. If that is the case the developer commits to obtain acceptance from the residents or assess whether the turbine specifically increase the noise level above 45dB at 8m/s wind speed at nighttime. If that is the case the developer commits to operate the turbines within the set threshold up to 45 dB at 8 m/ s during night-time.*	**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
SOCIAL IMPACT ASSESSMENT				
CLEAN ENERGY	Development of infrastructure to generate clean, renewable energy.	**HIGH +**	*A skills development and training programme aimed at maximizing the number of employment opportunities for local community members, should be implemented. As indicated above, the focus should be in community members from Paternoster and St Helena Bay;* *Maximise opportunities for local content, procurement and community shareholding should be maximised;* *Consideration should be given to the establishment of a visitor centre. As indicated in the literature review, visitor centres in Scotland have attracted large numbers of visitors to wind farms.*	**HIGH +**
EMPLOYMENT	Creation of employment and business opportunities associated with the operation phase.	**MODERATE +**	*The proponent should implement a training and skills development programme for locals during the first 5 years of the operation phase. The aim of the programme should be to maximise the number of South African's and locals employed during the operation phase of the project. The focus should be on community members from Paternoster and St Helena Bay;* *The proponent, in consultation with the WCDM and SBLM, should investigate the options for the establishment of a Community Development Trust.*	**MODERATE +**
INCOME FOR LANDOWNERS	The generation of additional income represents a significant benefit for the local affected farmer(s) and reduces the risks to their livelihoods posed by droughts and fluctuating market prices for products and farming inputs, such as feed etc.	**MODERATE +**	*The relevant lease agreements between the proponent and the landowners must be put in place and signed off prior to commencement.*	**MODERATE +**
SOCIO-ECONOMIC BENEFITS: LOCAL COMMUNITY	SED initiatives funded by revenue generated from the sale of energy. The revenue can be used to fund local community development.	**LOW +**	*The focus of the SED initiatives, including the Community Trust, should be on supporting initiatives in Paternoster and the St Helena Bay*	**MODERATE +**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
	⅄ Creation of jobs; ⅄ Education; ⅄ Support for and provision of basic services; ⅄ School feeding schemes; ⅄ Training and skills development; ⅄ Support for SMME's.		*area;* ⅄ *The WCDM, SBLM and registered local community organisations with a proven track record should be consulted as to the structure and identification of potential projects to be supported by the SED initiatives. The key departments in the WCDM and SBLM that should be consulted include the Municipal Managers Office, IDP Manager and LED Manager;* ⅄ *Clear criteria for identifying and funding SED projects and initiatives in the area should be identified. The criteria should be aimed at maximising the benefits for the community as a whole and not individuals within the community;* ⅄ *Strict financial management controls, including annual audits, should be instituted to manage the funds generated for the Community Trust from the WF.*	
VISUAL IMPACT ON SENSE OF PLACE: HIA AND VIA	Visual impact associated with the proposed WF and the potential impact on the areas rural sense of place and character	**HIGH -**	⅄ *The proponent should consider the establishment of a visitor centre should the BWF be approved.* ⅄ *Note: In order to mitigate visual impacts, the developer has relocated seven (7) wind turbines, 5 to the east and 2 to the south of the Vredenburg-Paternoster Road, but the impact remains HIGH post mitigation.*	**HIGH -**
VISUAL IMPACT ON SENSE OF PLACE: INTERVIEWS	Visual impact associated with the proposed WF and the potential impact on the areas rural sense of place and character	**LOW -**	⅄ *As above.*	**LOW -**
PROPERTY VALUES	Potential impact on general property values in the area due to visual impact associated with the proposed WF.	**LOW -**	⅄ *Refer to mitigation measures in the property values, tourism and economic impact assessment above.*	**LOW -**
TOURISM	Potential impact of the wind energy facility on local tourism. Hindrance to tourism.	**LOW -**		**LOW -**
TOURISM	Potential impact of the wind energy facility on	**LOW +**		**LOW +**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
	local tourism. Tourism attraction.			
TRAFFIC IMPACT ASSESSMENT				
TRAFFIC FROM MAINTENANCE VEHICLES	Gravel loss along DR2160.	**LOW -**	*Routine road maintenance should be conducted by the relevant Roads Authority.*	**LOW -**
VISUAL IMPACT ASSESSMENT				
RESIDENTS & VISITORS	Visual impact on observers (residents at homesteads and visitors/tourists) in close proximity (i.e. within 5km) to the wind turbine structures	**HIGH -**	*The general good appearance of the facility as a whole, including the turbines, servitudes and the ancillary buildings, must be maintained throughout the life of the wind farm.* *All roads and servitudes must be maintained to avoid erosion and to suppress dust.* *Rehabilitated areas must be monitored as and when required to ensure implement remedial action has been properly implemented.* *Note: In order to mitigate visual impacts, the developer has relocated seven (7) wind turbines5 to the east and 2 to the south of the Vredenburg-Paternoster Road, but the impact remains HIGH post mitigation.*	**HIGH -**
ROAD USERS	Visual impact on observers travelling along the roads in close proximity (i.e. within 5km) to the wind turbine structures.	**HIGH -**		**HIGH -**
MODERATE PROXIMITY RESIDENTS & VISITORS	Visual impact on observers (residents at homesteads and visitors/tourists) in close proximity (i.e. within 5km – 10km) to the wind turbine structures.	**HIGH -**		**HIGH -**
SHADOW FLICKER	Visual impact of shadow flicker on sensitive visual receptors in close proximity to the proposed BWF.	**LOW -**	*Not Applicable due to the low probability of occurrence*	**LOW -**
LIGHTING - OPERATIONAL	Visual impact of lighting at night on visual receptors in close to medium proximity to the proposed BWF. Cumulative impacts: The construction of an additional WF may potentially increase the visual impacts associated with light pollution within an otherwise rural setting.	**HIGH -**	*Aircraft warning lights to the turbines must be limited to the perimeter of the wind farm according to CAA requirements, thereby reducing the overall impact.* *Aircraft warning lights that only activate when the presence of an aircraft is detected, should be investigated.* *Sources of light should be shielded by physical barriers (walls, vegetation, or the structure itself).* *The mounting heights of lighting fixtures should be limited, or alternatively footlights or bollard level*	**MODERATE -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
			lights used. • *Minimum lumen or wattage in fixtures should be used.* • *Down-lighters, or shielded fixtures should be used.* • *Low Pressure Sodium lighting or other types of low impact lighting should be used.* • *Motion detectors on security lighting should be used. This must allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.*	
ANCILLARY INFRASTRUCTURE	Visual impact of the ancillary infrastructure on observers in close proximity to the structures.	**LOW -**	• *The general good appearance of the facility as a whole, including the turbines, servitudes and the ancillary buildings, must be maintained throughout the life of the wind farm.*	**LOW -**
SENSE OF PLACE	The potential impact on the sense of place of the region.	**MODERATE -**	• *As above.*	**MODERATE -**
DECOMMISSIONING PHASE - SPECIALITS				
AVIFAUNAL IMPACT ASSESSMENT				
DISTURBANCE / DISPLACEMENT EFFECTS	Disturbance and/or displacement effects due to decommissioning works, noise, human presence and machinery movements	**LOW -**	• *Bird disturbance and displacement must be minimised through implementing certain measures, such as avoiding the presence of people and vehicles in the no-go areas as far as possible; whenever possible schedule activities in order to avoid disturbance during the breeding season if any confirmed nests are identified within the study area – the breeding season interruption must be adjusted to the species ecology; lower the levels of noise whenever possible and avoid the destruction or disturbance of identified important features, including waterbodies and/or nests.*	**LOW -**
PROPERTY VALUES, TOURISM & ECONOMIC IMPACT ASSESSMENT				
ECONOMIC OPPORTUNITIES	Increased production due to decommissioning activities and recovery of valuable resources	**LOW +**	• *A material recovery strategy should be developed and implemented to optimise the use of valuable*	**MODERATE +**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
	through recycling.		*metallic materials comprising various components of the wind farm.* *Services must be procured from local construction business, where feasible.*	
HERITAGE, ARCHAEOLOGY & PALAEONTOLOGY IMPACT ASSESSMENT				
VISUAL IMPACTS ON HERITAGE RESOURCES	Visual impact on scenic qualities of the Vredenburg-Stompneus Bay Road, the Paternoster-Stompneus Bay Road and the built environment heritage of Rooiheuwel and Boebesakskraal farmsteads.	**MODERATE -**	*All infrastructure not required for the post-decommissioning use of the servitude must be removed from site.* *All areas must be rehabilitated in consultation with an ecologist.*	**MODERATE -**
TRAFFIC IMPACT ASSESSMENT				
TRAFFIC FROM DECOMMISSIONING VEHICLES	Gravel loss and damage to the road layer works as a result of additional truck traffic and heavy load truck traffic during the decommissioning phase.	**LOW -**	*Sections along DR2160 should be resurfaced if/where required once the decommissioning has been completed.*	**LOW -**
VISUAL IMPACT ASSESSMENT				
RESIDENTS & VISITORS	Visual impact on observers (residents at homesteads and visitors/tourists) in close proximity (i.e. within 5km) to the wind turbine structures	**HIGH -**	*All infrastructure not required for the post-decommissioning use of the servitude must be removed from site.* *All areas must be rehabilitated in consultation with an ecologist and the rehabilitation monitored for at least a year after decommissioning has been completed.*	**LOW -**
ROAD USERS	Visual impact on observers travelling along the roads in close proximity (i.e. within 5km) to the wind turbine structures.	**HIGH -**		**LOW -**
MODERATE PROXIMITY RESIDENTS & VISITORS	Visual impact on observers (residents at homesteads and visitors/tourists) in close proximity (i.e. within 5km – 10km) to the wind turbine structures.	**HIGH -**		**LOW -**
ANCILLARY INFRASTRUCTURE	Visual impact of the ancillary infrastructure on observers in close proximity to the structures.	**LOW -**		**LOW -**
SENSE OF PLACE	The potential impact on the sense of place of the region.	**MODERATE -**		**LOW -**
NOISE IMPACT ASSESSMENT				
NOISE DURING SITE DECONSTRUCTION	Deconstruction activities could generate some noise	**MODERATE -**	*Machinery that causes noise must only be operated at appropriate times (during the day and at normal*	**LOW -**

ISSUE	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION
			working hours).	

10.1.1 General impacts

An analysis of the distribution of impacts indicates that the bulk of the mitigation effort should be placed on the Planning & Design Phase (Table 10-3). The Planning & Design Phase was assessed as the highest impacting phase with 10 pre-mitigation impacts rated as HIGH negative and one as VERY HIGH negative.

These impacts related to issues such as:

- Planning for stormwater management;
- Planning for soil erosion;
- Environmental, legal and policy compliance;
- Waste management; and
- Risk of runaway fires.

However, all of the general negative impacts could be mitigated to either LOW negative or MODERATE negative.

The VERY HIGH positive impacts relate to the greenhouse gas emissions mitigation potential amounting to about 18 million tons of CO_2 equivalents over the life of the project.

Table 10-3. General Impact Summary

DESIGN PHASE	PRE-MITIGATION								POST-MITIGATION							
	LOW		MODERATE		HIGH		VERY HIGH		LOW		MODERATE		HIGH		VERY HIGH	
Positive/Negative	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+
Planning & Design	1	1	4		6				10	1	1					
Construction	3		12		2		1		16		2					
Operations			4		2			1	5		1					1
Decommissioning	1	1	4						5	1						
TOTAL	**5**	**2**	**20**		**10**		**1**	**1**	**36**	**2**	**4**					**1**

10.1.2 Agriculture & Soils

Of the two impacts identified during the Agricultural Impact Assessment, one was rated as LOW negative (post mitigation), with one LOW positive (post mitigation) impact (Table 10-4).

Table 10-4. Agriculture & Soils Impact Summary

DESIGN PHASE	PRE-MITIGATION								POST-MITIGATION							
	LOW		MODERATE		HIGH		VERY HIGH		LOW		MODERATE		HIGH		VERY HIGH	
Positive/Negative	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+
Planning & Design					1				1							
Construction																
Operations	1									1						
Decommissioning																
TOTAL	**1**				**1**				**1**	**1**						

10.1.3 Avifaunal impacts

The Avifaunal Impact Assessment rated the all five impacts as LOW post-mitigation (Table 10-5).

Table 10-5. Avifaunal Impact Summary

DESIGN PHASE	PRE-MITIGATION								POST-MITIGATION							
	LOW		MODERATE		HIGH		VERY HIGH		LOW		MODERATE		HIGH		VERY HIGH	
Positive/Negative	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+
Planning & Design																
Construction	1		1						2							
Operations	1				1				2							

Decommissioning	1								1							
TOTAL	**3**		**1**		**1**				**5**							

10.1.4 Bats impacts

The Bat Impact Assessment rated two operation impacts as HIGH pre-mitigation. These related to:

- Bat fatalities during foraging and during migration; and
- The cumulative impacts of multiple wind farms in the region.

With tailored operation of the turbines, where they are stationary during critical periods, and the relocation of turbines within sensitive areas, the impact on causing bat fatalities reduced to MODERATE. With respect to cumulative impacts, these can be mitigated by regional coordinated curtailments should the monitoring data confirm high levels of fatalities.

The majority of the remaining bat impacts can be mitigated to LOW post-mitigation (Table 10-6). However, the cumulative impacts of multiple wind farms on bat fatalities in the region remains HIGH. However, if monitoring results show the impact to be HIGH, this could be reduced to an acceptable level if Boulders Wind Farm develops and implements curtailment measures deemed to be appropriate by DEA.

Table 10-6. Bat Impact Summary

DESIGN PHASE	PRE-MITIGATION								POST-MITIGATION							
	LOW		MODERATE		HIGH		VERY HIGH		LOW		MODERATE		HIGH		VERY HIGH	
Positive/Negative	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+
Planning & Design	1								1							
Construction	3		1						4							
Operations					2						1		1			
Decommissioning																
TOTAL	**4**		**1**		**2**				**5**		**1**		**1**			

10.1.5 Ecological

All impacts were rated as LOW pre- and post-mitigation.

Table 10-7. Ecological Impact Summary

DESIGN PHASE	PRE-MITIGATION								POST-MITIGATION							
	LOW		MODERATE		HIGH		VERY HIGH		LOW		MODERATE		HIGH		VERY HIGH	
Positive/Negative	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+
Planning & Design																
Construction	2								2							
Operations	3								3							
Decommissioning																
TOTAL	**5**								**5**							

10.1.6 Property Values, Tourism and Economic

Most of the property, tourism and economic impacts will be MODERATELY positive. Implementation of the suggested mitigation measures would allow for all of the impacts to be mitigated to MODERATE positive significance and mostly relate to the stimulation of the local economy through job creation and provision of other services locally.

The two LOW negative impacts, pre and post mitigation, relate to impacts on local property prices and local tourism.

Table 10-8. Property Values, Tourism and Economic Impact Summary

DESIGN PHASE	PRE-MITIGATION				POST-MITIGATION			
	LOW	MODERATE	HIGH	VERY HIGH	LOW	MODERATE	HIGH	VERY HIGH

Positive/Negative	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+
Planning & Design																
Construction		1		4						1		4				
Operations	2			4					2			4				
Decommissioning		1										1				
TOTAL	**2**	**2**		**8**					**2**	**1**		**9**				

10.1.7 Freshwater

Implementation of the suggested mitigation measures would allow for all 12 impacts to be mitigated to LOW negative significance.

Table 10-9. Freshwater Impact Summary

DESIGN PHASE	PRE-MITIGATION								POST-MITIGATION							
	LOW		MODERATE		HIGH		VERY HIGH		LOW		MODERATE		HIGH		VERY HIGH	
Positive/Negative	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+
Planning & Design																
Construction	6		6						12							
Operations																
Decommissioning																
TOTAL	**6**		**6**						**12**							

10.1.8 Heritage, Archaeology & Palaeontology

The Heritage Impact Assessment identified one HIGH impact which remains HIGH post mitigation. This impact relates to cumulative visual impact of multiple wind farms in the region on visual heritage resources. The remaining negative impacts are LOW (6) and MODERATE (3) pre and post mitigation. (Table 10-10).

Table 10-10. Heritage, Archaeology & Palaeontology Impact Summary

DESIGN PHASE	PRE-MITIGATION								POST-MITIGATION							
	LOW		MODERATE		HIGH		VERY HIGH		LOW		MODERATE		HIGH		VERY HIGH	
Positive/Negative	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+
Planning & Design			1		1						1		1			
Construction	6								6							
Operations			1								1					
Decommissioning			1								1					
TOTAL	**6**		**3**		**1**				**6**		**3**		**1**			

10.1.9 Noise

All impacts identified in the Noise Impact Assessment were rated as LOW post-mitigation (Table 10-11.

Table 10-11. Noise Impact Summary

DESIGN PHASE	PRE-MITIGATION								POST-MITIGATION							
	LOW		MODERATE		HIGH		VERY HIGH		LOW		MODERATE		HIGH		VERY HIGH	
Positive/Negative	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+
Planning & Design																
Construction	5		1						6							
Operations	1		1						2							
Decommissioning			1						1							
TOTAL	**6**		**3**						**9**							

10.1.10 Social

The greatest social benefits from the project were identified in the Operations Phase and relate mostly to job creation and skills development. The project has the potential to provide great economic benefits during the operational phase. The HIGH negative social impact associated with the loss of sense of place due to the visual impacts of the wind farm, remains HIGH post mitigation, as it cannot be

effectively mitigated (Table 10-12). The social benefits associated with clean renewable energy is rated a HIGH positive.

Table 10-12. Social Impact Summary

DESIGN PHASE	PRE-MITIGATION								POST-MITIGATION							
	LOW		MODERATE		HIGH		VERY HIGH		LOW		MODERATE		HIGH		VERY HIGH	
Positive/Negative	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+
Planning & Design																
Construction	2		4	1					6			1				
Operations	3	2		2	1	1			3	1		3	1	1		
Decommissioning																
TOTAL	**5**	**2**	**4**	**3**	**1**	**1**			**9**	**1**		**4**	**1**	**1**		

10.1.11 Traffic

All impacts identified in the Traffic Impact Assessment were rated as LOW post-mitigation (Table 10-13.

Table 10-13. Traffic Impact Summary

DESIGN PHASE	PRE-MITIGATION								POST-MITIGATION							
	LOW		MODERATE		HIGH		VERY HIGH		LOW		MODERATE		HIGH		VERY HIGH	
Positive/Negative	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+
Planning & Design																
Construction	1								1							
Operations	1								1							
Decommissioning	1								1							
TOTAL	**3**								**3**							

10.1.12 Visual

The Visual Impact Assessment indicated that very little mitigation is available to limit the impacts of such large structures on the surrounding areas. No mitigation methods were proposed that could effectively mitigate any of the impacts. Seven impacts (essentially the same issue) remain HIGH post mitigation and relate to the intrusion of large highly visible wind turbines on the existing views of sensitive visual receptors (Table 10-14).

Table 10-14. Visual Impact Summary

DESIGN PHASE	PRE-MITIGATION								POST-MITIGATION							
	LOW		MODERATE		HIGH		VERY HIGH		LOW		MODERATE		HIGH		VERY HIGH	
Positive/Negative	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+
Planning & Design	1		2		6				2		3		4			
Construction			1						1							
Operations	2		1		4				2		2		3			
Decommissioning	1		1		3				5							
TOTAL	**4**		**5**		**13**				**10**		**5**		**7**			

11.SENSITIVITY ANALYSIS

A site development sensitivity map (Figure 11-1) was developed based on specialist and general site information gathered, and the site was classified into areas of low and conditional sensitivity and **NO-GO** no development).

- **NO-GO** areas included areas of high sensitivity indicated by the bird and bat specialists (specific to turbines, rather than roads), identified heritage sites and buffers around existing infrastructure (including a 500m buffer around all noise sensitive areas).
- **Conditional Sensitivity** areas are areas where construction is conditional on the fulfilment of one or other aspect-specific requirement. For example, all construction in the Heritage conditional sensitivity areas will require sign-off by a palaeontologist in order to ensure that no fossils (if found) are damaged or destroyed. Other conditional sensitivity areas include areas of moderate sensitivity identified by the bird and bat specialist and ecologically sensitive areas such as watercourses, wetlands and thicket vegetation.
- **Low Sensitivity** areas are areas where construction may take place without hindrance.

NOTE: that the individual layers that make up the consolidated sensitivity map are provided at Appendix A-4.

The main objective of the sensitivity analysis is to guide development away from sensitive areas and have development footprints located in areas of lower sensitivity. We have previously used the terms go area; do-but area; and no-go area.

The limitation of the above is that a no-go area is just that – one cannot ever do anything in this area, because its **no-go.** But in certain cases, development is required. A road crossing over a stream, or some other linear infrastructure, which can be developed, provided there is sound mitigation and other constraints are applied. So, it's not no-go but developmentally constrained.

It is therefore preferable to use and map the following categories:

Low constraint - These areas can be easily developed, as there are only minor constraints, and little mitigation and management is required (aside from normal building design and construction restrictions outlined in the EMP).
Moderate constraint - These areas can accommodate development, but there are constraints. Mitigation and management will be required to reduce significant environmental impacts to acceptable levels, and appropriate technology (sewage, waste etc.) and design will be required to reduce impacts and ensure sustainability. Sound arguments as to why the development cannot be located in less sensitive areas will be required to justify locating development in moderately constrained areas.
High constraint **-** If development takes place in these areas, considerable effort (and most likely expense) will be required to design out, mitigate or manage negative environmental impacts. In many cases this will not be possible and in general no development should take place in these areas. Only facilities that are location dependent should be permitted in these areas. For example, a road crossing a sensitive riparian area, or a mine pit that must be located where the resources are.

In response to the site development sensitivity analysis conducted on the Draft Layout, Vredenburg Windfarm (Pty) Ltd revised the Boulders Wind Farm project layout and provided a Final Layout (Alternative 2) (Figure 11-1). Figure 11-2 represents the Boulders Wind Farm layout changes in response to site sensitivities - a) Draft Turbine Layout and b) Final Turbine Layout. Figure 11-3 illustrates the specialist specific site sensitives identified. Table 11-1 compares the two layouts, indicating the

reasoning behind the layout changes. No turbines in the Final Layout occur within any of the **NO-GO** areas.

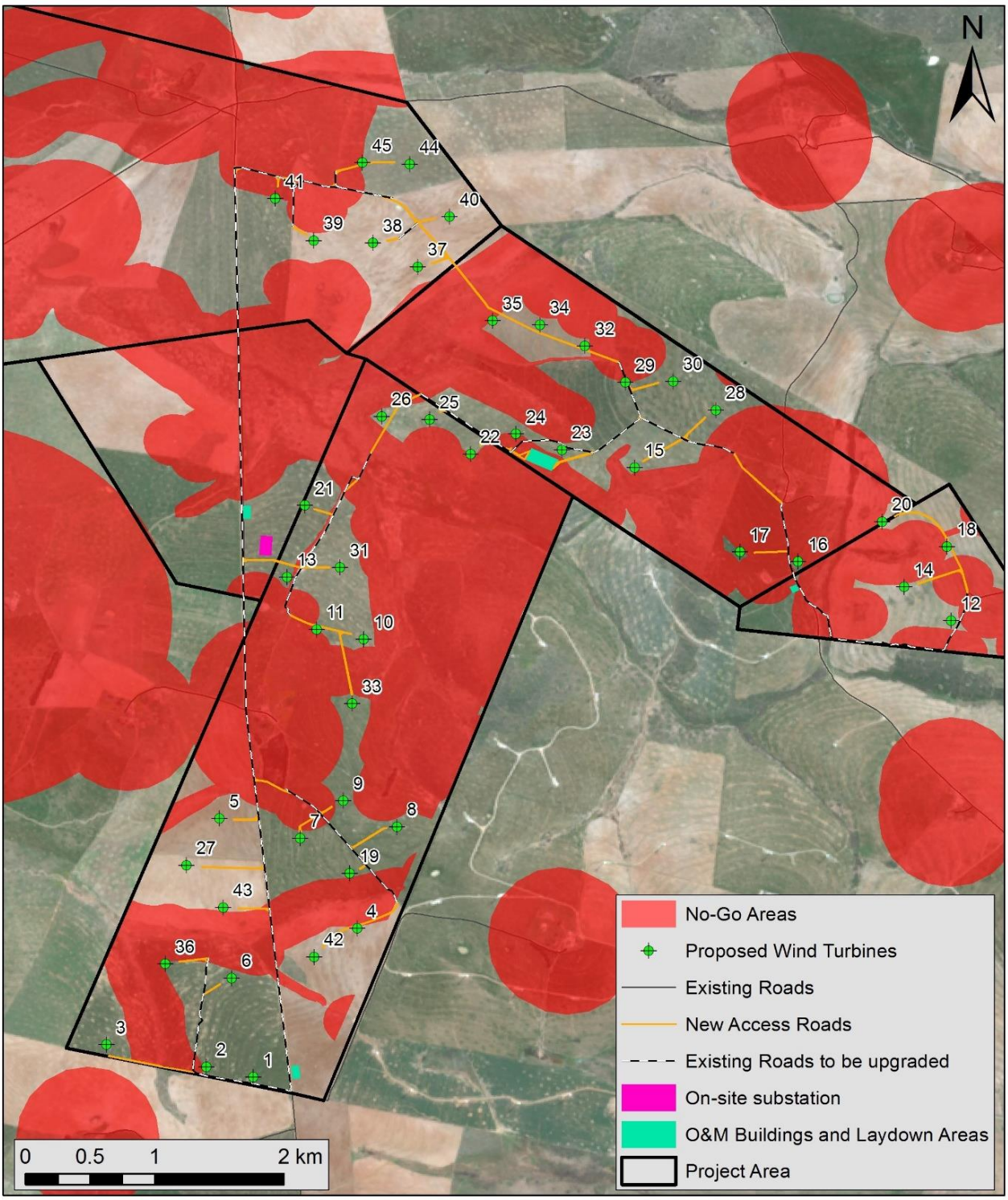

Figure 11-1: Final Layout for the proposed Boulders Wind Farm

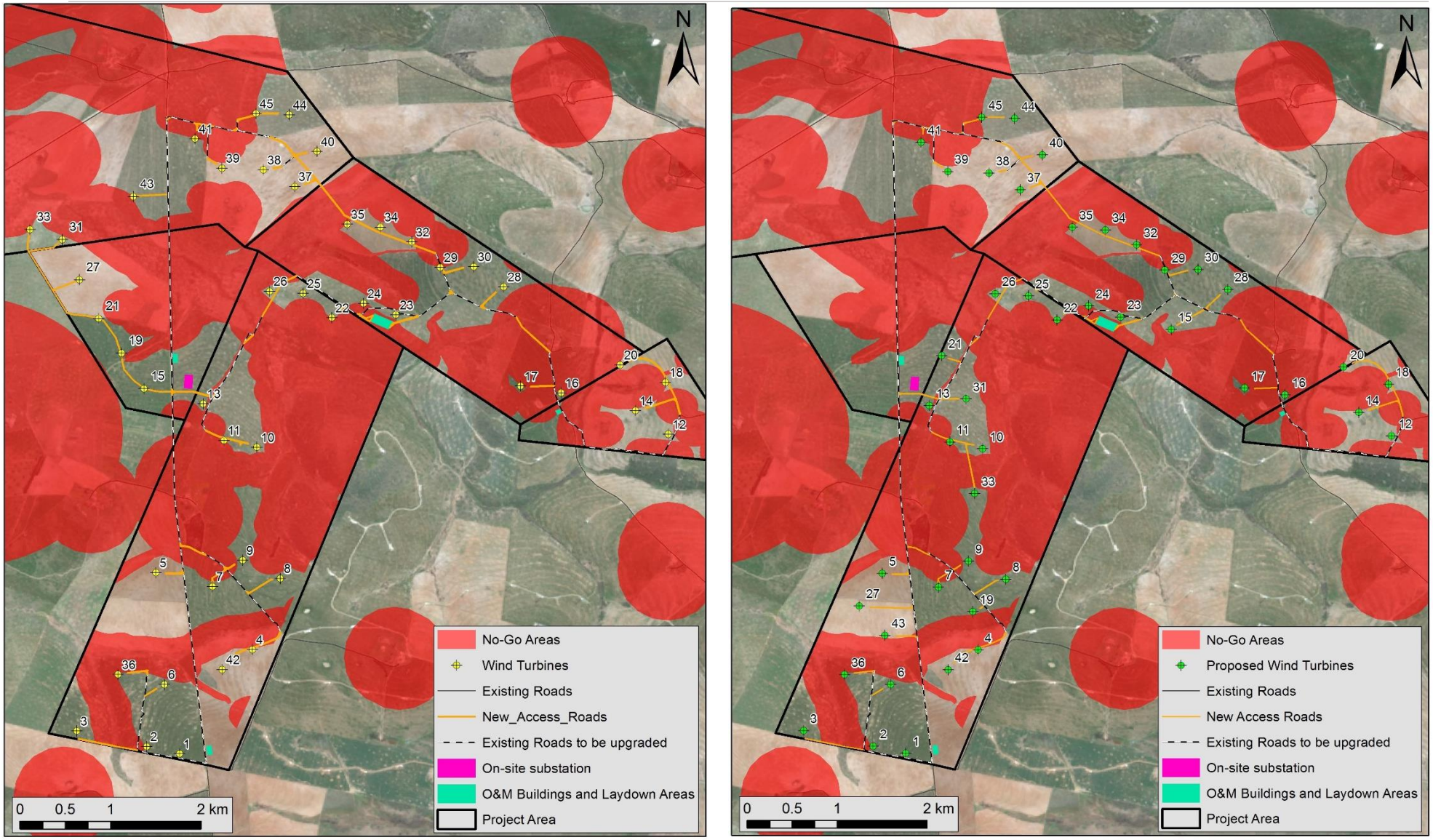

Figure 11-2: Draft Layout vs Final Layout

Figure 11-3: Specialist Specific Site Sensitivities

Table 11-1. Comparison of Layouts: Reason for Changes

	DRAFT LAYOUT	FINAL LAYOUT	COMMENT	REASON
1	WTG01	WTG01	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
2	WTG02	WTG02	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
3	WTG03	WTG03	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
4	WTG04	WTG04	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
5	WTG05	WTG05	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
6	WTG06	WTG06	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
7	WTG07	WTG07	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
8	WTG08	WTG08	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
9	WTG09	WTG09	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
10	WTG10	WTG10	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
11	WTG11	WTG11	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
12	WTG12	WTG12	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
13	WTG13	WTG13	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
14	WTG14	WTG14	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
15	WTG15	WTG15	TURBINE MOVED	*MOVED DUE TO **VISUAL IMPACTS** HIGHLIGHTED BY THE SPECIALIST AND I&AP*
16	WTG16	WTG16	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
17	WTG17	WTG17	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
18	WTG18	WTG18	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
19	WTG19	WTG19	TURBINE MOVED	*MOVED DUE TO **VISUAL IMPACTS** HIGHLIGHTED BY THE SPECIALIST AND I&AP*
20	WTG20	WTG20	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
21	WTG21	WTG21	TURBINE MOVED	*MOVED DUE TO **VISUAL IMPACTS** HIGHLIGHTED BY THE SPECIALIST AND I&AP*
22	WTG22	WTG22	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
23	WTG23	WTG23	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
24	WTG24	WTG24	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
25	WTG25	WTG25	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
26	WTG26	WTG26	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
27	WTG27	WTG27	TURBINE MOVED	*MOVED DUE TO **VISUAL IMPACTS** HIGHLIGHTED BY THE SPECIALIST AND I&AP*
28	WTG28	WTG28	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
29	WTG29	WTG29	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
30	WTG30	WTG30	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
31	WTG31	WTG31	TURBINE MOVED	*MOVED DUE TO **VISUAL IMPACTS** HIGHLIGHTED BY THE SPECIALIST AND I&AP*

32	WTG32	WTG32	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
33	WTG33	WTG33	TURBINE MOVED	*MOVED DUE TO **VISUAL IMPACTS** HIGHLIGHTED BY THE SPECIALIST AND I&AP*
34	WTG34	WTG34	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
35	WTG35	WTG35	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
36	WTG36	WTG36	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
37	WTG37	WTG37	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
38	WTG38	WTG38	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
39	WTG39	WTG39	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
40	WTG40	WTG40	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
41	WTG41	WTG41	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
42	WTG42	WTG42	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
43	WTG43	WTG43	TURBINE MOVED	*MOVED DUE TO **VISUAL IMPACTS** HIGHLIGHTED BY THE SPECIALIST AND I&AP*
44	WTG44	WTG44	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
45	WTG45	WTG45	NO CHANGE	*DOES NOT OCCUR WITHIN A NO-GO AREA*
	45	45		

Table 11-2. Key to Changes Made: Draft Layout versus Final Layout

KEY OF TURBINE DRAFT LAYOUT VS FINAL LAYOUT EXERCISE		
NO CHANGE		**TURBINES IN THE DRAFT LAYOUT WERE NOT LOCATED IN SENSITIVE AREAS AND DID NOT NEED TO MOVE POSITIONS IN THE FINAL LAYOUT**
TURBINES MOVED		**TURBINES WERE LOCATED IN MODERATELY SENSITIVE AREAS IN THE DRAFT LAYOUT AND WERE MOVED IN RESPONSE TO THESE SENSITIVITIES IN THE FINAL LAYOUT**
TURBINES REMOVED		**TURBINES WERE LOCATED IN HIGHLY SENSITIVE AREAS IN THE DRAFT LAYOUT AND WERE REMOVED IN RESPONSE TO THESE SENSITIVITIES IN THE FINAL LAYOUT**
NEW TURBINES		**NEW TURBINE LOCATIONS WERE ADDED IN NON-SENSITIVE AREAS AS ADDITIONAL TURBINE LOCATION OPTIONS IN THE FINAL LAYOUT**

12.CONCLUSIONS AND RECOMMENDATIONS

GOVERNMENT NOTICE 982, ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS, 2014 (AS AMENDED 2017). APPENDIX 3: SCOPE OF ASSESSMENT AND CONTENT OF ENVIRONMENTAL IMPACT ASSESSMENT REPORTS

3. An environmental impact assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include–

(l) An environmental impact statement which contains:

(i) A summary of the key findings of the environmental impact assessment;

(ii) A map at an appropriate scale which superimposes the proposed activity and its associated infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and

(iii) A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.

(n) The final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;

(o) Any aspects which were conditional to the finding of the assessment either by the EAP or specialist which are to be included as condition of the authorisation;

(p) A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;

(q) A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;

(s) An undertaking under oath or affirmation by the EAP in relation to:

(i) The correctness of the information provided in the reports;

(ii) The inclusion of comments and input from stakeholders and I&APs;

(iii) The inclusion of inputs and recommendations from the specialist reports where relevant; and

(iv) Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties.

In line with the above-mentioned legislative requirement, this Chapter of the Final EIR provides a summary of the findings of the proposed Boulders Wind Farm and a comparative assessment of the positive and negative implications of the proposed project and identified alternatives. In addition, this Chapter provides the EAP's opinion as to whether the activity should or should not be authorised as well as the reason(s) for the opinion.

12.1 DESCRIPTION OF PROPOSED ACTIVITY

Vredenburg Windfarm (Pty) Ltd is proposing the development of a 140MW (maximum) wind energy facility and associated infrastructure approximately 12km northeast of the commercial centre of Vredenburg in the Saldanha Bay Local Municipality, West Coast District Municipality, Western Cape. The proposed project is to be known as the Boulders Wind Farm.

The Boulders Wind Farm site is located approximately 7km east of Paternoster, 7km southwest of St Helena Bay and 12km northeast of Vredenburg. The project site is located on properties which are currently used for dryland agricultural activities (including small-grain, cattle and sheep farming) and is located directly adjacent to the existing operational West Coast One Wind Energy Facility (WEF).

In summary the wind farm includes:

- 45 wind turbines consisting of the following specifications:
  - Maximum hub height of up to 120m;
  - Tip height of up to 165m; and
  - A rotor diameter of up to 103m.
- Concrete foundations to support the turbines;
- Cabling between the turbines, to be laid underground where practical;
- A transformer station for each wind turbine;
- Access roads to the site and between project components with a width of approximately 8m;
- An on-site substation of up to 80m x 150m in extent to facilitate the connection between the wind farm and the electrical grid; and
- Laydown areas, crane hardstand pads, administrative buildings and offices.

It should be noted that based on recommendations from draft heritage and visual impact assessments, seven turbines were relocated from the west of the Paternoster Road as shown in Figure 1.3. Five (5) turbines were relocated to the east and two (2) to the south of the Paternoster Road.

12.2 ASSUMPTIONS, UNCERTAINTIES AND GAPS

12.2.1 Assumptions

The following assumptions have been made during the EIA process:

- Further specialist inputs into the micro-siting process will be sought.

12.2.2 Gaps

No detailed engineering input was provided in this phase of the development. It is general engineering practice that the detailed design phase of a project is only initiated once environmental authorisation for a project (based on what is submitted as preliminary design) is secured. In this regard, the EIR considered industrial norms. This has also provided the EIA process an opportunity to guide the Planning and Design proactively rather than reactively. The Environmental Management Programme (EMPr) should, therefore, be viewed as a dynamic evolving document that can be adapted to specific needs and design conditions.

If the project is authorised by the Department of Environmental Affairs (DEA)(now the Department of Environment, Forestry and Fisheries or DEFF), Vredenburg Windfarm (Pty) Ltd will be required to provide DEA with final layout plans. These plans should be informed by the EIA and any other post-authorization studies or surveys, such as geotechnical investigations, ecological walk throughs and micro siting adjustments. The final layout requirement will further serve to demonstrate to DEA how the relevant environmental standards and management specifications contained in the EMPr, as informed by the site-specific environmental context and potential impacts, as well as the relevant conditions of authorisation, will be incorporated in the detailed design process.

12.3 NEEDS & DESIRABILITY

Section 3 of the EIR describes the needs and desirability of the proposed Boulders Wind Farm project which is based substantially on the:

- Contribution of the wind farm to National goals and commitments for meeting global and National greenhouse gas emission reduction targets;
- Contribution to National and regional energy security;
- Alignment with various International, National and regional environmental and developmental policies and plans; and

- Contribution to the promotion of local economic growth and development.

Alignment with the National Development Plan (NDP) is particularly important as this represents the blueprint for the Country's future plan to promote sustainable and inclusive development in South Africa, promoting a decent standard of living for all. The NDP includes 12 key focus areas and those that are directly relevant to the current proposed Boulders Wind Farm include:

- An economy that will create more jobs;
- Improving infrastructure; and
- Transition to a low carbon economy.

The Integrated Resource Plan (IRP2010) is also important as this maps out the renewable energy mix and targets for the period up to 2030, of which wind energy makes up 8,400 MW installed capacity. This is likely to be further expanded in terms of the Draft Integrated Resource Plan (2018).

At a Provincial level, the project will also contribute towards the target of 15% renewable energy for the Western Cape Province and a reduction in carbon emissions, as set by the Provincial White Paper on Sustainable Energy and 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 (viz. 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 and demand management), and the development of renewable and alternate sustainable energy resources.

At a district and local municipal level, the need for the development of the Boulders Wind Farm is reflected within the West Coast District Municipality and Saldanha Bay Local Municipality Integrated Development Plans (IDP) and other policies.

Overall, the need and desirability of the Boulders Wind Farm is not only supported from a planning and policy perspective on a National level but also at the Provincial, district and local municipal levels.

The Boulders Wind Farm project developer has also indicated that local socio-economic benefits will be realised with the development of the wind farm, specifically in line with the socio-economic development goals under the REIPPPP, which will include:

- The realisation of the local needs and requirements within the area;
- Job creation within an area which has been primarily focused on fishing that has subsequently declined through the years;
- The creation of a second income for the affected landowners;
- An increase in the standard of living; and
- Overall economic and social upliftment within the area.

The development of the wind farms also attracts significant direct foreign financial investment into South Africa and local communities. REIPPP local content requirements can lead to the creation of local industry and both skilled and un-skilled jobs in the RE industrial sector.

12.4 CONSIDERATION OF ALTERNATIVES

The various alternatives associated with the proposed Boulders Wind Farm are assessed in Section 5 of this EIR and provides a comprehensive analysis (see Table 5.1) of various reasonable and feasible alternatives with respect to:

- Location
- Technology
- Layout

- Operational aspects
- No-go option

In terms of location, the current proposed sites were identified based on a pre-EIA screening process (see Appendix D-2) which included:

- Availability of good wind resources;
- Land availability;
- Environmental sensitivities;
- Distance to the national electrical grid;
- Site accessibility;
- Civil Aviation Authority acceptance;
- Topography;
- Suitability of current land uses; and
- The willingness of landowners to be involved.

In reaching the current proposed layout, the placement of turbines was refined on two occasions to further reduce the visual impact of the wind farm.

- To minimise these visual impacts on some Britannica Heights residents along the top of the ridge, the Paternoster residents and the Kasteelberg Heritage resource, the footprint of the proposed development was reduced in the EIA phase from the original 10 farms, to the five farms closest to the existing WC1 energy facility. A sensitivity analysis was used by the developers to design an initial proposed layout on the remaining 5 farms.
- The layout was further refined to adhere to the recommendations of the Heritage Impact Assessment, where seven turbines were relocated, to produce a final mitigated layout. The EIA specialist studies, therefore, assessed the relative impacts of both these proposed layouts (i.e. pre-relocation of 7 turbines and post-relocation of 7 turbines).

COMPARISON OF OVERALL IMPACT RATINGS (POST MITIGATION) OF THE DRAFT LAYOUT VERSUS THE FINAL LAYOUT (IN RESPONSE TO SPECIALIST RECOMMENDATIONS)

Overall Impact Significance (Draft Layout): **HIGH (-) visual related**
Overall Impact Significance (Final Layout): **HIGH (-) visual related**

THE NO-GO OR NO DEVELOPMENT OPTION

The No-go option was also assessed and would mean abandoning the proposed development with the following implications:

- None of the negative environmental impacts identified will materialise, particularly visual and cumulative visual impacts;
- None of the potential local economic benefits, income for communities in terms of job opportunities, and socio-economic benefits in terms of the REIPPP requirements, will materialise within the district or region;
- The opportunity for the proposed project to promote both local and national energy security will be lost; and
- The opportunity for the proposed project to contribute significantly to greenhouse gas emission reductions and climate change mitigation, will be lost.

12.5 PUBLIC PARTICIPATION PROCESS

The current EIA process for the proposed Boulders Wind Farm has been subjected to a rigorous Public Participation and stakeholder engagement process (PPP) both during the Scoping and EIA Phases, as comprehensively described in Section 8 of this EIR. The various outputs of the PPP are provided in the following supplementary EIR volumes:

- VOLUME 4 – PPP SUPPORTING DOCUMENTS
- VOLUME 5 – COMMENTS & RESPONSE REPORT (CRR)

The most common comments were related to the high visual impact and the anticipated impact this would have on tourism and property values, with many arguing that this was a fatal flaw, particularly people involved in the local tourism industry and the affected residents along the top of Britannica Heights. Most of the comments on the Heritage impacts were related to the visual impact and sense of place.

Many objectors also raised concerns about the noise impacts and particularly the impact of low frequency noise (including the submission of some papers or articles on such impacts associated with wind farms).

There were also many I&APs who expressed concern that the proposed site was not suitable and either argued that the development should be placed in other 'more suitable' areas or other sites should be investigated, or asked what alternative sites were investigated.

Some of the key issues raised by I&APs on the EIA process, included:

- Allegations of the EAP being biased in favour of the developer and subjective, and failing to take the local context adequately into account;
- That the public review process was just a tick box exercise, and was rash and fast tracked;
- Requests for extensions of the public review period and demands for an additional public review period for the Final EIR;
- Demands for access to the radar data;
- Complaints about having separate focus group meetings for different categories of I&APs;
- Missing information – EAP identify, radar report – represents fatal flaw;
- Non-compliance with Plan of Study due to additional CES Visual Impact Assessment being undertaken;
- Complaints that the No-Go option was inadequately analysed and compared to other alternatives; and
- Numerous other issues as reported on in the CRR (Volume 5).

A large number of concerns about the impacts on birds (and to a lesser extent bats) were raised, including the submission of a review by Dr Andrew Jenkins who is an Avifaunal specialist who was involved in the assessment of the West Coast One windfarm, and the initial post-construction monitoring.

The conservation authorities did not have major concerns, but some requested additional maps and commitments from the developers that they would comply with the mitigation measures in the EMPr.

In addition to the above, there were calls or demands from certain I&APs for an additional public review process for the final EIR. This is not a normal requirement in terms of the EIA Regulations, and may only be considered necessary in cases where significant new information has been presented after the review of the Draft EIR, or if the nature of the proposed development changes materially. With respect to the current application, neither of the above situations has occurred.

While a number of additional papers were submitted by various I&APs, these were general opinion pieces or non-peer reviewed papers of a general nature that are not directly relevant to this specific EIA and proposed wind farm. The literature on low noise frequency impacts from wind farms was reviewed in the Scoping phase by the noise specialist and was not found to be a relevant impact.

The allegations about the missing radar data are also not relevant as this was examined by the avifaunal specialists and factored into their analysis. In addition, there were no significant changes made to any of the specialist studies subsequent to the review of the draft EIR. While the economic specialists investigated the property market in Britannica Heights in more detail and included this in their report, this did not result in a change in their impact ratings. CES, therefore, finds that there is no basis for an additional public review period for the Final EIR.

12.6 ENVIRONMENTAL AND SOCIAL COST/BENEFIT ANALYSIS

It is important to note that cost/benefit analyses can take many forms and that there is no prescribed methodology for conducting such an analysis. The approach is generally limited by the difficulty in attaching economic values to environmental and social impacts (costs) or benefits and the availability of relevant quantitative information. Most environmental cost/benefit analyses, therefore, adopt a qualitative approach, where one simply identifies the types of costs and benefits associated with a particular activity and then apply a simple ranking system to assist in reaching an overall conclusion.

Consequently, the current EIA impact assessment provides a sound basis for conducting an environmental and social cost/benefit analysis for the Boulders Wind Farm, as the full range of positive and negative impacts is integral to the process. Table 12-1 provides an overall summary of the negative (cost) and positive (benefit) environmental impacts associated with the proposed Boulders Wind Farm.

Overall, the summary Table 12-1 indicates that there are numerous potential negative impacts (environmental and social costs) associated with the Boulders Wind Farm. However, the vast majority of these costs can be reduced to an acceptable level by implementing appropriate mitigation measures, except for visual impacts which are traditionally difficult to mitigate. However, although these visual impacts are rated as HIGH, in the EAPs opinion they do not represent a fatal flaw to the proposed Boulders Wind Farm. This is primarily because it has been demonstrated that this visual intrusion will have no significant effect on property values and tourism. The economic specialist investigation into the potential impacts on property values and tourism indicates that these impacts are likely to be low or absent. This conclusion is further supported by the fact that these tangible impacts have not materialised as a result of the WC1 development which has been in operation for almost 3 years. A similar experience has been seen for wind farms located near Cape St Francis and Jeffrey's Bay in the Eastern Cape. In addition, the property value study was updated to specifically look at the potential impacts on homeowners with properties on the ridgeline in Britannica Heights and found that their property values will not be affected.

The visual impact is not new but an intensification of an existing one (i.e. West Coast One wind farm) and the layout mitigation measures that have been implemented have concentrated the development adjacent to the existing WC1 wind facility to minimize the visual impacts. Furthermore, the visual intrusion from Paternoster is naturally mitigated, as all properties face seaward, and effectively "look away" from the site. Tourists traveling through the area will only be impacted for a short time, and results of the tourism studies indicate that the project will have no significant negative effect on tourism.

The severity of the visual impacts also depends on the sensitivity of the viewers. There are some local people (particularly the Britannica Heights residents along the hilltop) who are directly affected and very opposed, but there are also people who would see the turbines and are indifferent or supportive. These aspects will need to be taken into consideration by the DEA.

There are also a number of significant positive impacts (benefits) associated with the Boulders Wind Farm. These relate primarily to indirect benefits around climate change mitigation and resource (energy) conservation, which are not locality dependant, as pointed out by I&APs. The greenhouse gas emission savings are significant and are estimated to be about 400,000 tons CO_2 equivalents per year or 8 million tons over the 20 year life of the project, while the wind farm has the capacity to provide green electricity to over 80,000 households.

In addition, there are also economic and social benefits for the surrounding communities which are locality dependant. While local employment and provision of other services both during construction and operation of the facility will contribute to the local economy, social benefits required by the Department of Energy in terms of the REIPPPP, will flow directly to the local community socio-economic development, which is projected to be in the order of R9 million each year and about R180 million over the 20 year life of the project.

Table 12-1. Summary of negative (costs) and positive (benefits) environmental impacts associated with the Boulders Wind Farm for all phases of proposed development (+ = beneficial impact)

	PRE-MITIGATION								POST-MITIGATION							
	LOW		MODERATE		HIGH		VERY HIGH		LOW		MODERATE		HIGH		VERY HIGH	
Positive/Negative	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+
General Impacts																
Planning & Design	1	1	4		6				10	1	1					
Construction	3		12		2		1		16		2					
Operations			4		2			1	5		1					1
Decommissioning	1	1	4						5	1						
Agriculture & Soils Impacts																
Planning & Design					1				1							
Construction																
Operations	1									1						
Decommissioning																
Avifaunal Impacts																
Planning & Design																
Construction	1		1						2							
Operations	1				1				2							
Decommissioning	1								1							
Bat Impacts																
Planning & Design	1								1							
Construction	3		1						4							
Operations					2						1		1			
Decommissioning																
Ecological Impacts																
Planning & Design																
Construction	2								2							
Operations	3								3							
Decommissioning																
Property Values, Tourism and Economic Impacts																
Planning & Design																
Construction		1		4						1		4				
Operations	2			4					2			4				
Decommissioning		1										1				

	PRE-MITIGATION								POST-MITIGATION							
	LOW		MODERATE		HIGH		VERY HIGH		LOW		MODERATE		HIGH		VERY HIGH	
Positive/Negative	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+
Freshwater Impacts																
Planning & Design																
Construction	6		6						12							
Operations																
Decommissioning																
Heritage, Archaeology & Palaeontology Impacts																
Planning & Design			1		1						1		1			
Construction	6								6							
Operations			1								1					
Decommissioning			1								1					
Noise Impacts																
Planning & Design																
Construction	5		1						6							
Operations	1		1						2							
Decommissioning			1						1							
Social Impacts																
Planning & Design																
Construction	2		4	1					6			1				
Operations	3	2		2	1	1			3	1		3	1	1		
Decommissioning																
Traffic Impacts																
Planning & Design																
Construction	1								1							
Operations	1								1							
Decommissioning	1								1							
Visual Impacts																
Planning & Design	1		2		6				2		3		4			
Construction			1						1							
Operations	2		1		4				2		2		3			
Decommissioning	1		1		3				5							
TOTAL	**50**	**6**	**47**	**11**	**29**	**1**	**1**	**1**	**103**	**5**	**13**	**13**	**10**	**1**	**0**	**1**

Based on the above analysis of all identified impacts (146 in total), it can be seen that with respect to negative impact significance before mitigation, there are 50 LOW, 47 MODERATE, 29 HIGH and 1 VERY HIGH impact.

After mitigation, there are 103 LOW impacts, due to a reduced rating for 34 MODERATE impacts, 19 HIGH impacts and 1 VERY HIGH impact. After mitigation there are no negative residual impacts of VERY HIGH significance.

Nine of the 10 remaining HIGH negative impacts relate to the potential visual impacts of the proposed Boulders Wind Farm.

They include the following five impacts in the planning and design phase:

- Visual impact on observers (residents at homesteads and visitors/tourists) in close proximity (i.e. within 5km) to the wind turbine structures;
- Visual impact on observers travelling along the roads in close proximity (i.e. within 5km) to the wind turbine structures;
- Visual impact on observers (residents at homesteads and visitors/tourists) in close proximity (i.e. within 5km – 10km) to the wind turbine structures;

- The potential cumulative impact of the Boulders and West Cape One wind farms on the visual quality of the landscape; and
- The cumulative visual impact of multiple wind farms in the region on visual resources and the secondary impact on heritage, archaeology and palaeontology.

They also include the following four impacts in the operational phase:

- Visual impact on observers (residents at homesteads and visitors/tourists) in close proximity (i.e. within 5km) to the wind turbine structures;
- Visual impact on observers travelling along the roads in close proximity (i.e. within 5km) to the wind turbine structures;
- Visual impact on observers (residents at homesteads and visitors/tourists) in close proximity (i.e. within 5km – 10km) to the wind tur bine structures; and
- Visual impact associated with the proposed WF and the potential impact on the areas rural sense of place and character.

The remaining HIGH negative impact relate to the potential cumulative impact of multiple wind farms in the region on bat fatalities.

12.7 OPINION OF THE EAP

Based on the outcomes of the current EIA process, it is the professional opinion of CES and the specialists that:

- The Boulders Wind Farm project will result in ten HIGH visual impacts even after mitigation. However, this does not represent a fatal flaw for the project, as the remaining 125 negative environmental and social impacts can be adequately mitigated to reduce the impacts to an acceptable level (defined as moderate or low significance), provided mitigation measures recommended in this report are implemented and maintained throughout the life of the project.
- There is the potential for a HIGH cumulative impact of multiple wind farms in the region on bat populations. However, this too does not represent a fatal flaw, because if monitoring results confirm that the impact is HIGH and fatality thresholds are exceeded, this impact could be reduced to an acceptable level by applying appropriate curtailment measures at the Boulders Wind Farm.
- The Final Layout and the associated layout of ancillary infrastructure should be approved. If any changes to these layouts are made, the input of the relevant specialists must be obtained and incorporated into any changes.
- A detailed construction and operational Environmental Management Programme (EMPr) must be developed prior to commencement of construction and operation of the Boulders Wind Farm, incorporating the recommendations of the bird and bat specialists in terms of additional operational phase monitoring.
- The information in the report is sufficient to allow DEA to make an informed decision.

Based on the iterative process of refining the layout of the Boulders Wind Farm, it is the opinion of CES that the current Final Layout is the most suitable option for the site provided that all the mitigation measures described in Chapter 11 are adhered to, and that specialist input is obtained during the micro-siting exercise.

12.8 RECOMMENDATIONS OF THE EAP

CES makes that following recommendations:

- That the proposed Boulders Wind Farm project and the current proposed turbine layout, should be approved, as the tangible residual negative impacts are of LOW or MODERATE significance, and the project represents a sustainable use of the resource base in the area. This recommendation is made

despite the 10 residual negative impacts of HIGH significance, as the benefits arising from the project outweigh these impacts and proceeding with the project is seen to be in the common good. However, the Competent Authority must be mindful of the fact that there are residual impacts of HIGH significance and must take this into consideration when reaching a decision. This recommendation is made provided that the proposed mitigation measures are implemented, and that the EMPr is implemented, maintained and adapted to incorporate relevant legislation, standard requirements and audit reporting, throughout the life of the development.

- That the current proposed turbine height (120m hub height and 103m rotor diameter) be approved. While the Heritage Impact Assessment suggests that the viability of reducing turbine heights should be investigated, the bird specialists suggest the opposite and that turbine heights should be raised to avoid bird flight levels.
- That with respect to the high cumulative risk on regional bat fatalities, it is recommended that if the combined post construction bat monitoring determines that allowable fatality thresholds are exceeded, then Boulders Wind Farm should be required to engage with DEA and a curtailment plan developed and implemented if deemed the appropriate response by DEA.
- The mitigation measures for all impacts identified in the EIA must be incorporated into the EMPr and must be used by the project team during the detailed Planning & Design Phase, by the contractors during the Construction and Decommissioning Phases and by Vredenburg Windfarm (Pty) Ltd during the Operation Phase.
- Inclusions, additions and adaptations of the EMPr, as well as all final plan drawings and maps must be submitted to DEA for final approval.

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14.APPENDICES

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