

**PROPOSED ALBANY WIND ENERGY FACILITY & GRID INFRASTRUCTURE NEAR
MAKHANDA (GRAHAMSTOWN), EASTERN CAPE PROVINCE.**

FINAL ECOLOGICAL ASSESSMENT REPORT

PREPARED FOR:

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REVISIONS TRACKING TABLE



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REPORT VERSION: FINAL REPORT

PROJECT NUMBER: P40700009

NAME	RESPONSIBILITY	DATE
Mr Craig Sholto-Douglas	Initial Site Survey (Fauna) & Report Writer	November 2016
Mr Luke Kemp	Report Assistance (Reptile and Amphibian Site Assessment)	November 2016
Ms Ayanda Zide	Initial Site Survey (Flora) & Report Writer	November 2016
Ms Rosalie Evans	GIS Mapping & Report Updates	February 2020 Revised October 2020
Dr Greer Hawley	Report Review and Update	February 2020 Revised October 2020

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INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

The Environmental Impact Assessment (EIA) Regulations, promulgated in terms of the National Environmental Management Act (NEMA, Act no. 107 of 1998 as amended) dated 8th of December 2014, were amended on the 7th of April 2017. In terms of Appendix 6 of the Amended EIA Regulations (2014, and subsequent 2017 amendments), a Specialist Report must contain all the information necessary for a proper understanding of the nature of issues identified, and must include–

(1) A SPECIALIST REPORT PREPARED IN TERMS OF THE AMENDED NEMA EIA REGULATIONS (2014, AND SUBSEQUENT 2017 AMENDMENTS) MUST CONTAIN –	
(a) Details of- (i) The specialist who prepared the report; and (ii) The expertise of that specialist to compile a specialist report including a curriculum vitae;	<i>Page iii, Page iv and Appendix A-6</i>
(b) A declaration that the specialist is independent in a form as may be specified by the competent authority;	
(c) An indication of the scope of, and the purpose for which, the report was prepared;	<i>Chapter 1</i>
(cA) An indication of the quality and age of the base data used for the specialist report;	
(cB) A description of the existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	<i>Chapter 4 and Chapter 8</i>
(d) The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	<i>Chapter 1</i>
(e) A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	<i>Chapter 1 and Appendix A-1</i>
(f) Details of an assessment of a specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure inclusive of a site plan identifying alternatives;	<i>Chapter 6</i>
(g) An identification of any areas to be avoided, including buffers;	<i>Chapter 4, Chapter 8 and Chapter 9</i>
(h) A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	<i>Chapter 6</i>
(i) A description of any assumptions made and any uncertainties or gaps in knowledge;	<i>Chapter 1</i>
(j) A description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	<i>Chapter 8</i>
(k) Any mitigation measures for inclusion in the EMPr;	
(l) Any conditions for inclusion in the environmental authorisation;	
(m) Any monitoring requirements for inclusion in the EMPr or environmental authorisation;	
(n) A reasoned opinion- (i) Whether the proposed activity, activities or portions thereof should be authorised; and (iA) Regarding the acceptability of the proposed activity or activities, and (ii) If the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	<i>Chapter 9</i>
(o) A description of any consultation process that was undertaken during the course of preparing the specialist report;	<i>Chapter 1</i>
(p) A summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	<i>None to date.</i>
(q) Any other information requested by the competent authority.	<i>None to date.</i>

THE PROJECT TEAM

Dr Greer Hawley

Report Reviewer & Input

Dr Greer Hawley is a Principal Consultant with thirteen (13) years' experience and she is based in the East London branch. She 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 assisted with the completion of the Eastern Cape Biodiversity Conservation Plan (2019), the Eastern Cape Biodiversity Strategy and Action Plan and assisted with the generation of the Western Cape State of the Coast Report. She is currently involved with developing the Environmental Management Framework for the King Cetshwayo District Municipality.

Ms Rosalie Evans

GIS Mapping & Report Updates

Rosalie is a Senior Environmental Consultant with five (5) and a half years' experience and she is based in the Port Elizabeth branch. She holds a BA degree in Social Dynamics with majors in Geography and Psychology as well as a BA Honours degree in Geography and Environmental Studies, both from Stellenbosch University. Rosalie's honours dissertation analysed the role of small grains in soil carbon sequestration in the agricultural sector of the Western Cape. Rosalie completed the Introduction to Environmental Impact Assessment Procedure Short Course by Coastal & Environmental Services and the Department of Environmental Science Rhodes University as well as the Estuary Management Short Course by Nelson Mandela University (NMU). In addition, Rosalie is a member of the Land Rehabilitation Society of Southern Africa (LaRSSA) and a member of the International Association for Impact Assessment (IAIA). Her main focuses include the general Environmental Impact Assessment (EIA) process, project management, the Public Participation Process, NEMA Section 24 (G) Applications and associated reports, GIS Mapping, and Agriculture and Soils Assessments.

Ms Ayanda Zide

Initial Site Survey (flora) & Report Writer

Ayanda holds a BSc in Botany, Microbiology and Chemistry and a BSc (Hons) in Botany where her thesis focused on identifying and characterising galls and gall forming insects and associated pathogens (Fungi) on the mangrove species *Avicennia marina*. Courses in her honours year included Diversity Rarity and Endemism (DRE), Pollination Biology, Estuarine Ecology, Rehabilitation Ecology, a Stats course and a short GIS course. Her research interests lie in biological invasion, conservation, rehabilitation ecology, plant biotechnology and water research. Ayanda conducts vegetation and impact assessments that guide proposed developments to reduce their impacts on sensitive vegetation. As part of these surveys she identifies and maps the vegetation communities and areas of high sensitivity. She has worked as a botanical assistant on the Lesotho Highlands Development Authority botanical baseline survey and has conducted groundtruthing surveys and ecological assessments for developments in the Eastern Cape.

Mr Craig Sholto-Douglas

Initial Site Survey (fauna) & Report Writer

Craig holds a BSc (Env Sci and Zoology) and a BSc (Hons) in Environmental Science. He is currently completing his MSc in Environmental Science, focussing on factors influencing survivorship of *Portulacaria afra* (*Spekboom*) cuttings, in attempts to restore degraded lands in the Greater Addo Elephant National Park. Academic research projects include a leopard (*Panthera pardus*) population survey, large vertebrate monitoring projects, and invasive plant species analyses. Craig has consulting experience in the restoration ecology and natural resource management fields, with focus on the Subtropical Thicket Restoration Project (STRP). Since working at EOH CES, Craig has been involved in a number of ecological specialist studies, including: Fairewood Estate Ecological Specialist Study Grahamstown, Eastern Cape; Ukomeleza Wind Energy Facility Ecological Assessment, Eastern Cape, South Africa; PPC Mining Floristic and Faunal Scoping Report, Eastern Cape, South Africa; Uhambiso Glen Hurd Road Upgrade Faunal Specialist Study, Eastern Cape,

South Africa; Eskom 400kV Powerline Faunal and Avifauna Impact Assessment, Western Cape, South Africa; Kariega River Causeway Ecological Assessment, Eastern Cape, South Africa; Nxuba WEF Ecological Ground-truthing, Eastern Cape, South Africa; and the Department of Environmental Affairs Quion Point Avifaunal Impact Assessment. Craig also conducts bird and bat monitoring for Wind Energy Facilities.

Mr Luke Kemp

Report Assistance

Luke has a B.Sc. Rhodes student currently working on a project to determine the effects of domestic animal grazing on reptile and amphibian diversity. Luke completed a FGASA accredited Standard and Advanced snake handling course as well as advanced first aid for snake bite through African Snakebite Institute. Luke has conducted reptile and amphibian surveys in the Northern Cape, Eastern Cape and Mpumalanga, mapping reptiles and amphibians and collecting samples for the Port Elizabeth Museum (Bayworld). Luke is currently on the panel of judges for reptile identification on the Animal Demography Unit (ADU).

SPECIALIST DECLARATIONS OF INDEPENDENCE

I, **Greer Hawley-McMaster**, declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed development of the Albany Wind Energy Facility and Grid Infrastructure in the Eastern Cape Province, application or appeal in respect of which I was appointed other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of my performing such work.

Full Names: **Greer Hawley-McMaster**

Date: **October 2020**

I, **Rosalie Ann Evans**, declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed development of the Albany Wind Energy Facility and Grid Infrastructure in the Eastern Cape Province, application or appeal in respect of which I was appointed other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of my performing such work.

Full Names: **Rosalie Ann Evans**

Date: **October 2020**

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1. INTRODUCTION AND PROJECT DESCRIPTION

1.1. BACKGROUND

Albany Wind Power (Pty) Ltd plans to develop, construct and operate a Wind Energy Facility (WEF) and associated grid infrastructure approximately ten (10) kilometres east of Makhanda (previously known as Grahamstown) in the Eastern Cape Province. The project site is situated in the Makana Local Municipality, which forms part of the Sarah Baartman District Municipality, as indicated in Figure 1-1 below. According to the data recorded by Albany Wind Power in the area, this project site appears to have favourable wind conditions to operate a wind farm.

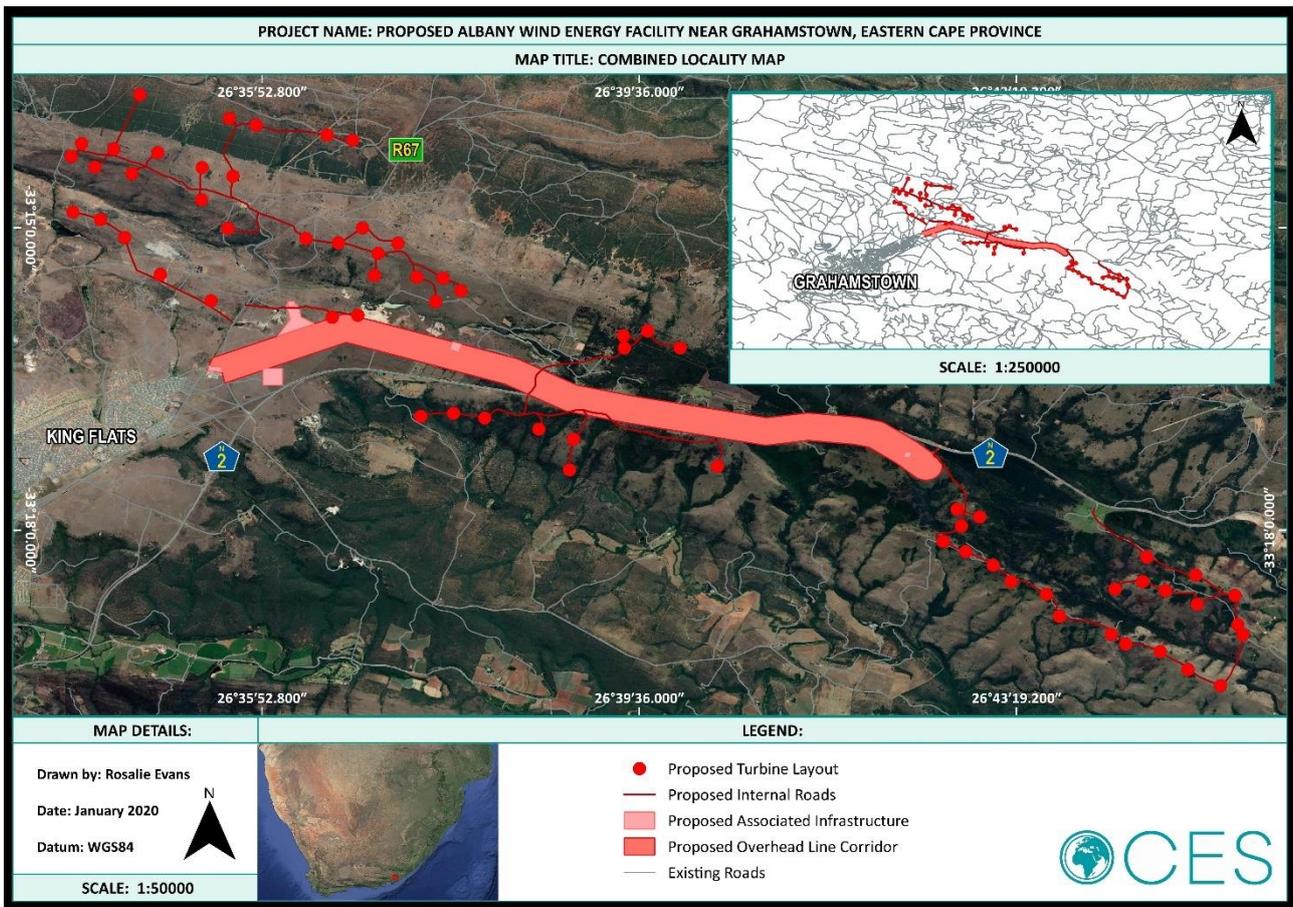


Figure 1-1: Locality Map indicating the proposed locations of the Albany WEF and Grid Infrastructure.

1.2. PROJECT DESCRIPTION

Albany Wind Power is proposing the development of a WEF and associated grid infrastructure. Further details regarding the project description is provided in the sections below.

1.2.1. Albany Wind Energy Facility

The project description, since the project was conceptualised in 2016, has been revised. In order to cater for the revised project, an additional chapter describing the new layout and the implications thereof are presented in Chapter 9, instead of revising the whole report. The project description of the Albany WEF, which has been assessed, includes:

- Temporary infrastructure including a site camp and a laydown area of approximately 30 m² per turbine (all to be rehabilitated post-construction).
- Previously, up to sixty-six 66 wind turbines with a rotor diameter of up to 170 m, a hub height of up to 130 m and blade length of up to 85 m - each with an output of between 4 and 8 megawatts (MW). This has been revised down to 43 turbines (see Chapter 9)
- Foundations (up to 550 m²) for each wind turbine (see Table 1-1 for total footprint calculations).
- A laydown area next to the locations of the proposed wind turbines (3 900 m² for crane hardstand per turbine).
- Areas of approximately 25 m² for the switchgear and/or transformer at each turbine;
- Internal access roads of between 8 m (during operation) and 14 m (during construction, to be partly rehabilitated) wide to each turbine.
- Medium voltage (MV) cabling between turbines and the switching station, to be laid underground where technically feasible.
- Overhead medium voltage powerlines between turbine rows, where necessary.
- Overhead powerlines to connect the facility to the electrical grid.
- Existing roads will be used as far as possible. However, where required, internal access roads will be constructed between the turbines.
- A temporary area of approximately 90 000 m² which will include a batching plant, laydown facilities, concrete tower manufacturing and steel tower processing and construction compound.

1.2.2. Albany Grid Infrastructure

In addition, Albany Wind Power plan to develop the following grid infrastructure:

- **Option 1** (preferred) - An Independent Power Producer (IPP) Substation (MV/132 kV) which will include, battery storage and site office area, situated in the middle of the site, up to 23000 m².
- **Option 2** – Direct connection, via the same corridor, to the potential 132 kV substation, adjacent to the Eskom Albany 132 kV substation, up to 23 000 m², which will include battery storage and a site office area situated in the middle of the site.
- Two (2) collector substations, each 10000 m², (Collector Substation West and Collector Substation East) will be constructed.
- The grid connection will be a Line In Line Out (LILO) on the Pembroke-Albany 132 kV line.
- All turbines will connect, via underground MV lines, either directly to the IPP substation or to a collector. Each collector will in turn connect to the IPP substation via MV or 132 KV overhead line(s) within the grid corridor.
- Grid corridor width is 500 m wide to allow for manoeuvrability for the final line position within the corridor.
- The corridor from Collector Substation West to the main corridor is 170 m in width with a flanking area to accommodate for the line turn in.
- See Table 1-1 for total footprint calculations)

Table 1-1: Summary of the proposed Albany WEF and Infrastructure footprint.

ALBANY WEF		
FACILITY COMPONENT	CONSTRUCTION FOOTPRINT	FINAL FOOTPRINT AFTER REHABILITATION
Laydown Area (crane hardstand)	TOTAL 3 900 m ² x 66 turbines = 257 400 m ² which equates to 25.74 ha	TOTAL 3 900 m ² x 66 turbines = 257 400 m ² which equates to 25.74 ha
Temporary Laydown Area, Batching Plant and Construction Compound	TOTAL 90 000 m ² which equates to 9.00 ha	TOTAL 0 m ² which equates to 0.00 ha
Turbine Foundation	TOTAL	TOTAL

ALBANY WEF		
FACILITY COMPONENT	CONSTRUCTION FOOTPRINT	FINAL FOOTPRINT AFTER REHABILITATION
	Up to 550 m ² x 66 turbines = 36 300 m ² which equates to 3.63 ha	550 m ² x 66 turbines = 36 300 m ² which equates to 3.63 ha
Temporary Infrastructure (including a site camp and a laydown area)	<u>TOTAL</u> 30 m ² x 66 = 1 980 m ² which equates to 0.20 ha	<u>TOTAL</u> 0 m ² x 66 = 0 m ² which equates to 0.00 ha
Switchgear and/or Transformer	<u>TOTAL</u> 25 m ² x 66 = 1 650 m ² which equates to 0.17 ha	<u>TOTAL</u> 25 m ² x 66 = 1 650 m ² which equates to 0.17 ha
New Internal Access Roads (14 m construction, rehabilitated to 8 m during operation)	<u>TOTAL</u> 36 000 m x 14 m = 504 000 m ² which equates to 50.4 ha	<u>TOTAL</u> 36 000 m x 8 m = 288 000 m ² which equates to 28.8 ha
Upgraded Existing Internal Access Roads	<u>TOTAL</u> 11 000 m x 14 m = 154 000 m ² which equates to 15.4 ha	<u>TOTAL</u> 11 000 m x 8 m = 88 000 m ² which equates to 8.8 ha
TOTAL WEF FOOTPRINT:	104.54 ha of clearing needed for the construction phase of the development of the proposed Albany WEF	67.14 ha of clearing remaining during the post-construction operational phase (after rehabilitation)
ALBANY GRID INFRASTRUCTURE		
INFRASTRUCTURE COMPONENT	CONSTRUCTION FOOTPRINT	FINAL FOOTPRINT AFTER REHABILITATION
Option 1: IPP Switching Station (battery storage and site office)	<u>TOTAL</u> 23 000 m ² which equates to 2.3 ha	<u>TOTAL</u> 23 000 m ² which equates to 2.3 ha
Option 2: Direct connection (battery storage and site office)		
Two (2) Collector Switching Stations (west and east)	<u>TOTAL</u> 10 000 m ² x 2 = 20 000 m ² which equates to 2 ha	<u>TOTAL</u> 10 000 m ² x 2 = 20 000 m ² which equates to 2 ha
Overhead Line (monopole placement every 250 m along line ONLY)	<u>TOTAL</u> 11 000 m/250 m = 44 monopoles 44 x 72 m ² = 3 168 m ² which equates to 0.3168 ha	<u>TOTAL</u> 11 000 m/250 m = 44 monopoles 44 x 2 m ² = 88 m ² which equates to 0.0088 ha
Collector Switching Station Collector Corridor (West)	<u>TOTAL</u> 500 m/250 m = 2 monopoles 2 x 72 m ² = 144 m ² which equates to 0.0144 ha	<u>TOTAL</u> 500 m/250 m = 2 monopoles 2 x 2 m ² = 4 m ² which equates to 0.0004 ha
TOTAL GRID INFRASTRUCTURE FOOTPRINT:	4.63 ha of clearing needed for the construction phase of the development of the proposed Albany Grid Infrastructure	4.31 ha of clearing remaining during the post-construction operational phase (after rehabilitation)
LINEAR INFRASTRUCTURE COMPONENT	CORRIDOR REQUIREMENTS	
Overhead Line (total length and width of line servitude)	<u>TOTAL SERVITUDE</u> 11 000 m x 31 m = 341 000 m ² which equates to 34.1 ha overhead line servitude area.	
	<u>TOTAL MAINTENANCE TRACKS (within the servitude)</u> 11 000 m x 4 m = 44 000 m ² which equates to 4.4 ha maintenance tracks.	
Collector Switching Station Collector Corridor (West)	<u>TOTAL SERVITUDE</u> 500 m x 31 m = 15 500 m ²	

ALBANY WEF		
FACILITY COMPONENT	CONSTRUCTION FOOTPRINT	FINAL FOOTPRINT AFTER REHABILITATION
	which equates to 1.55 ha overhead line servitude area.	
	TOTAL MAINTENANCE TRACKS (within the servitude) 500 m x 4 m = 2 000 m ² which equates to 0.2 ha maintenance tracks.	

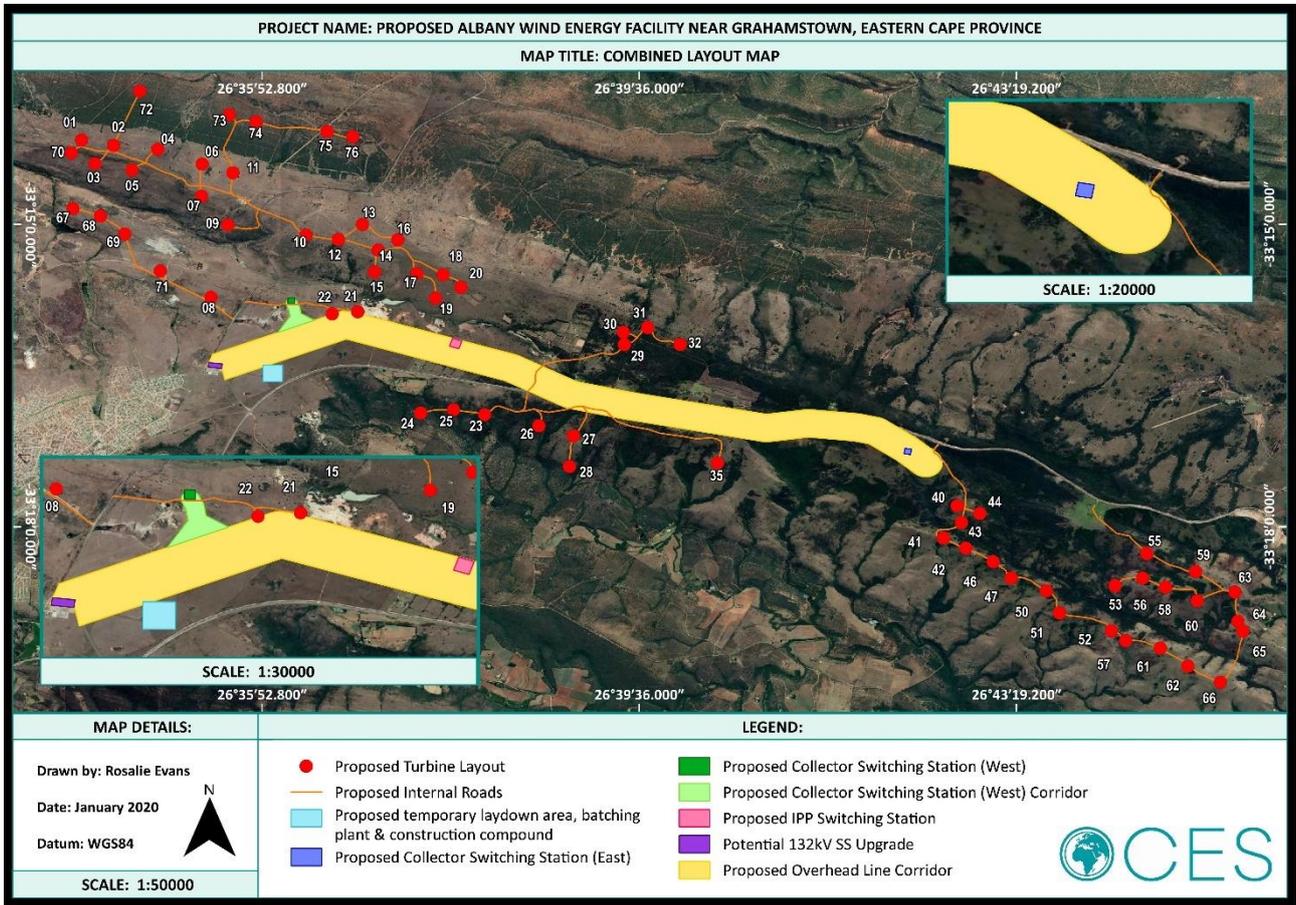


Figure 1-2: Combined Layout Map of the proposed Albany WEF and Grid Infrastructure.

1.3. PUBLIC PARTICIPATION

The Draft Ecological Assessment Report will undergo a Public Participation Process (PPP) during the thirty (30) day public review period of the Draft Environmental Impact Report (EIR) and accompanying specialist volume. Any comments received, relating to the ecological aspects of the proposed site, will be addressed and included in the Final Ecological Assessment Report, which will be submitted to the competent authorities as part of the Final EIR.

1.4. TERMS OF REFERENCE

The Terms of Reference (ToR) provided for this study are outlined below:

- Review the previous Ecological and Sensitivity study, which was undertaken in 2016, for the area.
- Review published literature on the ecology of the area to describe the study site in the context of the region and the Eastern Cape Province as a whole. The following spatial planning tools and references have been consulted:
 - Eastern Cape Biodiversity Conservation Plan (ECBCP, 2007) Critical Biodiversity Areas (CBAs);

- Department of Environment, Forestry and Fisheries (DEFF, previously the Department of Environmental Affairs (DEA)) Land Cover Data (2013-14);
 - SANBI vegetation (Mucina *et al.*, 2019);
 - South African Geology II spatial data;
 - Soil and Terrain (SOTER) databases;
 - South African Protected Areas Database (SAPAD) 4th Quarter (2019);
 - Subtropical Thicket Ecosystem Programme (STEP, 2006-7);
 - National Freshwater Ecosystem Priority Areas (NFEPAs, 2011 and 2014);
 - National Biodiversity Assessment (NBA, 2019);
 - SA Red Data List;
 - National Environmental Management: Biodiversity Act (NEM:BA) species list (Act No. 10 of 2004);
 - Protected tree species list in terms of the National Forest Act (NFA, Act No. 84 of 1998); and the
 - Provincial Nature Conservation Ordinance Act PNCO.
- Describe the study area in terms of land cover, vegetation, likely fauna and habitats. Faunal considerations which include mammals, reptiles, and amphibians. This aspect of the report will specifically include the identification of -
 - Areas of high biodiversity;
 - The presence of Species of Conservation Concern (SCC), including sensitive, endemic and protected species;
 - Habitat associations of the identified fauna and flora;
 - The presence of areas which are sensitive to invasion by alien species; and
 - The presence of conservation areas and sensitive habitats, where disturbance should be avoided or minimised.
- An assessment of the potential direct and indirect impacts resulting from the proposed WEF development and grid infrastructure, both within the footprint and the immediate surrounding area;
 - A detailed description of appropriate mitigation measures and recommendations which can be adopted to reduce negative impacts for each phase of the project, where required; and
 - Checklists of flora and faunal groups identified in the region to date, highlighting sensitive species and their possible areas of distribution.

1.5. APPROACH

The study site and surrounding areas were described using a two-phased approach. Firstly, a desktop assessment of the site was conducted in terms of current vegetation classifications and biodiversity programmes and plans. This included the consideration of:

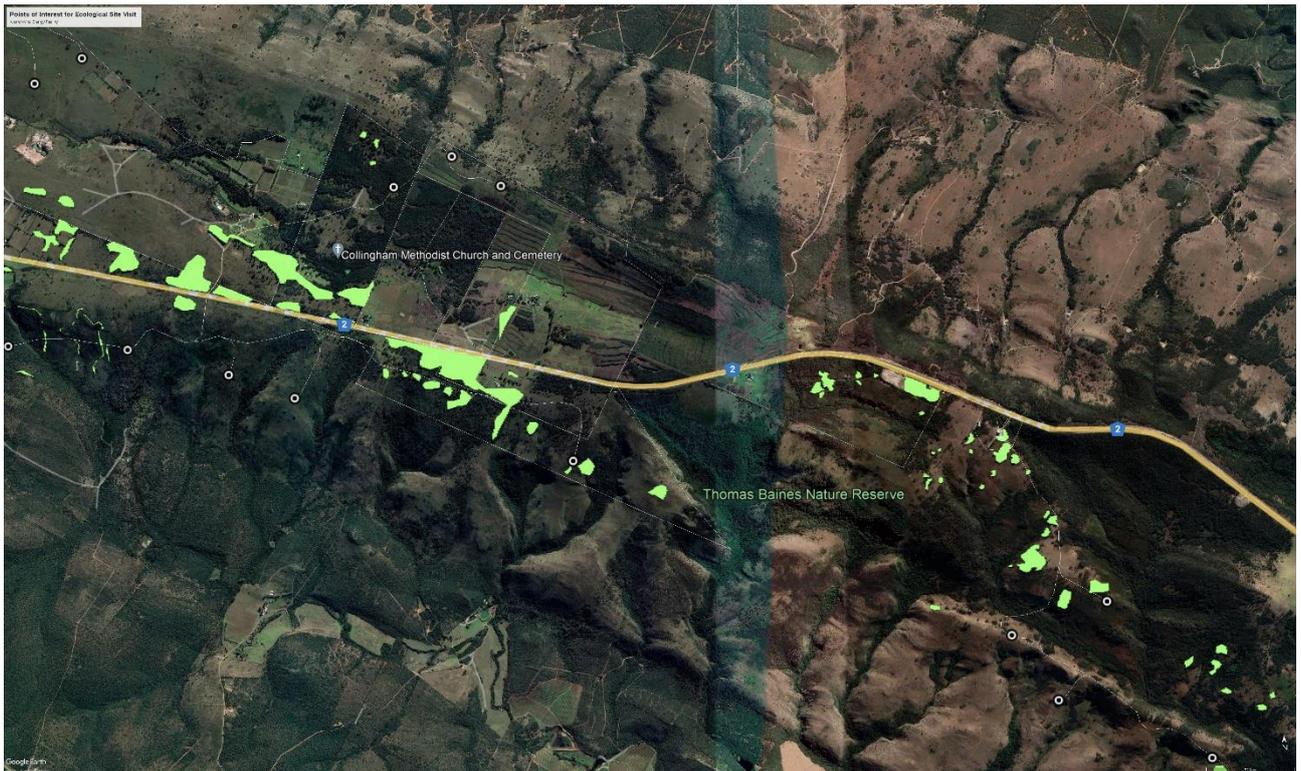
- Eastern Cape Biodiversity Conservation Plan (ECBCP, 2007);
- South African Geology II spatial data;
- Soil and Terrain (SOTER) databases;
- Eastern Cape Biodiversity Conservation Plan (ECBCP, 2007) Critical Biodiversity Areas (CBAs);
- Department of Environment, Forestry and Fisheries (DEFF, previously the Department of Environmental Affairs (DEA)) Land Cover Data (2013-14);
- South African Protected Areas Database (SAPAD) 4th Quarter (2019);
- SANBI vegetation (Mucina *et al.*, 2019);
- Subtropical Thicket Ecosystem Programme (STEP, 2006-7);
- National Freshwater Ecosystem Priority Areas (NFEPAs, 2011 and 2014);
- National Spatial Biodiversity Assessment (NSBA, 2004);
- Makana Spatial Development Framework (SDF, 2013);
- Makana Municipality Integrated Development Plan (IDP, 2017 - 2022); and

- Local Authority Notice No. 36 of 2016: Makana Local Municipality: The Spatial Planning and Land Use Management By-Laws (2016 and any amendments).

Further to the above, site investigations were conducted in the weeks of the 2nd of November 2016 and the 5th of April 2017 to assess the actual ecological state, current land-use, identify potential sensitive habitats and identify plant species associated with the proposed project activities. The site investigations were undertaken in spring and summer as numerous vegetation types bloom during the months of spring and summer which makes observation and identification easier and more accurate. The faunal component was also critical, and spring and summer were the most appropriate seasons for species location and identification. The aim of the site investigations was to identify the potential impacts which are likely to result from the proposed development.

The areas which were assessed post-desktop assessment are displayed below. These areas were identified to be of potential ecological concern (fauna and/or flora). Site investigations, including photographs and species seen were recorded. Due to the size of the site a number of images for the site visits are displayed below. The points are displayed in green. It is important to note that the areas were selected by the mammal, reptile, amphibian and floral specialists who used aerial imagery to select areas of potential concern:







1.6. ASSUMPTIONS AND LIMITATIONS

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

- This report is based on preliminary assessments, two (2) site investigations, and the site will require ground truthing should it proceed to construction phase. This is noted as a prerequisite in the mitigation and EMPr.
- The preliminary assessment was conducted to assess areas which had already been deemed sensitive during the bat pre-construction monitoring of the site.
- The project description and design specifications for the proposed WEF and grid infrastructure have not yet been finalised, and they are likely to undergo several iterations and refinements before they can be regarded as definitive.
- Descriptions of the natural and social environments are based on limited fieldwork as well as available literature and spatial data.

2. RELEVANT LEGISLATION

Table 2-1 lists the legislation which is relevant to the proposed development of the Albany WEF and grid infrastructure.

Table 2-1: Relevant Ecological Legislation.

TITLE OF LEGISLATION, POLICY OR GUIDELINE	IMPLICATIONS FOR THE ALBANY WEF & GRID INFRASTRUCTURE
<p>National Environmental Management Act (NEMA, Act No. 107 of 1998) and its subsequent amendments</p>	<ul style="list-style-type: none"> • A Scoping and EIA Process is being undertaken for the proposed Albany WEF due to the NEMA EIA Regulations Listed Activities identified in Listing Notice 2;

TITLE OF LEGISLATION, POLICY OR GUIDELINE	IMPLICATIONS FOR THE ALBANY WEF & GRID INFRASTRUCTURE
National Environmental Management Act (NEMA, Act No. 107 of 1998) Environmental Impact Assessment (EIA) Regulations (2014 and subsequent 2017 amendments)	<ul style="list-style-type: none"> • A Basic Assessment (BA) Process is being undertaken for the proposed Albany Grid Infrastructure due to the NEMA EIA Regulations Listed Activities identified in Listing Notices 1 and 3; • This Ecological Assessment Report forms part of the EIR as well as the BAR and complies with Appendix 6 of the NEMA EIA Regulations (2014 and subsequent 2017 amendments); and • In terms of Section 28, every person who causes, has caused, or may cause significant pollution or degradation of the environment must take reasonable measures to prevent pollution or rectify the damage caused.
National Environmental Management: Biodiversity Act (NEM:BA, Act No. 10 of 2004)	<ul style="list-style-type: none"> • The proposed development must conserve endangered ecosystems and protect and promote biodiversity; • Must assess the impacts of the proposed development on threatened ecosystems;
National Environmental Management: Biodiversity Act, Alien and Invasive Species Regulations (2014)	<ul style="list-style-type: none"> • No protected species may be removed or damaged without a permit; and • The proposed site must be cleared of alien vegetation using appropriate measures.
National Water Act (NWA, Act No. 36 of 1998) and its subsequent amendments	<ul style="list-style-type: none"> • Appropriate measures must be taken to prevent the pollution of wetlands and water courses; • Riparian zones must be protected; and • Construction within one hundred metres (100 m) of water courses or within five hundred metres (500 m) of wetlands will require Water Use Authorisation issued by the Department of Water and Sanitation (DWS).
National Forest Act (Act No. 84 of 1998) and its subsequent amendments	<p>The central properties within the proposed Albany WEF and grid infrastructure sites contain forest patches. In addition, sections of the affected properties to the east of the Albany WEF site contain small forest patches (Southern Mistbelt Forest). No part of these forests may be impacted by the proposed development.</p>
Conservation of Agricultural Resources Act (CARA, Act No. 43 of 1983)	<p>The objectives of this Act are to provide for the conservation of the natural agricultural resources by the maintenance of the production potential of land, by the combating and prevention of erosion and weakening or destruction of the water sources, and by the protection of the vegetation and the combating of weeds and invader plants.</p>
National Environmental Management: Protected Areas Act (Act No. 31 of 2004) and its subsequent amendments	<ul style="list-style-type: none"> • The objective of this Act is to provide for the protection and conservation of ecologically viable areas which represent South Africa's biological diversity and its natural landscapes and seascapes; • The proposed Albany WEF site borders two recognised protected areas, namely the Ecca Local Authority Nature Reserve and the Beggars Bush State Forest
Constitution Act (Act No. 108 of 1996)	<ul style="list-style-type: none"> • Obligation to ensure that the proposed activity will not result in pollution and ecological degradation; and • Obligation to ensure that the proposed development is ecologically sustainable, while demonstrating economic and social development.
Endangered and Protected Flora in the 1974 Provincial Nature Conservation Ordinance (PNCO) and subsequent amendments	<ul style="list-style-type: none"> • An ecological walk through of the proposed development footprint will be required prior to construction to identify species that require permits for their removal; and • Permits must be obtained for the removal of species on these lists prior to vegetation clearance during the construction phase.
National Veld and Forest Fire Act (Act No. 101 of 1998) and its subsequent amendments	<p>The proposed Albany WEF may increase the risk of veld and mountain fires within the proposed site and surrounds.</p>

TITLE OF LEGISLATION, POLICY OR GUIDELINE	IMPLICATIONS FOR THE ALBANY WEF & GRID INFRASTRUCTURE
Eastern Cape Biodiversity Conservation Plan (ECBCP, 2007) – <i>currently being updated but updated spatial data is not yet available.</i>	The ECBCP main outputs are the terrestrial and aquatic Critical Biodiversity Areas (CBAs). These include three (3) main management categories: <ul style="list-style-type: none"> • CBA 1 areas should be maintained in a natural state; • CBA 2 areas should be maintained in a near-natural state; and • CBA 3 areas should be maintained as functional landscapes for biodiversity functions.
National Freshwater Ecosystem Priority Areas (NFEPA, 2011 – 2014)	The NFEPA project provides strategic spatial priorities for conserving South Africa’s freshwater ecosystems and supports sustainable use of water resources, including rivers and wetlands. The biodiversity conservation target for freshwater ecosystems in South Africa is 20%, which means that at least 20% of each wetland ecosystem type should be maintained in a natural or near-natural condition.

3. DESCRIPTION OF THE PHYSICAL ENVIRONMENT

3.1. GEOLOGY AND LANDFORM

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

3.1.1. Topography

The proposed Albany WEF and grid infrastructure sites are characterised by undulating hills. The elevation ranges from 480 to 760 metres above sea level (masl). The proposed sites and surrounds are generally steep with a maximum slope of 43.2% and average slope of 6.7%. Plate 3-1 illustrates the general topography of the project site.





Plate 3-1: Photographs illustrating the general topography of the area.

3.1.2. Geology

The proposed Albany WEF and grid infrastructure sites are underlain by lithologies of the Witteberg Group and the Grahamstown Formation, as indicated in Figure 3-1. The surrounding lithologies include the Dwyka Group and the Ecca Group.

The Witteberg Group (light brown and light yellow in Figure 3-1), within the proposed Albany WEF and grid infrastructure sites, consist of arenite, shales and diamictite. Whereas the Grahamstown Formation (dark brown in Figure 3-1) primarily consists of silcrete.

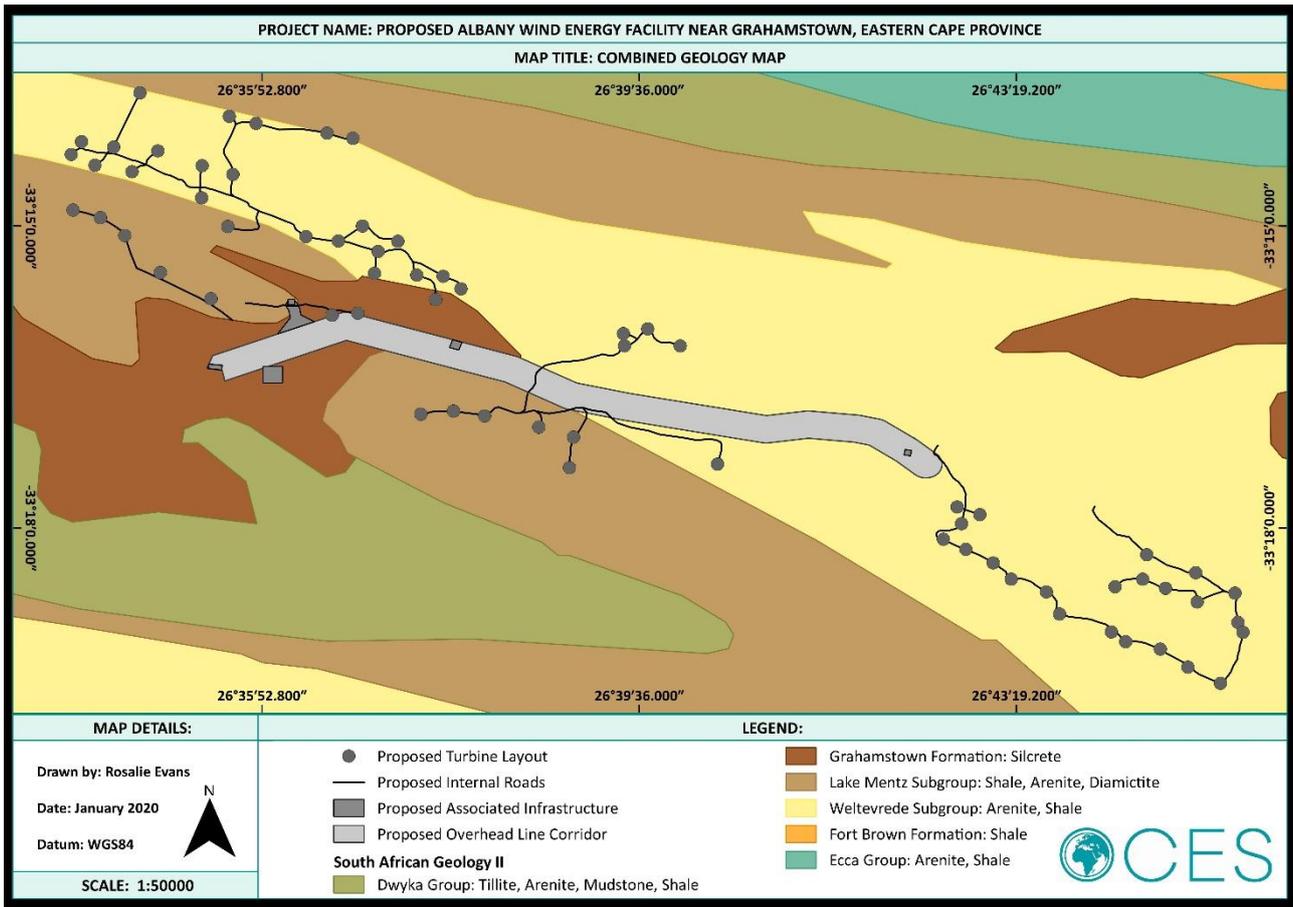


Figure 3-1: Geology Map of the Proposed Albany WEF and Grid Infrastructure Sites.

3.2. CLIMATE

Makhanda receives approximately 680 mm of precipitation per annum, with the highest rainfall months of March (autumn) and October (spring). The average minimum temperature is 10.5° C, with the lowest minimum temperatures occurring during the month of July (winter). The average maximum temperature is 23.2° C, with the highest maximum temperatures occurring during the month of February (summer). Climate data is relevant to the agriculture of an area due to the reliance of agricultural lands on enough rainfall and sunlight. In addition, periods of high rainfall increase the likelihood of soil erosion due to runoff.

Table 3-1: Makhanda Climate Table (Source: en.climate-data.org).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg. Temp (°C)	20.7	20.9	20	17.6	15.3	13	12.4	13.5	15.1	16.1	17.9	19.5
Min. Temp (°C)	14.6	15.1	14.4	11.3	8.6	5.9	5.4	6.4	8.5	10	12.2	13.5
Max. Temp (°C)	26.8	26.8	25.7	24	22	20.1	19.4	20.7	21.8	22.3	23.6	25.6
Precipitation (mm)	60	68	75	47	43	33	36	51	61	75	68	66

3.3. LAND COVER

According to the South African National Land Cover Dataset (DEA, 2013-14), the properties which are affected by the proposed Albany WEF and grid infrastructure sites currently consist of a combination of grasslands, indigenous forest, thicket/dense bush, mature plantations, woodland/open bush, cultivated commercial fields, permanent water, seasonal water and mines 1 (bare), as indicated in Figure 3-2 on the following page.

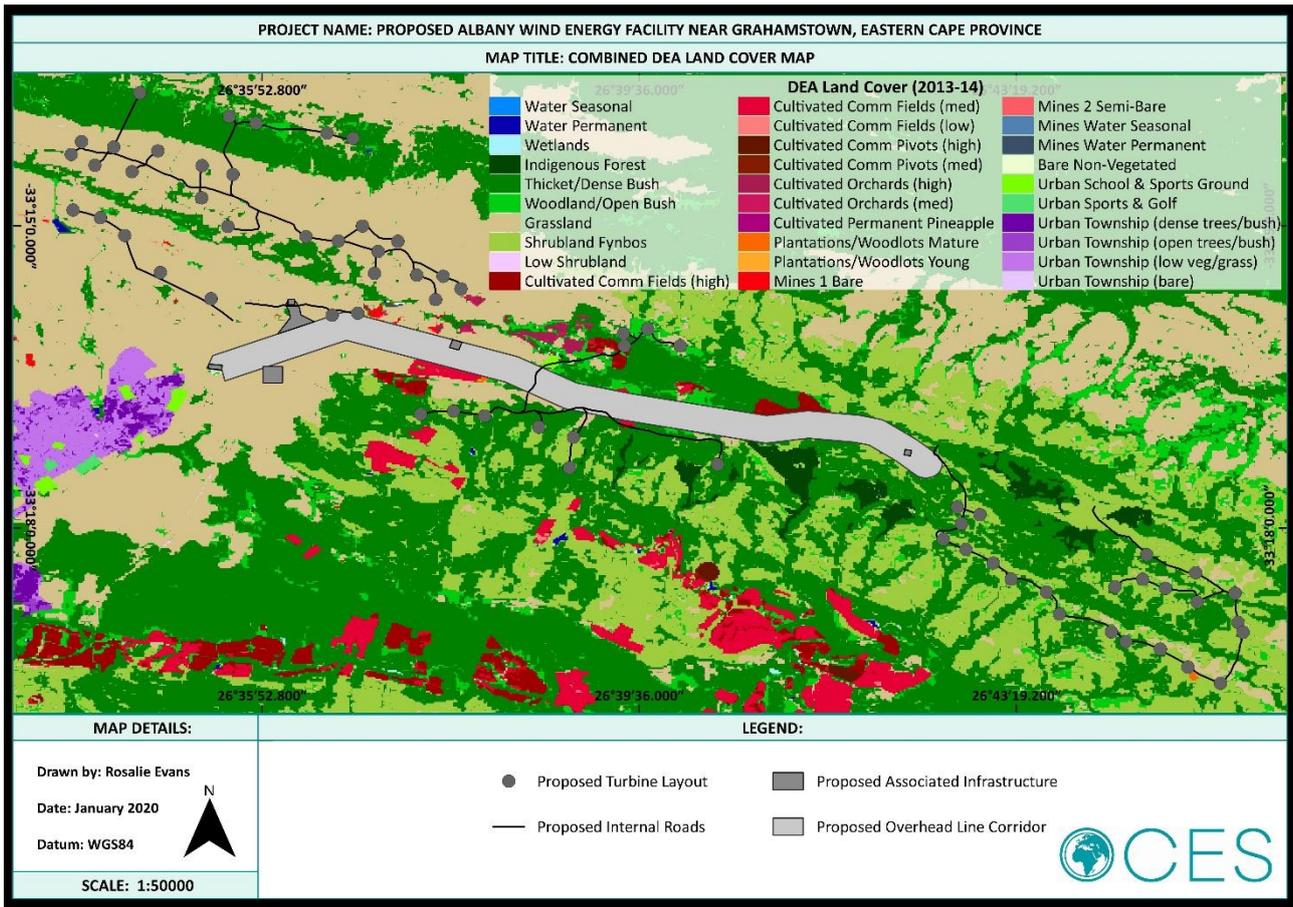


Figure 3-2: Land Cover Map of the Proposed Albany WEF and Grid Infrastructure Sites.

4. DESCRIPTION OF THE ECOLOGICAL ENVIRONMENT

The proposed Albany WEF and grid infrastructure fall within three (3) biomes, namely the Fynbos Biome (Suurberg Shale Fynbos and Suurberg Quartzite Fynbos), the Savanna Biome (Bhisho Thornveld), and the Albany Thicket Biome (Grahamstown Grassland Thicket, Albany Bontveld and Albany Valley Thicket). In addition, small sections of the affected properties contain patches of Southern Mistbelt Forest, from the Forests Biome. It must however be noted that none of the proposed Albany WEF site falls within the Southern Mistbelt Forest but a small section of the overhead line corridor runs along the edge of one of the Southern Mistbelt Forest patches (dark purple in Figure 4-1).

4.1. SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (SANBI) VEGETATION

Mucina and Rutherford (2006) developed the National Vegetation Map as part of a South African National Biodiversity Institute (SANBI) funded project. The vegetation has subsequently been revised and republished. The latest version was published in 2019 (Mucina *et al.*, 2019). The vegetation map project has two (2) main aims:

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

The map and accompanying book describe each vegetation type in detail, along with the most important species, including endemic species and those which are biogeographically important. According to vegetation map, six (6) vegetation types will be affected by the current layout of the Albany WEF and grid infrastructure, as indicated in Table 4-1 below.

Table 4-1: Vegetation Types within the Proposed Site (Mucina & Rutherford, 2006 and 2018).

BIOME	VEGETATION TYPE	CONSERVATION STATUS & TARGET	PROTECTION STATUS & TOTAL	COLOUR IN FIGURE 4-1	PROPOSED INFRASTRUCTURE
Albany Thicket Biome	Grahamstown Grassland Thicket	Least threatened with a target of 19%	Poorly protected		28 turbines, ±15% of the overhead line corridor, collector substation (west), ±5% of the IPP substation, ±35% of the temporary laydown area (batching plant and construction compound), the associated collector substation corridor and ±37% of the total internal roads
	Albany Bontveld	Least threatened with a target of 19%	Poorly protected		5 turbines and ±3% of the total internal roads.
	Albany Valley Thicket	Vulnerable with a target of 19%	Moderately protected		±2% of the total internal roads.
Savanna Biome	Bhisho Thornveld	Least threatened with a target of 25%	Hardly protected with a total of 0.2% (+2%)		4 turbines, ±12% of the total internal roads, ±95% of the IPP substation, ±65% of the temporary laydown area (batching plant and construction compound), potential 132 kV substation upgrade, and ±70% of the overhead line corridor.
Fynbos Biome	Suurberg Shale Fynbos	Least threatened with a target of 23%	Well protected with a total of 38.4% (+6.1%)		4 turbines and ±7% of the total internal roads.
	Suurberg Quartzite Fynbos	Least threatened with a target of 23%	Moderately protected with a total of 15% (+16%)		25 turbines, collector substation (east), ±39% of the total internal roads and ±15% of the overhead line corridor.

4.1. SITE VEGETATION

Suurberg Quartzite Fynbos was observed in the eastern portion of the proposed site, consisting of a mosaic of alien invasive stands, rocky outcrops with bush clumps and fynbos vegetation. The fynbos vegetation found in this area were characterised by species such as *Erica spp*, *Leucodendron salignum*, *Elytropappus rhinocerotis* and *Themeda triandra*. *Oldenburgia grandis* was abundant in the rocky areas and tree species, such as *Cussonia spicata* and *Rhus spp*, were also found. The area was generally in low to moderate condition, with several SCC present, rocky outcrops, a relatively large area of alien vegetation cover and disturbed areas. A portion of this vegetation, near the valleys, is highly invaded by *Acacia mearnsii*, which have formed large stands that resemble a forest with little understory.

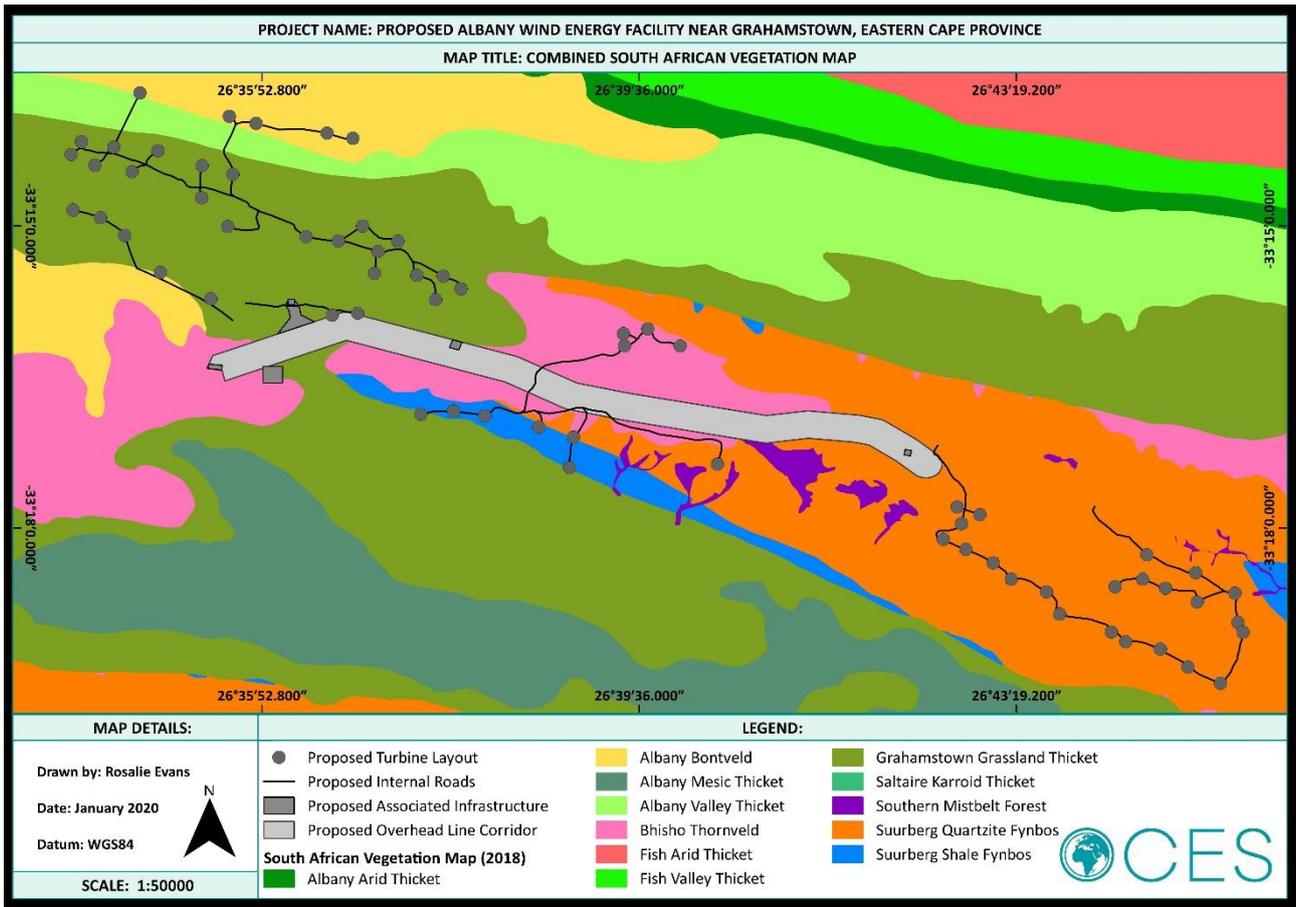


Figure 4-1: South African Vegetation Map of the Proposed Albany WEF and Grid Infrastructure Sites.



Plate 4-1: Fynbos Vegetation with Alien Invasive Species, such as *Pinus* spp and *Acacia mearnsii*.



Plate 4-2: Alien invasive stands invading rocky outcrop with little grass cover.



Plate 4-3: Alien invasive stands: *Acacia mearnsii*

Grahamstown Grassland Thicket within the proposed site, consisted of fragmented thicket vegetation, which included tree species such as *Scotia afra*, *Portulacaria afra* and SCC such as *Sideroxylon inerme*, as well as grassland vegetation and rocky outcrops which harboured succulent species, such as *Carpobrotus edulis*, *Crassula spp* and *Euphorbia spp*. This vegetation within the study area of the proposed development varied from degraded to good condition, with a number of SCC occurring in the good areas and a large cover of alien invasive species in the degraded areas.

The higher elevation areas of this vegetation was mostly in good condition and included rocky outcrops (Plate 4-4 and Plate 4-6). Whilst the sloped and riparian sections of the Grassland Thicket consisted of thicket vegetation. Steep areas are unlikely to be impacted by the proposed turbines and turbine infrastructure. The lower valley river bottoms (see Plate 4-7) of this vegetation (flatter areas) were degraded and had high alien invasion.



Plate 4-4: Grassland Thicket Vegetation within the Proposed Site.



Plate 4-5: *Euphorbia stellata* (A) and *Euphorbia spp.* (B) and succulent species *Crassula spp.* (C) and *Crassula spp.*(D) which were in the rocky outcrops within the Proposed Site.



Plate 4-6: Thicket Fragments within the Grassland Thicket.



Plate 4-7: Thicket Vegetation on the Slopes and Alien Invasive vegetation dominating the flat areas within the Proposed Site.

A small section of Bhisho Thornveld was observed within the proposed site. This vegetation type was characterised by a combination of grass and a herbaceous layer, which included tree species such as *Acacia Karoo*, *Grewia occentalis* and *Searsia longispina*. The Bhisho Thornveld was relatively degraded and contained few SCC.



Plate 4-8: General vegetation found to occur in the Bhisho Thornveld.

4.1.1. Species of Conservation Concern

The species list from the site investigation was assessed against the South African Red Data List, the National Environmental Management Biodiversity Act (NEM:BA, Act No. 10 of 2004) List of Protected Species, DAFF's List of Protected Tree Species and the 1974 Provincial Nature Conservation Ordinance (PNCO) List of Species, as indicated in Table 4-3.

After the preliminary assessment, *Boophane disticha* and *Cyrtanthus obliquus*, which are listed as declining on the South African Red Data List, were recorded to occur within the proposed site (see below). *Sideroxylon inerme* is listed as a protected tree. Approximately ten (10) species are listed as Schedule 4 species on the PNCO and no species listed on NEM:BA, were found to occur in the study area.

Table 4-3: SCC found during the site investigation. Please note that additional SCC are likely to occur within the Propose Site.

FAMILY	SCIENTIFIC NAME	SANBI RED LIST	IUCN	PNCO	NEMBA	PROTECTED TREES	NEM:BA
ASPHODELACEAE	<i>Aloe striata</i>	Least Concern	-	Schedule 4	-	-	-
IRIDACEAE	<i>Aristea ecklonii</i>	Least Concern	-	Schedule 4	-	-	-
AMARYLLIDACEAE	<i>Boophane disticha</i>	Declining	-	Schedule 4	-	-	-
APOCYNACEAE	<i>Carissa Bispinosa</i>	Least Concern	-	Schedule 4	-	-	-
AIZOACEAE	<i>Carpobrotus edulis</i>	Least Concern	-	Schedule 4	-	-	-
AMARYLLIDACEAE	<i>Cyrtanthus obliquus</i>	Declining	-	Schedule 4	-	-	-
EUPHORBIACEAE	<i>Euphorbia polygona (Euphorbia horrida)</i>	Least Concern	-	Schedule 4	-	-	-
PROTEACEAE	<i>Leucodendron salignum</i>	Least Concern	-	Schedule 4	-	-	-
IRIDACEAE	<i>Watsonia sp.</i>	-	-	Schedule 4	-	-	-
SAPOTACEAE	<i>Sideroxylon inerme</i>	Least Concern	-	-	-	Protected	-



Plate 4-9: *Cyrtanthus obliquus* (A) and *Boophane disticha* (B) observed within the Proposed Site.

4.1.2. Alien Species

Numerous alien species were present within the proposed site, especially *Acacia spp*, where they have formed closed canopies and dense stands. Other alien species were found to occur in various vegetation types.

Table 4-4: Alien Invasive Species Found within the Proposed Site, According to the NEM:BA.

SPECIES	CATEGORY	COMMENT
<i>Echinopsis spachiana</i>	1b	1) According to the NEM:BA Category 1b, Listed Species are those species listed as such by notice in terms of section 70(1)(a) of the Act as species which must be contained. 2) A landowner upon whose land a Category 1b Listed Invasive Species occurs and which species is under the landowner's control must: (a) Comply with the provisions of section 73(2) of the Act; and (b) Contain the listed invasive species in compliance with section 75 (1), (2) and (3) of the Act. 3) If an Invasive Species Management Programme has been developed in terms of Regulation 7, a landowner must control the listed invasive species in accordance with such programme. 4) A landowner contemplated in sub-regulation (2) must allow an authorised official from the Department to enter onto the land to monitor, assist with or implement the containment of the listed invasive species, or compliance with the Invasive Species Management Programme contemplated in Regulation 7.
<i>Opuntia ficus-indica</i>	1b	
<i>Acacia cyclops</i>	1b	
<i>Cirsium Vulgare</i>	1b	
<i>Acacia saligna</i>	1b	
<i>Acacia mearnsii</i>	2	
<i>Pinus spp</i>	-	-

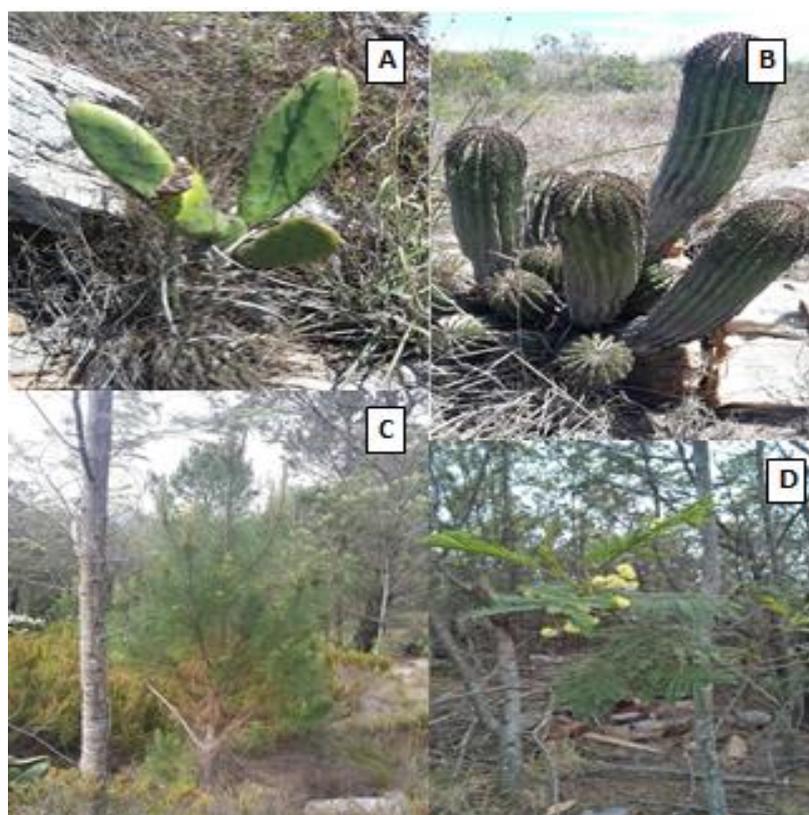


Plate 4-10: Alien Invasive Species Identified within the Proposed Site; *Opuntia ficus-indica* (A), *Echinopsis spachiana* (B), *Pinus spp* (C), *Acacia mearnsii* (D).

4.1.3. Eastern Cape Biodiversity Conservation Plan (ECBCP)

The ECBCP (2019) replaces the ECBCP (2007) in its entirety and provides a map of important biodiversity areas, outside of the Protected Areas network, which can be used to inform land use and resource-use planning and decision making. The objectives of the ECBCP (2019) are to:

- 1) Identify the minimum spatial requirements needed to maintain a living landscape that continues to support all aspects of biodiversity and retain/maintain essential ecological infrastructure. This is achieved through the selection of areas, based on achieving targets, which represent important biodiversity pattern AND ecological processes;
- 2) Serve as the primary source of biodiversity information for land use planning and decision-making; and
- 3) Inform conservation and restoration action in important biodiversity areas.

The aim of the ECBCP is to map biodiversity priority areas through a systematic conservation planning process. The main outputs of the ECBCP include Protected Areas (PA), Critical Biodiversity Areas (CBA), Ecological Support Areas (ESA), Other Natural Areas (ONA) and No Natural Habitat Remaining (NNR) for both terrestrial and aquatic ecosystems.

According to the ECBCP (2019), the study area falls within an aquatic ESA 1. The management requirements for these areas are as follows:

Maintain ecological function within the localised and broader landscape. A functional state in this context means that the area must be maintained in a semi-natural state such that ecological function and ecosystem services are maintained.

For areas classified as ESA1, the following objectives apply:

- These areas are not required to meet biodiversity targets, but they still perform essential roles in terms of connectivity, ecosystem service delivery and climate change resilience.
- These systems may vary in condition and maintaining function is the main objective, therefore:
 - Ecosystems still in natural, near natural state should be maintained.
 - Ecosystems that are moderately disturbed/degraded should be restored.

According to the ECBCP (2019) spatial planning tool, the proposed Albany WEF and grid infrastructure sites are situated in Terrestrial CBA 1 and CBA 2 areas (Figure 4-3a). CBA 1 and CBA 2 areas should be kept in a natural or near-natural state.

The CBA 1 areas within the proposed site were selected due to the recording of threatened bird and plant species. A separate Avifaunal Impact Assessment has been conducted to determine the impact of the development on birds and important bird habitat, therefore this report will focus on the presence of plant biodiversity and the impacts of the proposed development on conservation of threatened plant species. Although the threatened plant species were not observed on site, they may have gone undetected. The list of possible threatened plant species and comments on their likelihood of persistence in the area are provide below:

- *Agathosma bicornuta*: this species is classified at Endangered, with over 50% of the populations having disappeared due to overgrazing. It is highly likely that the specimens previously recorded in the study area have been lost to overgrazing due to the close proximity of the Nompumelelo township. The large number of associated livestock that are kept by this community will have caused high grazing pressure in area surrounding the township.

- *Faucaria tigrina*: this species is classified at Endangered with only 4 known locations around Grahamstown and is therefore endemic to the study area. The decline of the species is associated with urban expansion and overgrazing.
- *Brachystelma comptum*: this species is classified as vulnerable and is known from 5 locations around Grahamstown and is therefore endemic to the study area. Threats to the species include loss of habitat due to alien invasive plant species, urban expansion and overgrazing.

The condition of central sections (lower portion of the site) of the study area was significantly degraded by high levels of alien plant invasion which was found to have altered the vegetation cover in these areas. It is highly unlikely that threatened plant species have managed to survive the high infestation levels.

It must be noted that an area demarcated as a Protected Area in the CBA map (red outline in Figure 4-3a) is a legacy from previous SAPAD versions, which have subsequently been removed as a Protected Area from the database. Since the site is surrounded by CBA 1 and 2 areas, this area will take on the same classification, the land management objectives of which requires that the site remains in a natural state.

In addition, the ECBPC (2019) Aquatic CBA map places Turbines 19-37 and Turbines 41-66 in the catchment of CBA 1 rivers, namely the Bloukrans River and Kap River, respectively. These catchments are classified as Ecological Support Areas, as they influence the quality and quantity of water in the river systems. The implication for the development is that no degradation of the site should be permitted as this will in turn affect the CBA 1 rivers. Care should be taken during construction and rehabilitation and revegetation will be important components of the project.

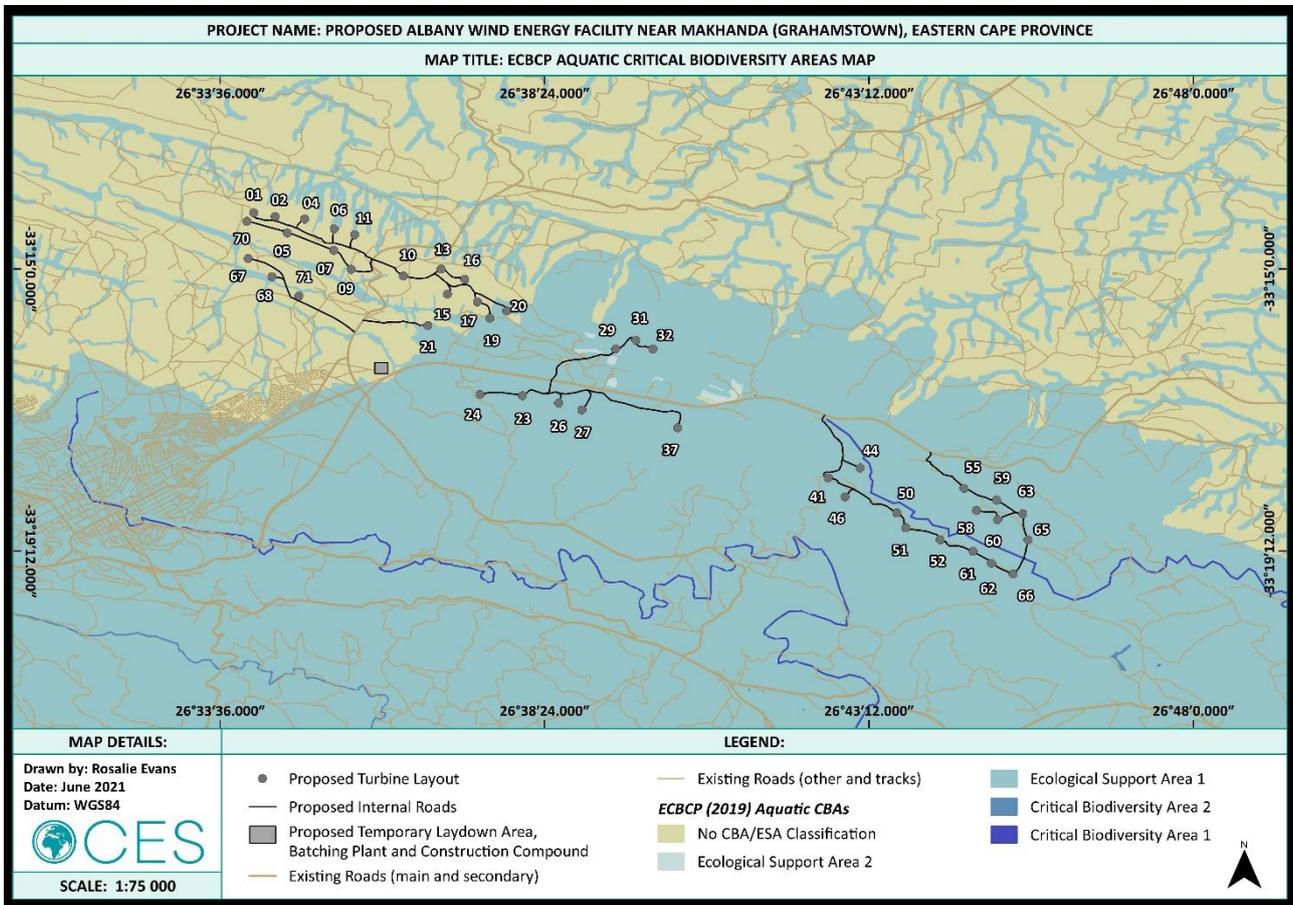
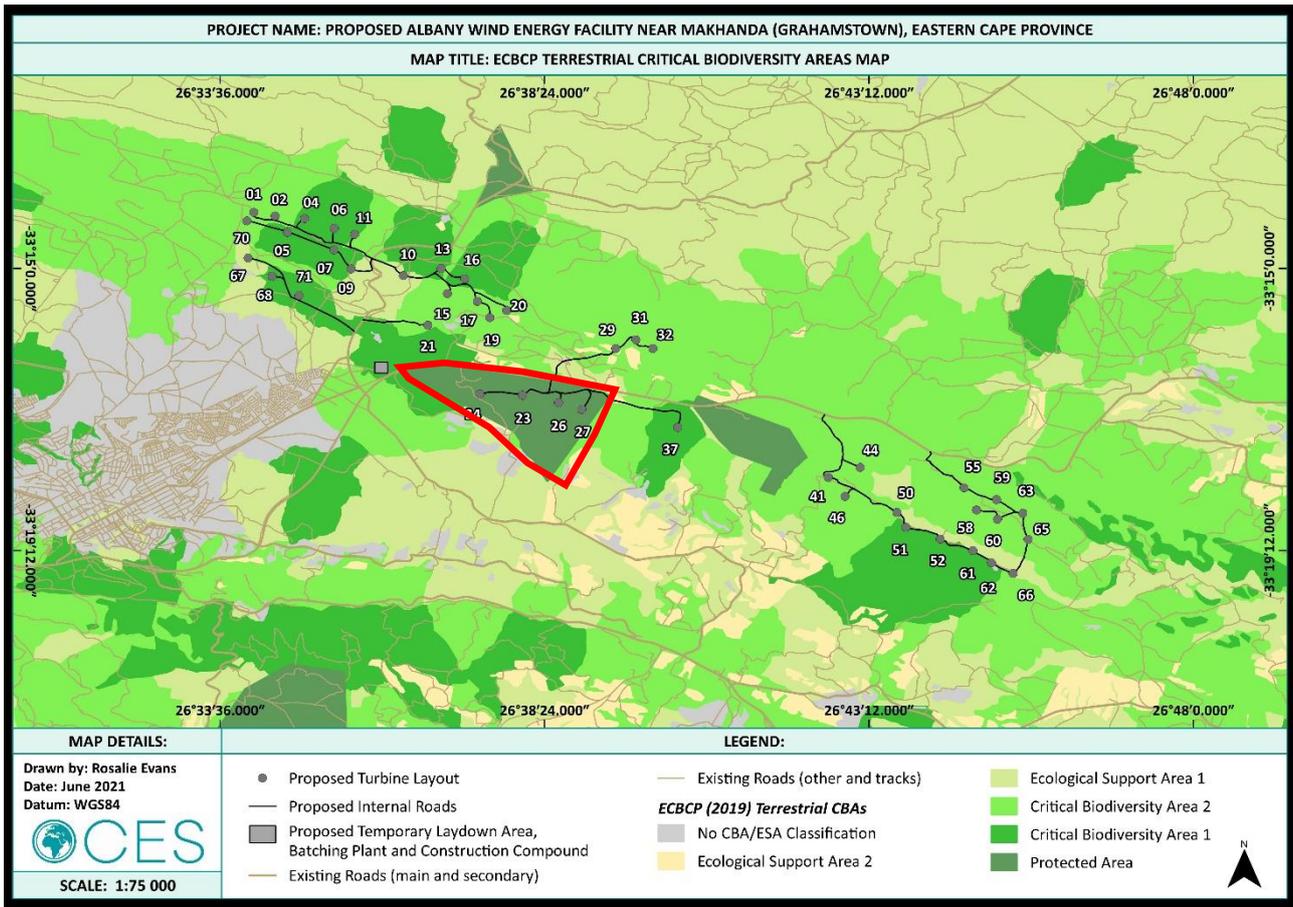


Figure 4-3: a) ECBCP (2019) Terrestrial CBA Map of the Proposed Albany WEF and Grid Infrastructure Sites; b) ECBCP (2019) Aquatic CBA Map of the Proposed Albany WEF and Grid Infrastructure.

4.2. PROTECTED AREAS

Two Protected Areas, namely the Beggars Bush State Forest (the orange shaded area within the study area is a *de facto* Protected Area managed by ECPTA) and the Ecca Local Authority Nature Reserve are both adjacent to the proposed Albany WEF study area. No turbines or associated infrastructure are proposed within Beggars Bush State Forest.

A number of Protected Areas are located north (± 10 km) and south (± 12 km) of the proposed Albany WEF site.

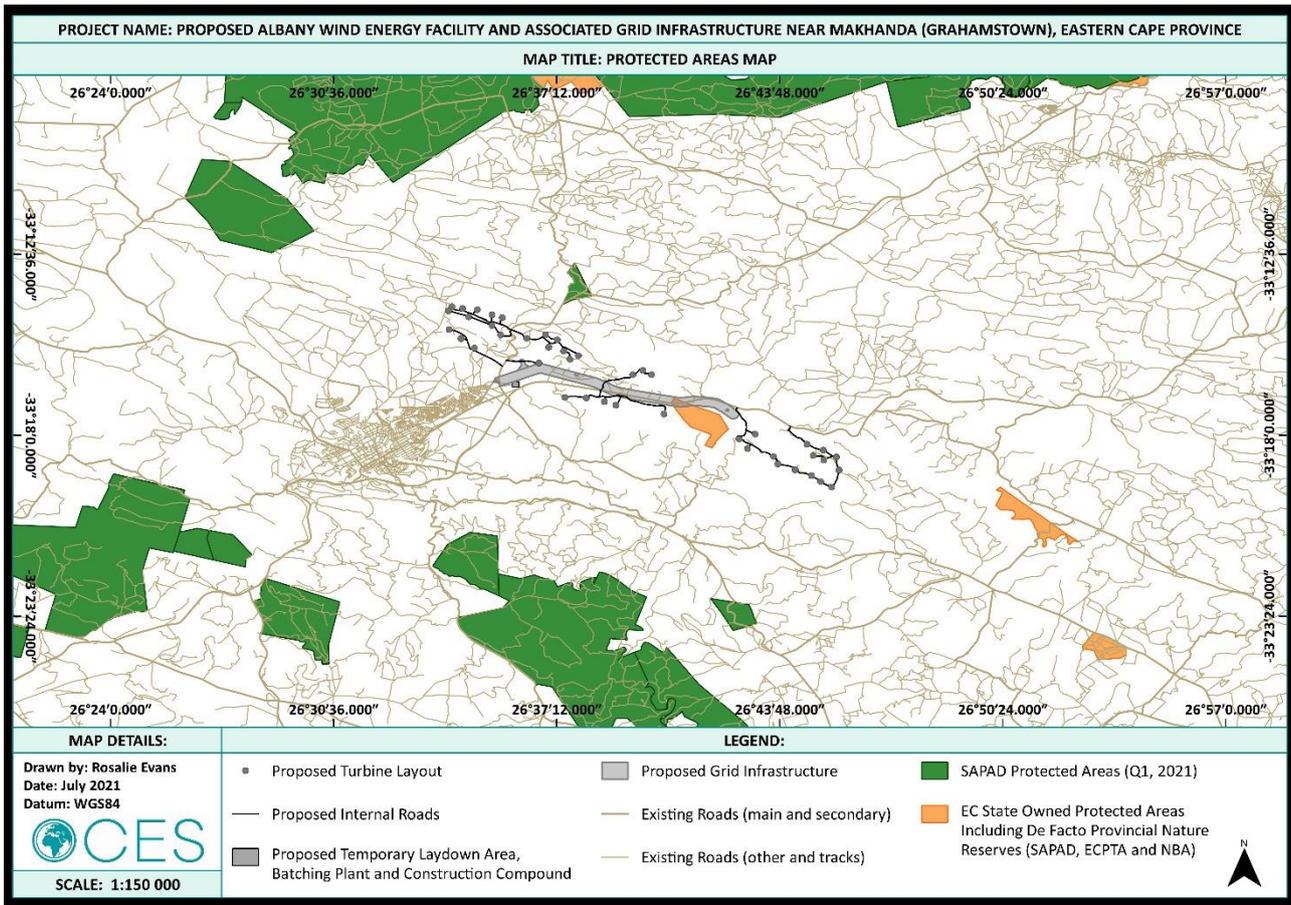


Figure 4-4: Protected Areas around the proposed Albany WEF and Grid Infrastructure Sites.

4.3. SURFACE WATER

The NFEPA identifies, numerous wetlands were found to occur within 500 m of the proposed Albany WEF and grid infrastructure sites. Most of these wetlands have been found to be artificial dams. No rivers are located within 100 m of the proposed turbines but the proposed associated infrastructure, including the proposed overhead line corridor, traverses numerous rivers, as indicated in Figure 4-5. Water Use Authorisation, from the Department of Water and Sanitation (DWS), is required prior to the construction within 100 m of the watercourses and within 500 m of the wetlands. The types of wetlands which occur within the proposed sites are described in Table 4-5.

Table 4-5: Types of Wetlands which occur within the Proposed Site.

WETLAND	DESCRIPTION
Bench Flat	A near-level wetland area (i.e. with little or no relief) with little or no gradient, situated on a plain or a bench in terms of landscape setting. The primary source of water is precipitation. Dominant hydrodynamics are bidirectional vertical fluctuations, although there may be limited

WETLAND	DESCRIPTION
	multidirectional horizontal water flow in some cases. Water exits through evaporation and infiltration.
Bench Depression	A near-level wetland area (i.e. with little or no relief) with little or no gradient, situated on a plain or a bench in terms of landscape setting. A depression is a landform with closed elevation contours that increases in depth from the perimeter to the central area of the greatest depth, where water accumulates. Water sources are precipitation, ground water discharge, interflow and overland flow.
Slope Seep	An inclined stretch of ground that is not part of a valley floor, typically located on the side of a mountain, hill or valley. A slope seep is a wetland area located on gently sloping land dominated by the gravity driven movement of material down-slope. Seeps are generally associated with strong, unidirectional flow of water horizontally. Water input is primarily groundwater or precipitation.
Valley Floor: Channelled Valley-Bottom Wetland	Small depressional areas within a channelled valley-bottom wetland can result in the temporary containment and storage of water within the wetland. Water generally exits in the form of diffuse surface flow and interflow, with the infiltration and evaporation of water from these wetlands also being potentially significant.

Water bodies play an important ecological role, which includes the functioning of the vegetation which is found to occur in these areas. This vegetation plays a role in the improvement of the water quality and the trapping of sediment (Daily, 1997).

The maintenance of these water bodies is important as it provides suitable habitat for hydrophytic and hydrophilic species and riparian vegetation which occurs in these wetland areas. Plates 4-11, 4-12 and 4-13 illustrate some of the wetlands and dams which were identified within the proposed site and surrounds.



Plate 4-11: Example 1 Indicating an artificial wetland within the Proposed Sites and surrounds.



Plate 4-12: Example 2 Indicating an artificial wetland within the Proposed Sites and surrounds.



Plate 4-13: Example 3 Indicating an artificial wetland within the Proposed Sites and surrounds.

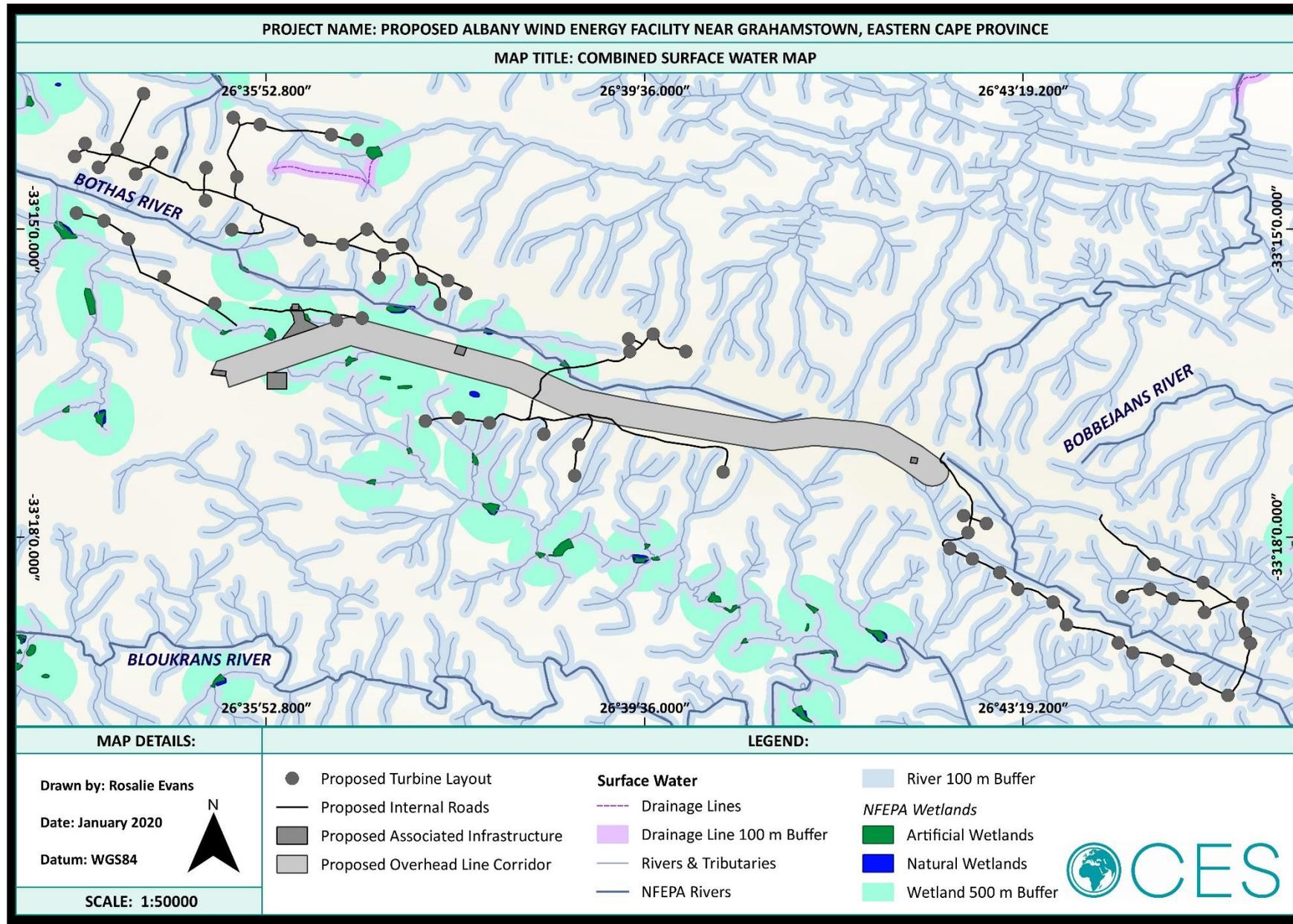


Figure 4-5: Surface Water Map of the Proposed Albany WEF and Grid Infrastructure Sites and Surrounds.

5. FAUNAL SPECIES AND HABITATS

In the sections below, information and survey data associated with amphibians, reptiles and mammals (with the exception of bats) is provided. Since birds and bats are particularly sensitive to wind turbines, specialist monitoring and impact assessments have been undertaken separate to this report. Therefore, for any information relating to these taxonomic groups, please refer to these specialist reports.

5.1. REPTILES, AMPHIBIANS, AND MAMMALS

Amphibians and reptiles are well represented in sub-Saharan Africa. However, distribution patterns in southern Africa are uneven, both in terms of species distribution and in population numbers (du Preez and Carruthers, 2009). Climate, centres of origin and range restrictions are the three (3) main factors which determine species distribution. The eastern coast of South Africa has the highest amphibian diversity and endemism, while reptile diversity is generally highest in the north-eastern extremes of South Africa and declines to the south and west (Alexander and Marais, 2010).

5.1.1. Reptiles

The Eastern Cape is home to one-hundred and thirty-three (133) reptile species, which include twenty-one (21) snakes, twenty-seven (27) lizards and eight (8) chelonians (tortoises and turtles). The majority of these are found in Mesic Succulent Thicket and riverine habitats.

The Animal Demography Unit (ADU) historical records indicate that sixty-two (62) reptile species are likely to occur within the proposed site (QDS 3326 BA, 3326 BC, and 3326BD). None of these species are threatened in terms of the Red List of Reptiles of South Africa (2014) and only the Southern African Python (*Python natalensis*) is listed under NEM:BA. However, all of the lizards and tortoises, which are likely to occur within the proposed site, are listed as a Schedule II species on the PNCO list and will therefore require permits for their removal. Table 5-1 lists the reptilian SCC which are likely to occur within the proposed site.

Table 5-1: Reptile SCC within the Proposed Site (ADU).

SCIENTIFIC NAME	COMMON NAME	SA RED LIST CATEGORY (SARCA)	IUCN	NEM:BA	CITES	PNCO	REGION ENDEMIC	RECORDED ON SITE
<i>Boaedon capensis</i>	Brown House Snake	Least Concern	-	-	-	Schedule II	-	Yes
<i>Bradypodion ventrale</i>	Eastern Cape Dwarf Chameleon	Least Concern	-	-	Appendix II	-	Yes	-
<i>Chamaesaura anguina anguina</i>	Cape Grass Lizard	Least Concern	-	-	-	Schedule II	Yes	-
<i>Chersina angulata</i>	Angulate Tortoise	Least Concern	-	-	Appendix II	Schedule II	-	-
<i>Cordylus cordylus</i>	Cape Girdled Lizard	Least Concern	-	-	App. II	Schedule II	Yes	Yes
<i>Dasypeltis scabra</i>	Rhombic egg-eater	Least Concern	-	-	-	Schedule II	-	-
<i>Dasypeltis inornata</i>	Southern Brown Egg-eater	Least Concern	-	-	-	Schedule II	Yes	-
<i>Duberria lutrix lutrix</i>	South African Slug-eater	Least Concern	-	-	-	Schedule II	Yes	Yes
<i>Homopus areolatus</i>	Parrot-beaked Tortoise	Least Concern	-	-	Appendix II	Schedule II	Yes	Yes

<i>Lamprophis fuscus</i>	Yellow-bellied House Snake	Least Concern	-	-	-	Schedule II	Yes	-
<i>Lycodonomorphus rufulus</i>	Brown Water Snake	Least Concern	-	-	-	Schedule II	-	Yes
<i>Lycodonomorphus inornatus</i>	Olive House Snake	Least Concern	-	-	-	Schedule II	Yes	-
<i>Lycodonomorphus laevis</i>	Dusky-bellied Water Snake	Least Concern	-	-	-	Schedule II	Yes	-
<i>Lycophidion capense capense</i>	Cape Wolf Snake	Least Concern	-	-	-	Schedule II	-	-
<i>Nucras lalandii</i>	Delalande's Sandveld Lizard	Least Concern	-	-	-	Schedule II	-	Yes
<i>Nucras taeniolata</i>	Albany Sandveld Lizard	Near Threatened	-	-	-	Schedule II	Yes	-
<i>Pedioplanis burchelli</i>	Burchell's Sand Lizard	Least Concern	-	-	-	Schedule II	Yes	Yes
<i>Pedioplanis lineoocellata pulchella</i>	Common Sand Lizard	Least Concern	-	-	-	Schedule II	-	-
<i>Philothamnus natalensis occidentalis</i>	Western Natal Green Snake	Least Concern	-	-	-	Schedule II	Yes	-
<i>Philothamnus semivariegatus</i>	Spotted Bush Snake	Least Concern	-	-	-	Schedule II	-	-
<i>Python natalensis</i>	Southern African Python	Least Concern	-	p	Appendix II	-	-	-
<i>Stigmochelys pardalis</i>	Leopard Tortoise	Least Concern	-	-	Appendix II	Schedule II	-	-
<i>Tropidosaura montana rangeri</i>	Ranger's Mountain Lizard	Not listed	-	-	-	Schedule II	-	Yes
<i>Varanus niloticus</i>	Water Monitor	Least Concern	-	-	Appendix II	-	-	-

Twenty (20) of the sixty-two (62) species which are likely to be found within the proposed site and surrounds have been recorded on site by the specialists. Please see Plate 5-1 below, and on the pages that follow, for images of all reptiles recorded on site. Please also refer to Appendix A-2 for a full list of species which are likely to occur within the proposed site.



Ranger's mountain lizard (*Tropidosaura montana rangeri*)



Variable skink (*Trachylepis varia*)



Cape Skink (*Trachylepis capensis*)



Burchell's sand lizard (*Pedioplanis burchelli*)



Delalande's sandveld lizard (*Nucras lalandii*)



Cape girdled lizard (*Cordylus cordylus*)



Southern rock agama (*Agama atra*)



Spotted gecko (*Pachydactylus maculatus*)



Essex's Pygmy gecko (*Goggia essexi*)



Eastern cape legless skink (*Acontias orientalis*)



Spotted skaapsteker (*Psammophylax rhombeatus*)



South African slug-eater (*Duberria lutrix*)



Brown water snake (*Lycodonomorphus rufulus*)



Brown house snake (*Boaedon capensis*)



Cross-marked whip snake (*Psammophis crucifer*)



Bibron's blind snake (*Afrotyphlops bibronii*)



Delaland's beaked blind snake (*Rhinotyphlops lalandei*)



Rhombic egg-eater (*Dasypeltis scabra*)

Rhombic night adder (*Causus rhombeatus*)Parrot-beaked padlooper (*Homopus areopatus*)

Plate 5-1: Reptile Species Recorded within the Proposed Site and Surrounds.

5.1.2. Amphibians

Amphibians are an important, and often neglected, component of terrestrial vertebrate faunas. A relatively rich amphibian fauna occurs in the Eastern Cape Province, where a total of thirty-two (32) species and sub-species occur. This represents almost a third of the species known in South Africa. Knowledge of amphibian species diversity within the proposed site is limited. However, according to the ADU's Amphibian database, seventeen (17) species of frog have been documented in the Quarter Degree Squares (QDS), within which the Albany WEF is being proposed. Of these seventeen (17) species, none are listed as Schedule 1 on the PNCO list. However, all frogs and toads are listed as Schedule II species on the PNCO list and will therefore require permits for their removal. None of these species are listed in the NEM:BA List of Threatened and Protected Species (TOPS), and only the Giant Bull Frog (*Pyxicephalus adspersus*) is listed as **Near Threatened** on IUCN's Red Data List. Please refer to Appendix A-3 for a full species list of frogs and toads which are likely to be found within the proposed site.

During the site investigation and during additional visits to the proposed site and surrounds, the specialists recorded eight (8) out of the seventeen (17) species which are likely to be found within the proposed site. Plate 5-2 below consists of photographs of frogs and toads within the proposed site.

Clicking Stream Frog (*Strongylopus grayii*)Bubbling Kassina (*Kassina senegalensis*)



Boettger's Caco (*Cacosternum boettgeri*)



Bronze Caco (*Cacosternum nanum*)



Painted reed frog (*Hyperolius marmoratus verrucosus*)



Bushveld rain frog (*Breviceps adspersus pentheri*)



Raucous toad (*Amietophrynus rangeri*)



Common Platanna (*Xenopus laevis*)

Plate 5-2: Amphibian Species Recorded within the Proposed Site.

5.1.3. Mammals

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

According to the NEM:BA, four (4) **Protected** terrestrial mammal species and two (2) **Vulnerable** terrestrial species have distributions which coincide with the proposed site (Table 5-2). Four (4) species are listed as either **Endangered** or **Vulnerable** according to the South African Red Data List, and three (3) species are listed as either **Endangered** or **Vulnerable** according to the IUCN Red Data List. Most terrestrial mammal species tend to avoid areas which are disturbed by anthropogenic activities. However, there is the possibility that smaller and less mobile mammal species, such as moles, will be encountered. The Giant Golden Mole (*Chrysofalax trevelyani*) is listed as an **Endangered** species according to the IUCN Red Data List, **Vulnerable** according to the SA Red Data List, and has a **Vulnerable** status according to the NEM:BA.

Table 5-2: Terrestrial Mammals of Conservation Concern likely to Occur within the Proposed Site.

SCIENTIFIC NAME	COMMON NAME	SA RED LIST	IUCN	NEM:BA	PNCO
<i>Atelerix frontalis</i>	South African Hedgehog	NT	LC	PR	Schedule II
<i>Chrysofalax trevelyani</i>	Giant Golden Mole	VU	EN	VU	-
<i>Felis nigripes</i>	Black-footed Cat	LC	VU	PR	
<i>Mellivora capensis</i>	Honey Badger	NT	LC	PR	Schedule II
<i>Myosorex sclateri</i>	Sclater's Tiny Mouse Shrew	EN	LC	-	Schedule II
<i>Mystromys albicaudatus</i>	White-tailed Mouse	EN	EN	-	-
<i>Philantomba monticola</i>	Blue Duiker	VU	LC	VU	Schedule II
<i>Vulpes chama</i>	Cape Fox	LC	LC	PR	Schedule II

6. SITE SENSITIVITY

6.1. PROPOSED ALBANY WEF AND POWERLINE INFRASTRUCTURE

The sensitivity map was developed by identifying areas of very high, high, moderate and low sensitivity (Figure 6-1). **Please note that the sensitivity map excludes bird and bat sensitivity as these are included in the respective specialist reports.**

The following areas of very high sensitivity should be considered **NO-GO areas**:

- The Southern Mistbelt Forest patches (Beggars Bush State Forest); and
- The Ecca Local Authority Nature Reserve.

Areas of **HIGH sensitivity** include:

- Process areas such as rivers, wetlands and drainage lines which are important for ecosystem functioning;
- Areas which are classified as CBA 1 (ECBCP, 2007);
- Areas which have a high species richness;
- Areas which are not significantly impacted, transformed or degraded by current land use; and
- Areas which contain the majority of SCC found in the area and may contain high numbers of globally important species or comprise part of a globally important vegetation type.

Areas of **MODERATE sensitivity** include:

- The regulatory buffers of rivers, wetlands and drainage lines;
- Areas which are classified as CBA 2 (ECBCP, 2007);
- Areas which provide a valuable contribution to biodiversity and ecosystem functioning despite being degraded;
- Degraded areas which have a relatively high species richness; and
- Degraded areas which contain SCC.

Areas of **LOW sensitivity** include:

- Areas which are highly impacted by current land use (roads, urban development, excavations, etc.) and provide little value to the ecosystem; and
- Highly degraded areas which are unlikely to harbour any SCC.

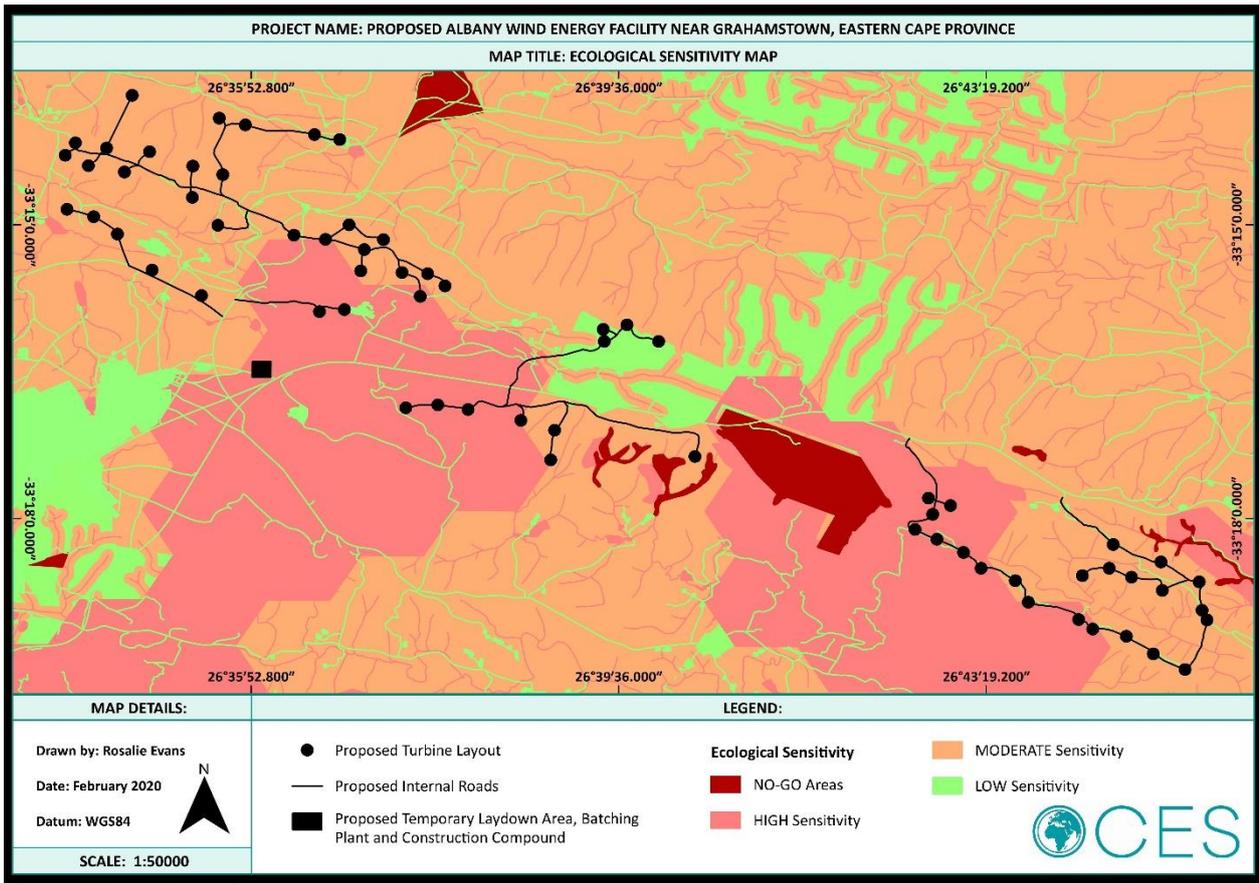


Figure 6-1: Ecological Sensitivity Map of the Proposed Albany WEF Site and Surrounds.

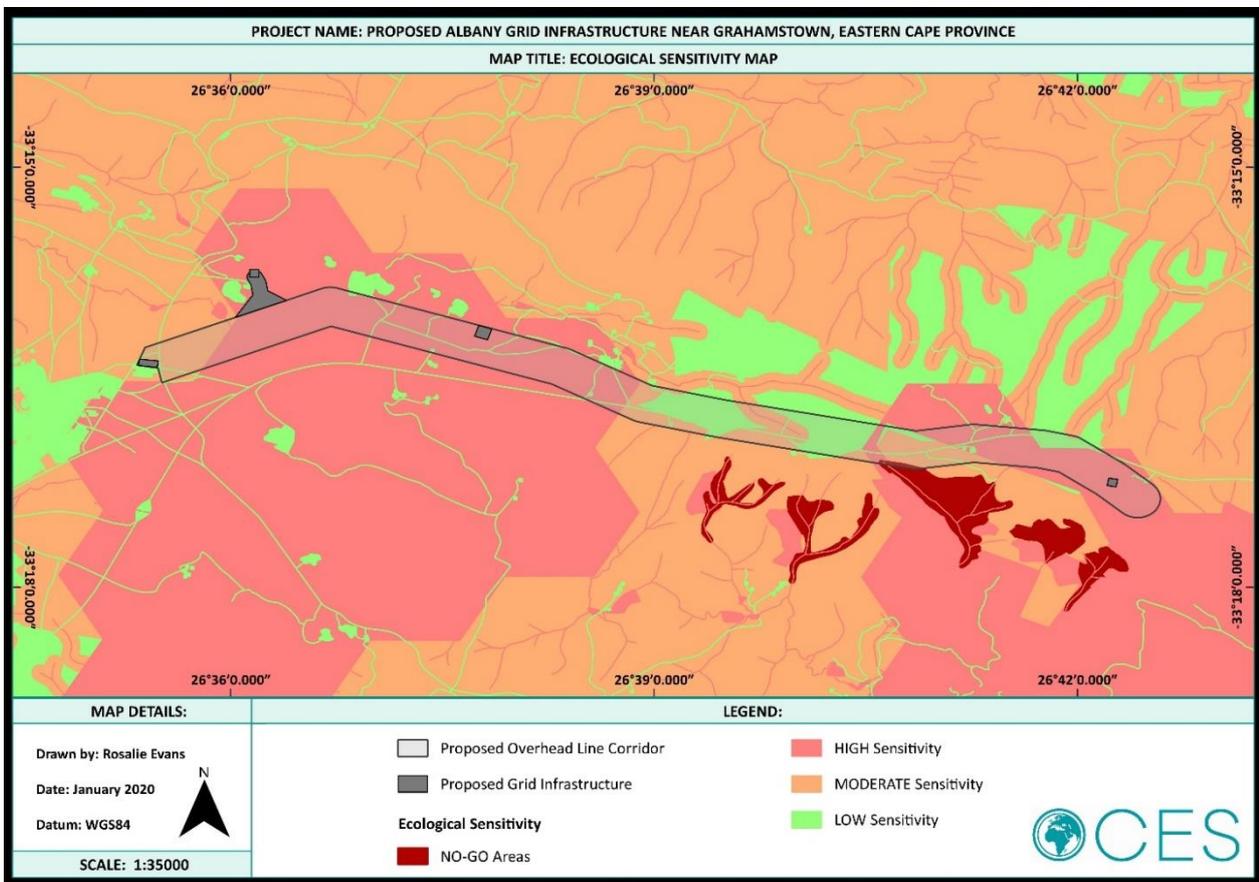


Figure 6-2: Ecological Sensitivity Map of the Proposed Albany Grid Infrastructure Site and Surrounds.

7. ALBANY WEF IMPACT IDENTIFICATION AND ASSESSMENT

7.1. INTRODUCTION

This chapter details the ecological impacts, relating to proposed Albany WEF, which have been identified by the specialist consultants. Each potential issue is identified and described, followed by the recommended mitigation measures which are required to minimise the negative impacts associated with the issue and, where relevant, increase the benefits. The impact rating methodology used to determine the impacts below is presented in Appendix A-1 of this report.

The overall impacts associated with the current layout of the proposed Albany WEF as well as the “no-go alternative” will be assessed to evaluate the significance of the “as predicted” ecological impacts (prior to mitigation) and the “residual” ecological impacts (that remain after mitigation measures are considered).

7.2. PLANNING AND DESIGN PHASE

No direct, indirect or cumulative ecological impacts have been identified for the Planning and Design Phase of the proposed Albany WEF because no tangible alterations to the environment will occur within the proposed site during this phase, although the current layout plan shows turbines and infrastructure within Critical Biodiversity Areas and is therefore not entirely consistent with the land use guidelines in the Eastern Cape Biodiversity Conservation Plan (2007). It must be noted, however, that the CBA classification is triggered by the presence of threatened bird (assessed in the Avifaunal Impact Assessment) and plant species and was not driven by the need of these areas to meet National ecosystem targets.

7.3. CONSTRUCTION PHASE

Impact 1: Faunal Habitat Loss and Fragmentation

Cause and Comment

The habitats within the proposed site and those of the surrounding areas form part of a functional ecosystem. An ecosystem provides more than simply a ‘home’ for a set of organisms, it is a functional system where biological and biophysical processes such as nutrient cycling, soil formation, reproduction, migration, competition, predation, succession, evolution and migration take place. Destruction or modification of habitats causes disruption of ecosystem function and threatens the interplay of processes which ensure environmental health and the survival of individual species.

Faunal habitats will be impacted on and could be lost during the clearing of vegetation for the construction of internal roads and the construction of turbine hardstands. This is usually accompanied by the loss of food sources and/or shelter but may also include the loss of temporary wetlands, caves or rocky outcrops. Construction of turbine hardstands and road infrastructure through these habitats could have a significant impact on an already fragmented population of species due to the existing infrastructure, such as the N2 and R67 roads.

Mitigation and Management

- Where possible, internal roads and turbine hardstands should be planned and constructed to avoid highly sensitive areas.

- Where access roads and/or turbine hardstands do need to be located within highly sensitive areas then there should be further ground-truthing to determine the exact road routes and turbine hardstand locations so to, where possible, avoid site specific sensitive areas.
- Wherever possible, existing service/access roads should be used.
- Clearing of vegetation should be kept to a minimum and all rocky outcrops and wetlands must be avoided.
- Construction areas should be demarcated with hazard tape and no clearing must occur outside of these areas. Laydown areas and construction camps must be located in areas of low sensitivity. Where this is not feasible, then in areas of moderate sensitivity.
- An Environmental Control Officer (ECO) must be employed to monitor the clearing of vegetation for the construction of roads and hardstands.

Significance Statement

IMPACT 1: FAUNAL HABITAT LOSS AND FRAGMENTATION							
IMPACT	INFRASTRUCTURE ALTERNATIVE	TYPE	EFFECT			LIKELIHOOD	OVERALL SIGNIFICANCE
			DURATION	EXTENT	CONSEQUENCE		
Without Mitigation	Preferred Albany WEF Layout	Direct & Cumulative	Permanent	Localised	Severe	Definite	HIGH (-)
	No-Go Alternative	Existing	Permanent	Study Area	Moderate	Definite	MODERATE (-)
With Mitigation	Preferred Albany WEF Layout	Direct & Cumulative	Permanent	Localised	Moderate	Probable	MODERATE (-)
	No-Go Alternative	N/A	N/A	N/A	N/A	N/A	N/A

Impact 2: Loss of Reptile Diversity

Cause and Comment

It is likely that some of the reptile species, which occur within the proposed site, will be disturbed or killed due to construction activities. This could be due to habitat loss or mortality associated with road mortality or poaching.

Due to the existing primary and secondary roads in proximity to the proposed site, it is likely that reptile habitats have already been disturbed in some areas within the proposed site. It is also likely that reptiles have been and will continue to be killed along these roads in the absence of the proposed development.

Mitigation and Management

- All the lizards and tortoises, which are likely to occur within the proposed site that are listed as Schedule II species on the PNCO List, and it is therefore illegal for any construction staff to remove them from the site. It will be difficult to avoid all areas where reptiles are likely to occur, but it is recommended that construction staff are educated with regards to reptile conservation and that all staff employed by the developer ensure that any reptiles encountered are not killed. Any reptiles encountered should be allowed to move away from the area but those which require relocation should be relocated in accordance with local legislation.
- No reptiles must be removed from the site without proper authorisation from the relevant authority.
- A rescue plan must be developed to protect reptiles which could fall into construction pits.

- The construction of turbine hardstands on rocky outcrops should be avoided.
- Speed restrictions (40 km per hour is recommended) must be in place to reduce the likelihood of reptiles being killed along the roads.
- Wherever possible, existing service/access roads must be used.
- Access to all internal roads must be restricted through locked gates and/or guarded booms.
- It is recommended that construction staff are educated regarding poaching and any such activities must be strictly prohibited.

Significance Statement

IMPACT 2: LOSS OF REPTILE DIVERSITY							
IMPACT	INFRASTRUCTURE ALTERNATIVE	TYPE	EFFECT			LIKELIHOOD	OVERALL SIGNIFICANCE
			DURATION	EXTENT	CONSEQUENCE		
Without Mitigation	Preferred Albany WEF Layout	Direct & Cumulative	Medium Term	Study Area	Moderate	Probable	MODERATE (-)
	No-Go Alternative	Existing	Long Term	Study Area	Slight	May Occur	LOW (-)
With Mitigation	Preferred Albany WEF Layout	Direct & Cumulative	Short Term	Study Area	Slight	May Occur	LOW (-)
	No-Go Alternative	N/A	N/A	N/A	N/A	N/A	N/A

Impact 3: Loss of Amphibian Diversity

Cause and Comment

It is likely that some of the amphibian species, which occur within the proposed site near surface water habitats, will be disturbed or killed due to construction activities. However, as amphibians are primarily associated with surface water, the likelihood of directly encountering amphibians during construction and operation is lower than that of reptiles. Although, the increase in traffic in the area could result in road fatalities, especially the fatalities of amphibians moving between the wetlands, rivers and streams within the site. In addition, an increase in noise could impact the breeding behaviour of some amphibian species.

Due to the existing primary and secondary roads in some areas the proposed site, it is likely that amphibian habitats have already been disturbed to some degree. It is also likely that amphibians have been, and will continue to be, killed along these roads in the absence of the proposed development.

Mitigation and Management

- All frogs and toads are listed as Schedule II species on the PNCO List and it is therefore illegal to remove them from the site without a permit.
- Where possible, the placement of turbine hardstands must avoid all aquatic habitats as they are valuable habitats for protected amphibian species.
- If amphibians are encountered during construction works, all construction staff should be educated with regards to amphibian conservation to ensure that they are not harmed or killed. Any amphibians encountered should be allowed to move away from the area or carefully relocated to an area within the same catchment.
- No amphibians will be allowed to be removed from the site.
- The construction of turbine hardstands must avoid the wetland areas.

- Speed restrictions (40 km per hour is recommended) must be in place to reduce the likelihood of amphibians being killed along the roads.
- Driving within the site should be restricted to day-light hours. Driving before sunrise and after sunset should be restricted to emergencies only.
- Vehicles should be well maintained so as not to leak oils and fuels which could pollute surface water sources.
- Oils and fuels should be stored on impermeable surfaces and preferably under lock and key to reduce the likelihood of the pollution of surface water.
- Where possible, existing service/access/haul roads should be used.
- Access to all internal roads should be restricted through locked gates and/or guarded booms.
- It is recommended that construction staff are educated regarding poaching and any such activities must be strictly prohibited.

Significance Statement

IMPACT 3: LOSS OF AMPHIBIAN DIVERSITY							
IMPACT	INFRASTRUCTURE ALTERNATIVE	TYPE	EFFECT			LIKELIHOOD	OVERALL SIGNIFICANCE
			DURATION	EXTENT	CONSEQUENCE		
Without Mitigation	Preferred Albany WEF Layout	Direct & Cumulative	Medium Term	Localised	Moderate	Probable	MODERATE (-)
	No-Go Alternative	Existing	Long Term	Localised	Slight	May Occur	LOW (-)
With Mitigation	Preferred Albany WEF Layout	Direct & Cumulative	Short Term	Localised	Slight	May Occur	LOW (-)
	No-Go Alternative	N/A	N/A	N/A	N/A	N/A	N/A

Impact 4: Loss of Mammal Diversity

Cause and Comment

It is likely that some mammal species will be impacted during the construction phase as a result of habitat loss and road mortality within the proposed site. During the operation phase, noise may affect communication and breeding potential. The proposed site traverses extensive areas of land which contain numerous large and small mammal species. Most of these large and small mammals, including mammal SCC, will move out of the disturbed areas during the construction phase, but may return once habituated for foraging opportunities. It is possible that some of the smaller, and more secretive mammal species, may still be encountered within the site throughout these phases.

In the absence of the proposed development, it is likely that most of the large and small mammal species will probably still move around within and outside of the site due to movement towards foraging opportunities and/or moving away from anthropogenic activities and associated noises within the site.

Mitigation and Management

- In the event of the unearthing of any mole species during construction, all construction staff should be educated with regards to mammal conservation to ensure that they are not killed, and any mammals encountered should be allowed to move away from the area or carefully moved to an area outside of the project activities.

- A mole specialist should be appointed to undertake a detailed survey to confirm the presence/absence of Golden moles and assist with micro-siting of the WEF and associated infrastructure and developing a plan to mitigate impacts if detected or favourable habitat is identified (such as relocation).
- Speed restrictions (40 km per hour is recommended) should be in place to reduce the likelihood of mammals being killed along the roads.
- Driving within the proposed site should be restricted to day-light hours. Driving before sunrise and after sunset should be restricted to emergencies only.
- Where possible, existing service/access roads must be used.
- Access to all access/service roads should be limited by having locked gates.
- It is recommended that construction staff are educated regarding poaching and any such activities must be strictly prohibited.

Significance Statement

IMPACT 4: LOSS OF MAMMAL DIVERSITY							
IMPACT	INFRASTRUCTURE ALTERNATIVE	TYPE	EFFECT			LIKELIHOOD	OVERALL SIGNIFICANCE
			DURATION	EXTENT	CONSEQUENCE		
Without Mitigation	Preferred Albany WEF Layout	Direct & Indirect	Short Term	Study Area	Slight	Probable	LOW (-)
	No-Go Alternative	Existing	Long Term	Study Area	Slight	May Occur	LOW (-)
With Mitigation	Preferred Albany WEF Layout	Direct & Indirect	Short Term	Study Area	Slight	May Occur	LOW (-)
	No-Go Alternative	N/A	N/A	N/A	N/A	N/A	N/A

Impact 5: Impact of Noise and Dust on Faunal Species

Cause and Comment

The construction of the proposed WEF and associated infrastructure will result in an increase in noise and dust within the proposed site and surrounds. Roads are known to alter the physical characteristics of the environment and it is possible that numerous species within the proposed site will be affected by the increase in noise and dust to some extent. The faunal group which is most likely to be impacted by the increase in noise and dust levels is amphibians. Increased dust levels alter wetlands and riparian areas which could affect the feeding and breeding of amphibians within these areas.

Fauna vary in the degree to which they can tolerate such disturbances and the increase in noise and dust could potentially have adverse impacts on various faunal groups. Increased noise and motor vibrations in wetland areas could also impact amphibian breeding choruses, but these impacts will be localised and many amphibian species are surprisingly tolerant of vehicle noise. Noise pollution will occur during all phases of development (construction, operational, and de-commissioning/closure).

Mitigation and Management

- Soil stockpiles should be limited to 1.5 m in height.
- Construction activities such as the digging of trenches, which could result in excessive dust pollution, should preferably cease during period of high winds.
- Newly cleared and exposed areas must be managed for dust and landscaped with indigenous vegetation to avoid soil erosion. Where necessary, temporary stabilization measures must be used until vegetation establishes.

- Speed restrictions (40 km per hour is recommended) should be in place to reduce the amount of dust caused by vehicle movement along the roads.
- Where possible, fine materials should be covered or kept in containers during transportation to avoid contamination of the surrounding areas.
- Driving within the proposed site should be restricted to day-light hours. Driving before sunrise and after sunset should be restricted to emergencies only.
- All reasonable and feasible measures should be implemented to reduce noise in ecologically sensitive areas, such as adjacent to wetlands and rivers.

Significance Statement

IMPACT 5: IMPACT OF NOISE AND DUST ON FAUNAL SPECIES							
IMPACT	INFRASTRUCTURE ALTERNATIVE	TYPE	EFFECT			LIKELIHOOD	OVERALL SIGNIFICANCE
			DURATION	EXTENT	CONSEQUENCE		
Without Mitigation	Preferred Albany WEF Layout	Direct & Indirect	Short Term	Localised	Moderate	Definite	MODERATE (-)
	No-Go Alternative	Existing	Long Term	Localised	Slight	May Occur	LOW (-)
With Mitigation	Preferred Albany WEF Layout	Direct & Indirect	Short Term	Localised	Slight	May Occur	LOW (-)
	No-Go Alternative	N/A	N/A	N/A	N/A	N/A	N/A

Impact 6: Loss of Vegetation Communities

Cause and Comment

Plant communities are dynamic ecosystems which provide habitats that support all forms of life. Different types of plant communities (and habitats) exist within the proposed site. The vegetation types which will be affected by the proposed development footprints include Grahamstown Grassland Thicket, Albany Bontveld, Albany Valley Thicket, Bhisho Thornveld, Suurberg Shale Fynbos and Suurberg Quartzite Fynbos from the Albany Thicket, Savanna and Fynbos Biomes. The current condition of these vegetation communities varies from good to poor condition, depending on the level of transformation caused by anthropogenic activities. In accordance with Mucina et al., (2018), the conservation statuses of all these vegetation types are least threatened, except for Albany Valley Thicket which is classified as vulnerable. Sections of these vegetation types will be lost due to vegetation clearance during the construction phase of the Albany WEF.

Currently, vegetation communities have been and will continue to be lost and/or fragmented in the area, in absence of the Albany WEF development, due to transformation for agricultural activities and other development.

Mitigation and Management

- The turbine and road layouts need to under-go micro-siting prior to finalisation of the turbine layout.
- A comprehensive Plant Search and Rescue must be undertaken by a suitably qualified specialist prior to vegetation clearance.
- All relevant plant permits must be in place prior to the removal or removal and relocation of protected species.
- Plant SCC found within the proposed site must either be housed in an onsite nursery for use during rehabilitation or be relocated to suitable areas where vegetation clearance will not occur.
- Areas of the proposed site which contain large populations of SCC must be avoided where possible.

- The clearance of vegetation, at any given time, must be kept to a minimum to reduce the possibility of soil erosion.
- The clearing of vegetation and damage to plants may not be permitted in any areas which have demarcated as no-go areas, these include the Southern Mistbelt Forest patches (Beggars Bush State Forest) as well as the Ecca Local Authority Nature Reserve.
- Where possible, all temporary infrastructure should be placed in areas which have already been transformed.
- Existing roads should be used as far as practically possible.

Significance Statement

IMPACT 6: LOSS OF VEGETATION COMMUNITIES							
IMPACT	INFRASTRUCTURE ALTERNATIVE	TYPE	EFFECT			LIKELIHOOD	OVERALL SIGNIFICANCE
			DURATION	EXTENT	CONSEQUENCE		
Without Mitigation	Preferred Albany WEF Layout	Direct & Cumulative	Long Term	Study Area	Severe	Definite	HIGH (-)
	No-Go Alternative	Existing	Long Term	Localised	Slight	Definite	LOW (-)
With Mitigation	Preferred Albany WEF Layout	Direct & Cumulative	Long Term	Localised	Moderate	Definite	MODERATE (-)
	No-Go Alternative	N/A	N/A	N/A	N/A	N/A	N/A

Impact 7: Removal of Alien Vegetation

Cause and Comment

The clearance of vegetation associated with the development of the Albany WEF and associated infrastructure will include the clearance of alien vegetation which is already present on portions of the proposed site. This will be a positive impact as alien invasive species will be removed, which will improve the condition of the existing indigenous vegetation as there will be less competition from alien invasive species.

Mitigation and Management

- A site-specific Alien Vegetation Management Plan must be implemented during the construction phase, and continued monitoring and eradication needs to take place throughout the life of the project.
- Alien vegetation, within the development footprints, should be removed from the site and disposed of at a registered waste disposal site.
- The development footprints and immediate surroundings should be monitored for the growth/regrowth of alien vegetation throughout the construction (and operation) phase.

Significance Statement

IMPACT 7: REMOVAL OF ALIEN VEGETATION							
IMPACT	INFRASTRUCTURE ALTERNATIVE	TYPE	EFFECT			LIKELIHOOD	OVERALL SIGNIFICANCE
			DURATION	EXTENT	CONSEQUENCE		
Without Mitigation	Preferred Albany WEF Layout	Direct	Short Term	Localised	Moderately beneficial	Definite	LOW (+)
	No-Go Alternative	Existing	Long Term	Study Area	Moderate	Definite	MODERATE (-)

With Mitigation	Preferred Albany WEF Layout	Direct	Long Term	Localised	Beneficial	Definite	MODERATE (+)
	No-Go Alternative	N/A	N/A	N/A	N/A	N/A	N/A

Impact 8: Pollution of Surface Water Resources

Cause and Comment

The proposed site contains numerous wetlands and watercourses. None of the proposed turbines, according to the current layout, are situated within wetlands or watercourses but numerous turbines are located within the 500 m regulatory buffer of wetlands. Sections of associated infrastructure, such as roads, are also routed within 500 m of numerous wetlands and within the 100 m regulatory buffer of a watercourses. Water use authorisation is required from the Department of Water and Sanitation (DWS) prior to the commencement of any construction activities within the regulatory buffers of these wetlands and watercourses.

Activities associated with the proposed development could result in the pollution of surface water resources both directly and indirectly through activities such as the inappropriate storage of hazardous materials which could result in spillages and the resultant contamination of surface water resources.

Mitigation and Management

- No concrete mixing must take place within 50 m of a wetland or watercourse during the construction phase.
- Concrete mixing must only take place on impermeable surfaces.
- No construction machinery must be parked within 50 m of a wetland or watercourse overnight.
- Construction machinery must be maintained regularly to reduce the risk of oil and fuel leaks.
- All stationary machinery should be equipped with drip trays to retain potential oil and fuel leaks.
- Emergency plans must be in place to remedy oil and fuel spill leaks.
- Chemical toilets must not be placed within 50 m from wetlands and watercourses. Toilets must be maintained/serviced regularly to prevent the contamination of the surrounding environments, including wetlands and watercourses.

Significance Statement

IMPACT 8: POLLUTION OF SURFACE WATER RESOURCES							
IMPACT	INFRASTRUCTURE ALTERNATIVE	TYPE	EFFECT			LIKELIHOOD	OVERALL SIGNIFICANCE
			DURATION	EXTENT	CONSEQUENCE		
Without Mitigation	Preferred Albany WEF Layout	Direct & Indirect	Medium Term	Localised	Severe	Probable	MODERATE (-)
	No-Go Alternative	N/A	N/A	N/A	N/A	N/A	N/A
With Mitigation	Preferred Albany WEF Layout	Direct & Indirect	Short Term	Localised	Moderate	May Occur	LOW (-)
	No-Go Alternative	N/A	N/A	N/A	N/A	N/A	N/A

Impact 9: Rehabilitation

Cause and Comment

Inadequate rehabilitation could result in limited revegetation and/or an invasion of alien vegetation which will result in long term ecological degradation and damage.

Mitigation and Management

- A Rehabilitation Management Plan should be developed and implemented during the construction phase as construction is complete at each site.
- Measures should be put in place to prevent the accidental or unintentional introduction of alien vegetation during rehabilitation.
- The development footprints and immediate surroundings should be monitored for the growth/regrowth of alien vegetation throughout the construction phase.
- Indigenous species must be used for rehabilitation.

Significance Statement

IMPACT 9: REHABILITATION							
IMPACT	INFRASTRUCTURE ALTERNATIVE	TYPE	EFFECT			LIKELIHOOD	OVERALL SIGNIFICANCE
			DURATION	EXTENT	CONSEQUENCE		
Without Mitigation	Preferred Albany WEF Layout	Direct	Long Term	Localised	Severe	Definite	MODERATE (-)
	No-Go Alternative	N/A	N/A	N/A	N/A	N/A	N/A
With Mitigation	Preferred Albany WEF Layout	Direct	Short Term	Localised	Moderate	May Occur	LOW (-)
	No-Go Alternative	N/A	N/A	N/A	N/A	N/A	N/A

7.4. OPERATIONAL PHASE

Impact 10: Invasion of Alien Vegetation

Cause and Comment

The clearance of vegetation associated with the development of the Albany WEF and associated infrastructure will create open/bare habitats which are likely to be colonised by pioneer plant species. While this is partly a natural revegetation/regeneration process, which would ultimately lead to the re-establishment of secondary vegetation cover, it also favours the establishment of alien vegetation.

Mitigation and Management

- The site-specific Alien Vegetation Management Plan must be implemented for the first two (2) years of the operational phase. Thereafter, alien vegetation must continue to be monitored and eradicated annually throughout the life of the project.
- Alien vegetation, within the development footprints, must be removed from the site as they appear and must be disposed of at a registered waste disposal site.

Significance Statement

IMPACT 10: INVASION OF ALIEN VEGETATION							
IMPACT	INFRASTRUCTURE ALTERNATIVE	TYPE	EFFECT			LIKELIHOOD	OVERALL SIGNIFICANCE
			DURATION	EXTENT	CONSEQUENCE		
Without Mitigation	Preferred Albany WEF Layout	Direct	Long Term	Localised	Severe	Probable	HIGH (-)
	No-Go Alternative	Existing	Long Term	Study Area	Moderate	Definite	MODERATE (-)
With Mitigation	Preferred Albany WEF Layout	Direct	Short Term	Localised	Slightly Beneficial	Definite	LOW (+)
	No-Go Alternative	N/A	N/A	N/A	N/A	N/A	N/A

7.5. DECOMMISSIONING PHASE

It is highly unlikely that the proposed development would be decommissioned in the short term, however once it has reached the end of its lifespan (approximately 20 - 25 years), the top structures (actual turbines) will likely be removed. The turbine foundations and access roads will not be removed.

The ecological impacts associated with the decommissioning phase will be similar to those listed in the construction phase and the associated mitigations measures must be updated and implemented to reduce potential adverse impacts.

8. ALBANY GRID INFRASTRUCTURE IMPACT IDENTIFICATION AND ASSESSMENT

8.1. INTRODUCTION

This chapter details the ecological impacts, relating to proposed Albany grid infrastructure, which have been identified by the specialist consultants. Each potential issue is identified and described, followed by the recommended mitigation measures which are required to minimise the negative impacts associated with the issue and, where relevant, increase the benefits. The impact rating methodology used to determine the impacts below is presented in Appendix A-1 of this report. The overall impacts associated with the current layout of the proposed Albany grid infrastructure (including both overhead line options as they fall within the same corridor) and the “no-go alternative” will be assessed to evaluate the significance of the “as predicted” ecological impacts (prior to mitigation) and the “residual” ecological impacts (that remain after mitigation measures are considered).

8.2. PLANNING AND DESIGN PHASE

No direct, indirect or cumulative ecological impacts have been identified for the Planning and Design Phase of the proposed Albany grid infrastructure because no tangible alterations to the environment will occur within the proposed site during this phase.

8.3. CONSTRUCTION PHASE

Impact 1: Faunal Habitat Loss and Fragmentation

Cause and Comment

The habitats within the proposed site and those of the surrounding areas form part of a functional ecosystem. Destruction or modification of habitats causes disruption of ecosystem function and threatens the interplay of processes which ensure environmental health and the survival of individual species. During the construction phase, faunal habitats will be impacted and could be lost during the clearing of vegetation for the construction of the overhead line pylons and the associated substation infrastructure. However, it must be noted that faunal species are mobile and will move out of the affected areas due to construction activities but that they are likely to move back to these areas once the affected areas have been rehabilitated. Faunal habitats have already been lost in the area due to development and agricultural activities. In addition, the existing road networks have resulted in the fragmentation of faunal habitats.

Mitigation and Management

- Ground truthing must be undertaken within the overhead line corridor to determine the route with the least possible damage to faunal habitats.
- Clearing of vegetation should be kept to a minimum and rocky outcrops and wetlands must be avoided, where possible.
- Construction areas should be demarcated with hazard tape and no clearing must occur outside of these areas.

Significance Statement

IMPACT 1: FAUNAL HABITAT LOSS AND FRAGMENTATION							
IMPACT	INFRASTRUCTURE ALTERNATIVE	TYPE	EFFECT			LIKELIHOOD	OVERALL SIGNIFICANCE
			DURATION	EXTENT	CONSEQUENCE		

Without Mitigation	Both Grid Infrastructure Layouts	Direct & Cumulative	Short Term	Localised	Moderate	Probable	MODERATE (-)
	No-Go Alternative	Existing	Long Term	Localised	Slight	Definite	LOW (-)
With Mitigation	Both Grid Infrastructure Layouts	Direct & Cumulative	Short Term	Localised	Slight	May Occur	LOW (-)
	No-Go Alternative	N/A	N/A	N/A	N/A	N/A	N/A

Impact 2: Loss of Reptile Diversity

Cause and Comment

It is likely that some of the reptile species, which occur within the proposed site, will be disturbed or killed due to construction activities. This could be due to habitat loss or mortality associated with road mortality or poaching. Due to the current land uses within the proposed site, it is likely that reptile habitats have already been disturbed in some areas within the proposed site. It is also likely that reptiles have been and will continue to be killed along the road networks in the absence of the proposed development.

Mitigation and Management

- All the lizards and tortoises, which are likely to occur within the proposed site that are listed as Schedule II species on the PNCO List, and it is therefore illegal for any construction staff to remove them from the site. It will be difficult to avoid all areas where reptiles are likely to occur, but it is recommended that construction staff are educated with regards to reptile conservation and that all staff employed by the developer ensure that any reptiles encountered are not killed. Any reptiles encountered should be allowed to move away from the area but those which require relocation should be relocated in accordance with local legislation.
- No reptiles must be removed from the site without proper authorisation from the relevant authority.
- A rescue plan should be developed to protect reptiles which could fall into construction pits.
- The construction of grid infrastructure on rocky outcrops should be avoided.
- Speed restrictions (40 km per hour is recommended) must be in place to reduce the likelihood of reptiles being killed along the access roads during construction.
- It is recommended that construction staff are educated regarding poaching and any such activities must be strictly prohibited.

Significance Statement

IMPACT 2: LOSS OF REPTILE DIVERSITY							
IMPACT	INFRASTRUCTURE ALTERNATIVE	TYPE	EFFECT			LIKELIHOOD	OVERALL SIGNIFICANCE
			DURATION	EXTENT	CONSEQUENCE		
Without Mitigation	Both Grid Infrastructure Layouts	Direct & Cumulative	Short Term	Study Area	Moderate	Probable	MODERATE (-)
	No-Go Alternative	Existing	Long Term	Study Area	Slight	May Occur	LOW (-)
With Mitigation	Both Grid Infrastructure Layouts	Direct & Cumulative	Short Term	Study Area	Slight	May Occur	LOW (-)
	No-Go Alternative	N/A	N/A	N/A	N/A	N/A	N/A

Impact 3: Loss of Amphibian Diversity

Cause and Comment

It is likely that some of the amphibian species, which occur within the proposed site near surface water habitats, will be disturbed or killed due to construction activities. However, as amphibians are primarily associated with surface water, the likelihood of directly encountering amphibians during construction and operation is lower than that of reptiles. Although, the increase in traffic in the area could result in road fatalities, especially the fatalities of amphibians moving between the wetlands, rivers and streams within the site. In addition, an increase in noise could impact the breeding behaviour of some amphibian species. Due to the existing primary and secondary roads in some areas the proposed site, it is likely that amphibian habitats have already been disturbed to some degree. It is also likely that amphibians have been, and will continue to be, killed along these roads in the absence of the proposed development.

Mitigation and Management

- All frogs and toads are listed as Schedule II species on the PNCO List and it is therefore illegal to remove them from the site without a permit.
- Where possible, the placement of turbine hardstands should avoid all aquatic habitats as they are valuable habitats for protected amphibian species.
- If amphibians are encountered during construction works, all construction staff should be educated with regards to amphibian conservation to ensure that they are not harmed or killed. Any amphibians encountered should be allowed to move away from the area or carefully relocated to an area within the same catchment.
- No amphibians will be allowed to be removed from the site.
- The construction of pylons must avoid the wetland areas.
- Speed restrictions (40 km per hour is recommended) must be in place to reduce the likelihood of amphibians being killed along the roads.
- Driving within the site should be restricted to day-light hours. Driving before sunrise and after sunset should be restricted to emergencies only.
- Vehicles should be well maintained so as not to leak oils and fuels which could pollute surface water sources.
- Oils and fuels should be stored on impermeable surfaces, and preferably under lock and key, to reduce the likelihood of the pollution of surface water.
- Where possible, existing service/access/haul roads should be used.
- It is recommended that construction staff are educated regarding poaching and any such activities must be strictly prohibited.

Significance Statement

IMPACT 3: LOSS OF AMPHIBIAN DIVERSITY							
IMPACT	INFRASTRUCTURE ALTERNATIVE	TYPE	EFFECT			LIKELIHOOD	OVERALL SIGNIFICANCE
			DURATION	EXTENT	CONSEQUENCE		
Without Mitigation	Both Grid Infrastructure Layouts	Direct & Cumulative	Short Term	Localised	Moderate	Probable	MODERATE (-)
	No-Go Alternative	Existing	Long Term	Localised	Slight	May Occur	LOW (-)
With Mitigation	Both Grid Infrastructure Layouts	Direct & Cumulative	Short Term	Localised	Slight	May Occur	LOW (-)
	No-Go Alternative	N/A	N/A	N/A	N/A	N/A	N/A

Impact 4: Loss of Mammal Diversity

Cause and Comment

It is likely that some mammal species will be impacted during the construction phase as a result of habitat loss and road mortality within the proposed site. During the operation phase, noise may affect communication and breeding potential. The proposed site traverses extensive areas of land which contain numerous large and small mammal species. Most of these large and small mammals, including mammal SCC, will move out of the disturbed areas during the construction phase, but may return once habituated for foraging opportunities. It is possible that some of the smaller, and more secretive mammal species, may still be encountered within the site throughout these phases.

In the absence of the proposed development, it is likely that most of the large and small mammal species will probably still move around within and outside of the site due to movement towards foraging opportunities and/or moving away from anthropogenic activities and associated noises within the site.

Mitigation and Management

- In the event of the unearthing of any mole species during construction, all construction staff should be educated with regards to mammal conservation to ensure that they are not killed, and any mammals encountered should be allowed to move away from the area or carefully moved to an area outside of the project activities.
- Speed restrictions (40 km per hour is recommended) should be in place to reduce the likelihood of mammals being killed along the roads.
- Driving within the proposed site should be restricted to day-light hours. Driving before sunrise and after sunset should be restricted to emergencies only.
- It is recommended that construction staff are educated regarding poaching and any such activities must be strictly prohibited.

Significance Statement

IMPACT 4: LOSS OF MAMMAL DIVERSITY							
IMPACT	INFRASTRUCTURE ALTERNATIVE	TYPE	EFFECT			LIKELIHOOD	OVERALL SIGNIFICANCE
			DURATION	EXTENT	CONSEQUENCE		
Without Mitigation	Both Grid Infrastructure Layouts	Direct & Indirect	Short Term	Study Area	Slight	Probable	LOW (-)
	No-Go Alternative	Existing	Long Term	Study Area	Slight	May Occur	LOW (-)
With Mitigation	Both Grid Infrastructure Layouts	Direct & Indirect	Short Term	Study Area	Slight	May Occur	LOW (-)
	No-Go Alternative	N/A	N/A	N/A	N/A	N/A	N/A

Impact 5: Impact of Noise and Dust on Faunal Species

Cause and Comment

The construction of the proposed grid infrastructure will result in an increase in noise and dust within the proposed site and surrounds. It is possible that numerous species within the proposed site will be affected by the increase in noise and dust to some extent. The faunal group which is most likely to be impacted by the increase in noise and dust levels is amphibians. Increased dust levels alter wetlands and riparian areas which could affect the feeding and breeding of amphibians within these areas.

Fauna vary in the degree to which they can tolerate such disturbances and the increase in noise and dust could potentially have adverse impacts on various faunal groups. Increased noise in wetland areas could also impact amphibian breeding choruses, but these impacts will be localised and many amphibian species are surprisingly tolerant of vehicle noise. Noise pollution will primarily occur during the construction phase of the grid infrastructure development.

Mitigation and Management

- Soil stockpiles should be limited to 1.5 m in height.
- Construction activities such as the digging of trenches, which could result in excessive dust pollution, should preferably cease during period of high winds.
- Newly cleared and exposed areas must be managed for dust and landscaped with indigenous vegetation to avoid soil erosion. Where necessary, temporary stabilization measures must be used until vegetation establishes.
- Speed restrictions (40 km per hour is recommended) should be in place to reduce the amount of dust caused by vehicle movement along the roads.
- Where possible, fine materials should be covered or kept in containers during transportation to avoid contamination of the surrounding areas.
- Driving within the proposed site should be restricted to day-light hours. Driving before sunrise and after sunset should be restricted to emergencies only.

Significance Statement

IMPACT 5: IMPACT OF NOISE AND DUST ON FAUNAL SPECIES							
IMPACT	INFRASTRUCTURE ALTERNATIVE	TYPE	EFFECT			LIKELIHOOD	OVERALL SIGNIFICANCE
			DURATION	EXTENT	CONSEQUENCE		
Without Mitigation	Both Grid Infrastructure Layouts	Direct & Indirect	Short Term	Localised	Moderate	Definite	LOW (-)
	No-Go Alternative	Existing	Long Term	Localised	Slight	May Occur	LOW (-)
With Mitigation	Both Grid Infrastructure Layouts	Direct & Indirect	Short Term	Localised	Slight	Definite	LOW (-)
	No-Go Alternative	N/A	N/A	N/A	N/A	N/A	N/A

Impact 6: Loss of Vegetation Communities

Cause and Comment

Plant communities are dynamic ecosystems which provide habitats that support all forms of life. Different types of plant communities (and habitats) exist within the proposed site. The vegetation types which will be affected by the proposed development footprints include Grahamstown Grassland Thicket, Bhisho Thornveld and Suurberg Quartzite Fynbos. The current condition of these vegetation communities varies from good to poor condition, depending on the level of transformation caused by anthropogenic activities. Sections of these vegetation types will be lost due to vegetation clearance during the construction phase of the grid infrastructure. No development must occur within the patches of Southern Mistbelt Forest. Vegetation communities have been and will continue to be lost and/or fragmented in the area, in absence of the grid infrastructure development, due to transformation for agricultural activities and other development.

Mitigation and Management

- A comprehensive Plant Search and Rescue must be undertaken by a suitably qualified specialist prior to vegetation clearance.

- All relevant plant permits must be in place prior to the removal or removal and relocation of protected species.
- Plant SCC found within the proposed site must either be housed in an onsite nursery for use during rehabilitation or be relocated to suitable areas where vegetation clearance will not occur.
- Areas of the proposed site which contain large populations of SCC should be avoided where possible.
- The clearance of vegetation, at any given time, must be kept to a minimum to reduce the possibility of soil erosion.
- The clearing of vegetation and damage to plants may not be permitted in any areas which have been demarcated as no-go areas, these include the Southern Mistbelt Forest patches (Beggars Bush State Forest) as well as the Ecca Local Authority Nature Reserve.
- Where possible, all temporary infrastructure should be placed in areas which have already been transformed.

Significance Statement

IMPACT 6: LOSS OF VEGETATION COMMUNITIES							
IMPACT	INFRASTRUCTURE ALTERNATIVE	TYPE	EFFECT			LIKELIHOOD	OVERALL SIGNIFICANCE
			DURATION	EXTENT	CONSEQUENCE		
Without Mitigation	Both Grid Infrastructure Layouts	Direct & Cumulative	Permanent	Study Area	Moderate	Definite	MODERATE (-)
	No-Go Alternative	Existing	Permanent	Localised	Slight	Definite	LOW (-)
With Mitigation	Both Grid Infrastructure Layouts	Direct & Cumulative	Long Term	Localised	Moderate	Definite	LOW (-)
	No-Go Alternative	N/A	N/A	N/A	N/A	N/A	N/A

Impact 7: Removal of Alien Vegetation

Cause and Comment

The clearance of vegetation associated with the development of the Albany grid infrastructure will include the clearance of alien vegetation which is already present on portions of the proposed site. This will be a positive impact as alien invasive species will be removed, which will improve the condition of the existing indigenous vegetation as there will be less competition from alien invasive species.

Mitigation and Management

- A site-specific Alien Vegetation Management Plan must be implemented during the construction phase.
- Alien vegetation, within the development footprints, should be removed from the site and disposed of at a registered waste disposal site.
- The development footprints and immediate surroundings should be monitored for the growth/regrowth of alien vegetation throughout the construction phase.

Significance Statement

IMPACT 7: REMOVAL OF ALIEN VEGETATION							
IMPACT	INFRASTRUCTURE ALTERNATIVE	TYPE	EFFECT			LIKELIHOOD	OVERALL SIGNIFICANCE
			DURATION	EXTENT	CONSEQUENCE		
Without Mitigation	Both Grid Infrastructure Layouts	Direct	Short Term	Localised	Slightly Beneficial	Probable	LOW (+)
	No-Go Alternative	Existing	Medium Term	Localised	Moderate	Definite	LOW (-)
With Mitigation	Both Grid Infrastructure Layouts	Direct	Short Term	Localised	Beneficial	Definite	LOW (+)
	No-Go Alternative	N/A	N/A	N/A	N/A	N/A	N/A

Impact 8: Pollution of Surface Water Resources**Cause and Comment**

The proposed site contains numerous wetlands and watercourses. Sections of the overhead line corridor are located within 500 m of numerous wetlands, within 100 m of numerous tributaries and a section of the corridor is located within 100 m of the Bothas River. Water use authorisation is required from the DWS prior to the commencement of any construction activities within the regulatory buffers of these wetlands and watercourses.

Activities associated with the proposed development could result in the pollution of surface water resources both directly and indirectly through activities such as the inappropriate storage of hazardous materials which could result in spillages and the resultant contamination of surface water resources.

Mitigation and Management

- Where possible, the placement of pylons should avoid wetlands and tributaries.
- No concrete mixing must take place within 50 m of a wetland or watercourse during the construction phase.
- Concrete mixing must only take place on impermeable surfaces.
- No stationary construction machinery must be stored within 50 m of a wetland or watercourse.
- Construction machinery must be maintained regularly to reduce the risk of oil and fuel leaks.
- All stationary machinery should be equipped with drip trays to retain potential oil and fuel leaks.
- Emergency plans must be in place to remedy oil and fuel spill leaks.

Significance Statement

IMPACT 8: POLLUTION OF SURFACE WATER RESOURCES							
IMPACT	INFRASTRUCTURE ALTERNATIVE	TYPE	EFFECT			LIKELIHOOD	OVERALL SIGNIFICANCE
			DURATION	EXTENT	CONSEQUENCE		
Without Mitigation	Both Grid Infrastructure Layouts	Direct & Indirect	Medium Term	Localised	Severe	Probable	MODERATE (-)
	No-Go Alternative	N/A	N/A	N/A	N/A	N/A	N/A
With Mitigation	Both Grid Infrastructure Layouts	Direct & Indirect	Short Term	Localised	Moderate	May Occur	LOW (-)
	No-Go Alternative	N/A	N/A	N/A	N/A	N/A	N/A

Impact 9: Rehabilitation

Cause and Comment

Inadequate rehabilitation could result in limited revegetation and/or an invasion of alien vegetation which will result in long term ecological degradation and damage.

Mitigation and Management

- A Rehabilitation Management Plan should be developed and implemented during the construction phase as construction is complete only each section of line.
- Measures should be put in place to prevent the accidental or unintentional introduction of alien vegetation during rehabilitation.
- The development footprints and immediate surroundings should be monitored for the growth/regrowth of alien vegetation throughout the construction phase.
- Indigenous species must be used for rehabilitation.

Significance Statement

IMPACT 9: REHABILITATION							
IMPACT	INFRASTRUCTURE ALTERNATIVE	TYPE	EFFECT			LIKELIHOOD	OVERALL SIGNIFICANCE
			DURATION	EXTENT	CONSEQUENCE		
Without Mitigation	Both Grid Infrastructure Layouts	Direct & Indirect	Medium Term	Localised	Severe	Probable	MODERATE (-)
	No-Go Alternative	N/A	N/A	N/A	N/A	N/A	N/A
With Mitigation	Both Grid Infrastructure Layouts	Direct & Indirect	Short Term	Localised	Moderate	May Occur	LOW (-)
	No-Go Alternative	N/A	N/A	N/A	N/A	N/A	N/A

8.4. OPERATIONAL PHASE**Impact 10: Invasion of Alien Vegetation****Cause and Comment**

The clearance of vegetation associated with the development of the Albany grid infrastructure will create open/bare habitats which are likely to be colonised by pioneer plant species. While this is partly a natural revegetation/regeneration process, which would ultimately lead to the reestablishment of secondary vegetation cover, it also favours the establishment of alien vegetation.

Mitigation and Management

- The site-specific Alien Vegetation Management Plan must be implemented for the first two (2) years of the operational phase. Thereafter, alien vegetation must continue to be monitored and eradicated annually throughout the life of the project.
- Alien vegetation, within the development footprints, must be removed from the site as they appear and must be disposed of at a registered waste disposal site.

Significance Statement

IMPACT 10: INVASION OF ALIEN VEGETATION							
IMPACT	INFRASTRUCTURE ALTERNATIVE	TYPE	EFFECT			LIKELIHOOD	OVERALL SIGNIFICANCE
			DURATION	EXTENT	CONSEQUENCE		
Without Mitigation	Both Grid Infrastructure Layouts	Direct & Indirect	Long Term	Localised	Severe	Probable	MODERATE (-)

	No-Go Alternative	Existing	Long Term	Localised	Slight	Definite	LOW (-)
With Mitigation	Both Grid Infrastructure Layouts	Direct & Indirect	Short Term	Localised	Slightly Beneficial	Definite	LOW (+)
	No-Go Alternative	N/A	N/A	N/A	N/A	N/A	N/A

8.5. DECOMMISSIONING PHASE

It is highly unlikely that the proposed grid infrastructure will be decommissioned in the short term because the infrastructure will form part of the Albany WEF, which has a lifespan of approximately 20 to 25 years. In the unlikely event that the grid infrastructure is decommissioned subsequent to the WEF lifespan, the impacts are likely to be similar to those identified for the construction phase. The mitigation measures, which have been identified for the construction phase, will need to be updated by a suitably qualified specialist and implemented during the decommissioning phase to reduce the likelihood of adverse ecological impacts within the development site.

9. AMENDMENTS TO THE WEF LAYOUT AND IMPLICATIONS

9.1. Description of revised WEF layout

Subsequent to the Ecological Impact Assessment that was submitted in February 2020, revisions to the proposed Albany WEF layout have been made. This chapter describes the changes made to the layout and makes comment on whether these revisions affect the identification and assessment of impacts of the WEF on the surrounding ecological environmental, provided for in this report.

Table 9-1: Project summary of revised project activities:

Activity	Initial project description	Footprint prior to rehabilitation	Revised project description	Footprint prior to rehabilitation
Temporary site camp and laydown area.	30 m ² per turbine x 66	0.2 ha	30 m ² per turbine x 43	0.13 ha
Wind turbines with a rotor diameter of up to 170m, a hub height of up to 130m and blade length of up to 85m.	Foundations: 550 m ² Crane hardstand: 3900 m ² Switchgear and/or transformer: 25 m ² 4475m x 66	29.54 ha	Foundations: 550 m ² Crane hardstand: 3900 m ² Switchgear and/or transformer: 25 m ² 4475m x 43	19.24 ha
Internal access roads 14 m during construction, rehabilitated to 8m.	46.78 km X 14m (Some of which are existing roads)	65.5 ha	40.40 km x 14m (Some of which are existing roads)	56.56 ha
Batching plant, laydown facilities, concrete tower manufacturing and steel tower processing and construction compound.	90 000 m ²	9 ha	90 000 m ²	9 ha
Total WEF footprint		105 ha		85 ha

9.2. Comment on impact assessment

The revised Albany WEF layout is associated with a reduction in the number of turbines. The change will reduce the area to be cleared for construction by up to 20 ha (Table 9-1) and reduce the number of turbines in ecological sensitive areas from 15 down to 8 (Figure 9-2) and will therefore reduce the extent of impact. In addition, the road length will be reduced, which not only reduces the project footprint, but also reduces the level of fragmentation to some degree. Therefore, the amended layout it will achieve a better outcome.

No additional impacts or mitigation measures, associated with the proposed amendment were identified. Therefore the recommendations and mitigation measures contained in the Ecological Impact Assessment (February 2020) are still applicable, remain valid, and should be included as conditions for approval.

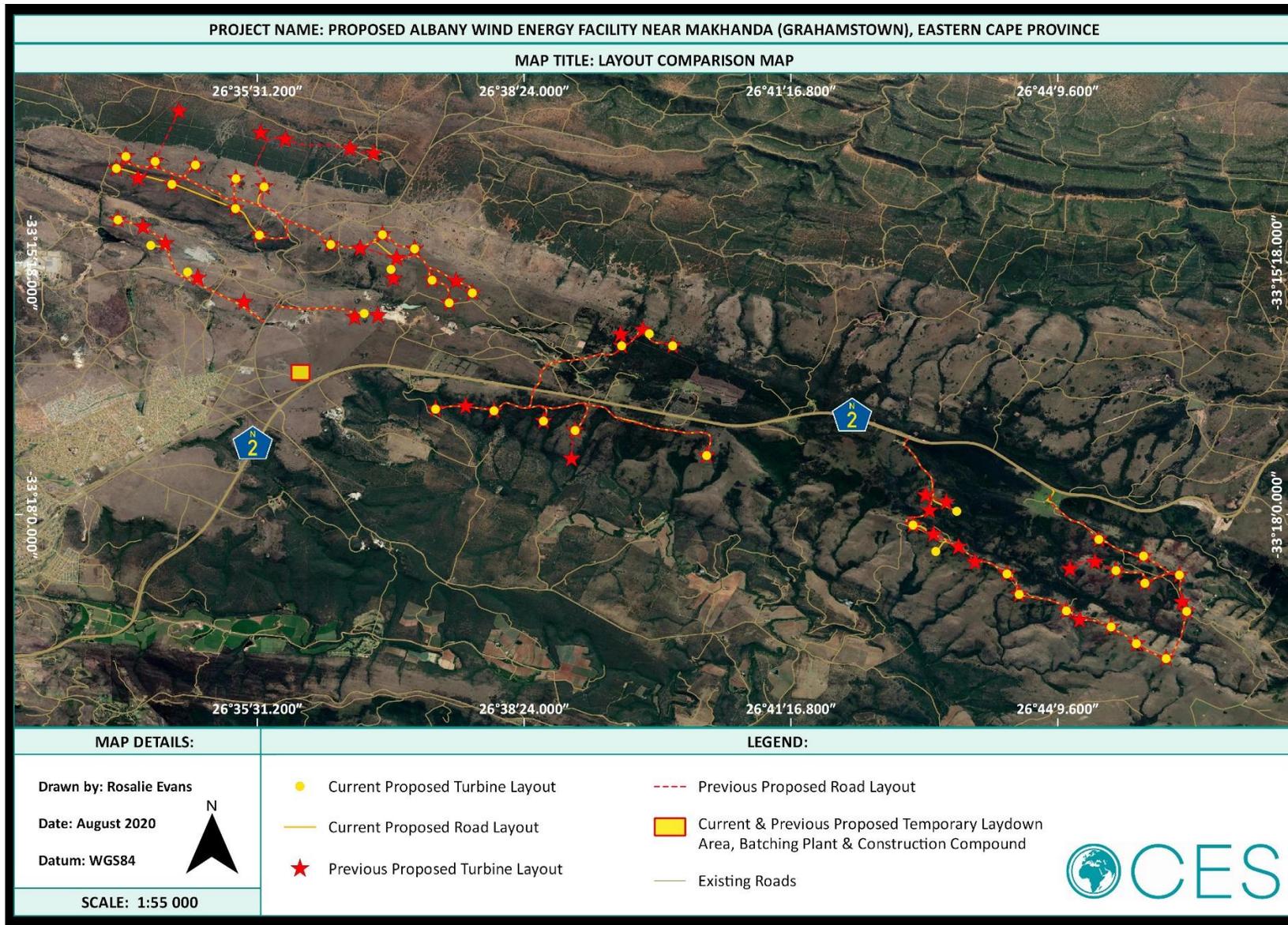


Figure 9-1: Comparison of original and revised WEF layout

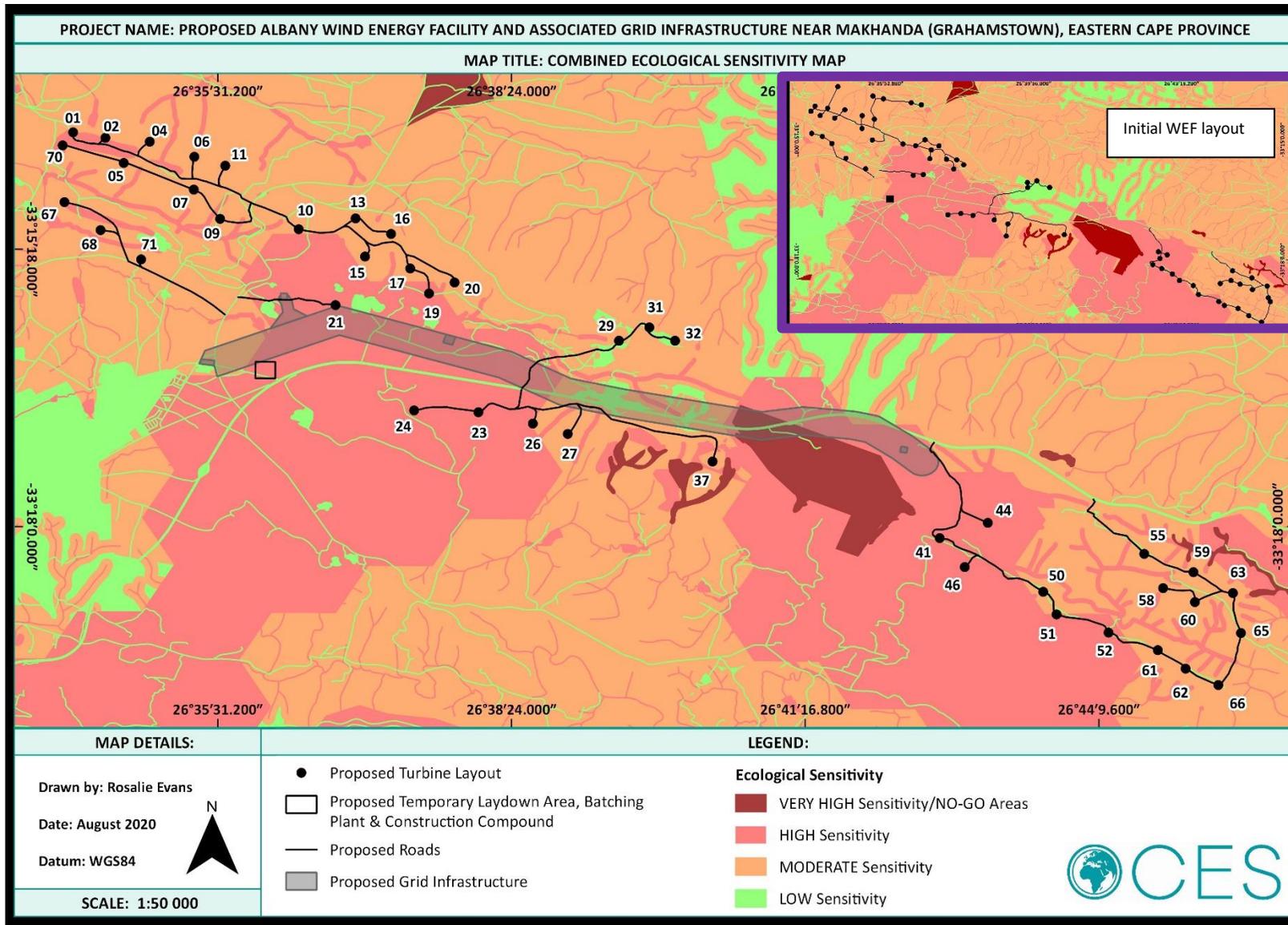


Figure 9-2: Sensitivity map and the revised WEF layout (inset is the initial WEF layout)

10. ALBANY WEF CONCLUDING REMARKS

10.1. SUMMARY OF IMPACTS ASSOCIATED WITH THE ALBANY WEF

Table 9-1 below consists of a summary of the ecological impacts associated with the preferred layout alternative of the proposed Albany WEF development as well as the impacts associated within the no-go alternative.

Table 9-1: Albany WEF Ecological Impacts Summary.

IMPACT	PREFERRED ALTERNATIVE		NO-GO ALTERNATIVE
	WITHOUT MITIGATION	WITH MITIGATION	
PLANNING & DESIGN PHASE			
<i>No direct, indirect or cumulative ecological impacts have been identified for the Planning and Design Phase of the proposed Albany WEF because no tangible alterations to the environment will occur within the proposed site during this phase.</i>			
CONSTRUCTION PHASE			
1. Faunal Habitat Loss and Fragmentation	HIGH (-)	MODERATE (-)	MODERATE (-)
2. Loss of Reptile Diversity	MODERATE (-)	LOW (-)	LOW (-)
3. Loss of Amphibian Diversity	MODERATE (-)	LOW (-)	LOW (-)
4. Loss of Mammal Diversity	LOW (-)	LOW (-)	LOW (-)
5. Impact of Noise and Dust on Faunal Species	MODERATE (-)	LOW (-)	LOW (-)
6. Loss of Vegetation Communities	HIGH (-)	MODERATE (-)	LOW (-)
7. Removal of Alien Vegetation	LOW (+)	MODERATE (+)	MODERATE (-)
8. Pollution of Surface Water Resources	MODERATE (-)	LOW (-)	N/A
9. Rehabilitation	MODERATE (-)	LOW (-)	N/A
OPERATIONAL PHASE			
7. Invasion of alien vegetation	HIGH (-)	LOW (+)	MODERATE (-)
DECOMMISSIONING PHASE			
<i>It is highly unlikely that the proposed development would be decommissioned in the short term, however once it has reached the end of its lifespan (approximately 20 - 25 years), the top structures (actual turbines) will likely be removed. The turbine foundations and access roads will not be removed.</i>			
<i>The ecological impacts associated with the decommissioning phase will be similar to those listed in the construction phase and the associated mitigations measures must be updated and implemented to reduce potential adverse impacts.</i>			

10.2. SPECIALIST STATEMENT

No fatal flaws were identified during the ecological impact assessment; however, the following areas of high ecological sensitivity, in proximity to the proposed development, must be “no-go” areas for the proposed Albany WEF development:

- The patches of Southern Mistbelt Forest vegetation (Beggars Bush State Forest); and
- The Ecca Local Authority Nature Reserve.

The current Albany WEF layout avoids all of these no-go areas. It must be noted that, although not observed in this study, threatened plant and animal species *may* be present and it is essential to undertake detailed surveys and micro-siting of the turbine platform prior to finalising the layout.

10.3. RECOMMENDATIONS FOR THE ALBANY WEF DEVELOPMENT

It is recommended that a suitably qualified ecological specialist is on site prior to vegetation clearance to determine whether any of the SCC or protected species are located within the final/authorised turbine foundation footprints, the road routes and/or the temporary laydown area. If species require removal and/or relocation, the appropriate permissions must be obtained prior to the commencement of vegetation clearance or earth-moving activities in the identified areas. The approvals/permits may be subject to certain conditions, for example allowing various nurseries to collect plants before vegetation clearance commences or the removal of specific species for rehabilitation purposes.

Plants which will be used for rehabilitation purposes must be stored in nurseries until such a time that they are replanted. It should be noted that many critical SCC are plants which will not be able to be successfully uprooted and replanted (Phillipson, 2002), or at best may have a low survival rate. In all cases, the species will require very careful treatment to give them the best chances of survival, and specialist horticultural knowledge is required.

It is recommended that the mitigation measures which are listed in sections 9.3.1, 9.3.2 and 9.3.3 are included in the Environmental Management Programme (EMPr) to reduce the potential ecological impacts associated with the proposed Albany WEF development.

10.3.1. Construction Phase Recommendations

- Where possible, internal roads and turbine hardstands should be planned and constructed to avoid highly sensitive areas.
- Where access roads and/or turbine hardstands do need to be located within highly sensitive areas then there should be further ground-truthing to determine the exact road routes and turbine hardstand locations so to, where possible, avoid site specific sensitive areas.
- Wherever possible, existing service/access roads should be used.
- Clearing of vegetation should be kept to a minimum and all rocky outcrops and wetlands must be avoided.
- Construction areas should be demarcated with hazard tape and no clearing must occur outside of these areas. Laydown areas and construction camps must be located in areas of low sensitivity. Where this is not feasible, then in areas of moderate sensitivity.
- An ECO must be employed to monitor the clearing of vegetation for the construction of roads and hardstands.
- All the lizards and tortoises, which are likely to occur within the proposed site, are listed as Schedule II species on the PNCO List, and it is therefore illegal for any construction staff to remove them from the site. It will be difficult to avoid all areas where reptiles are likely to occur, but it is recommended that construction staff are educated with regards to reptile conservation and that all staff employed by the developer ensure that any reptiles encountered are not killed. Any reptiles encountered should be allowed to move away from the area but those which require relocation should be relocated in accordance with local legislation.
- No reptiles must be removed from the site without proper authorisation from the relevant authority.
- A rescue plan must be developed to protect reptiles which could fall into construction pits.
- The construction of turbine hardstands on rocky outcrops should be avoided.
- Speed restrictions (40 km per hour is recommended) must be in place to reduce the likelihood of animal mortality on the roads and reduce the impacts associated with dust caused by vehicle movement.

- Access to all internal roads must be restricted through locked gates and/or guarded booms.
- It is recommended that construction staff are educated regarding poaching and any such activities must be strictly prohibited.
- All frogs and toads are listed as Schedule II species on the PNCO List and it is therefore illegal to remove them from the site.
- Where possible, the placement of turbine hardstands must avoid all aquatic habitats as they are valuable habitats for protected amphibian species (i.e. all aquatic habitats).
- If amphibians are encountered during construction works, all construction staff must be educated with regards to amphibian conservation to ensure that they are not harmed or killed. Any amphibians encountered must be allowed to move away from the area or carefully relocated to an area within the same catchment.
- No amphibians will be allowed to be removed from the site.
- The construction of turbine hardstands should avoid the wetland areas.
- Vehicles should be well maintained so as not to leak oils and fuels which could pollute surface water sources.
- Oils and fuels should be stored on impermeable surfaces and preferably under lock and key to reduce the likelihood of the pollution of surface water.
- Where possible, existing service/access/haul roads should be used.
- In the event of the unearthing of any mole species during construction, all construction staff should be educated with regards to mammal conservation to ensure that they are not killed, and any mammals encountered should be allowed to move away from the area or carefully moved to an area outside of the project activities.
- A mole specialist should be appointed to undertake a detailed survey to confirm the presence/absence of Golden moles and assist with micro-siting of the WEF and associated infrastructure and developing a plan to mitigate impacts if detected or favourable habitat is identified (such as relocation).
- Soil stockpiles should be limited to 1.5 m in height.
- Construction activities such as the digging of trenches, which could result in excessive dust pollution, should preferably cease during period of high winds.
- Newly cleared and exposed areas must be managed for dust and landscaped with indigenous vegetation to avoid soil erosion. Where necessary, temporary stabilization measures must be used until vegetation establishes.
- Where possible, fine materials should be covered or kept in containers during transportation to avoid contamination of the surrounding areas.
- All reasonable and feasible measures should be implemented to reduce noise in ecologically sensitive areas, such as adjacent to wetlands and rivers.
- The turbine and road layouts need to under-go micro-siting prior to finalisation of the turbine layout.
- A comprehensive Plant Search and Rescue must be undertaken by a suitably qualified specialist prior to vegetation clearance.
- All relevant plant permits must be in place prior to the removal or removal and relocation of protected species.
- Plant SCC found within the proposed site must either be housed in an onsite nursery for use during rehabilitation or be relocated to suitable areas where vegetation clearance will not occur.
- Areas of the proposed site which contain large populations of SCC must be avoided where possible.
- The clearance of vegetation, at any given time, must be kept to a minimum to reduce the possibility of soil erosion.

- The clearing of vegetation and damage to plants may not be permitted in any areas which have demarcated as no-go areas, these include the Southern Mistbelt Forest patches (Beggars Bush State Forest) as well as the Ecca Local Authority Nature Reserve.
- Where possible, all temporary infrastructure must be placed in areas which have already been transformed.
- Existing roads must be used as far as practically possible.
- A site-specific Alien Vegetation Management Plan must be implemented during the construction phase, and continued monitoring and eradication needs to take place throughout the life of the project.
- Alien vegetation, within the development footprints, must be removed from the site and disposed of at a registered waste disposal site.
- The development footprints and immediate surroundings should be monitored for the growth/regrowth of alien vegetation throughout the construction and operation phase.
- No concrete mixing must take place within 50 m of a wetland or watercourse during the construction phase.
- Concrete mixing must only take place on impermeable surfaces.
- No construction machinery must be parked within 50 m of a wetland or watercourse overnight.
- Construction machinery must be maintained regularly to reduce the risk of oil and fuel leaks.
- All stationary machinery should be equipped with drip trays to retain potential oil and fuel leaks.
- Emergency plans must be in place to remedy oil and fuel spill leaks.
- Chemical toilets must not be placed within 50 m from wetlands and watercourses. Toilets must be maintained/serviced regularly to prevent the contamination of the surrounding environments, including wetlands and watercourses.
- A Rehabilitation Management Plan should be developed and implemented during the construction phase as construction is complete at each site.
- Measures should be put in place to prevent the accidental or unintentional introduction of alien vegetation during rehabilitation.
- The development footprints and immediate surroundings should be monitored for the growth/regrowth of alien vegetation throughout the construction phase.
- Indigenous species must be used for rehabilitation.

10.3.2. Operational Phase Recommendations

- The site-specific Alien Vegetation Management Plan must be implemented for the first two (2) years of the operational phase. Thereafter, alien vegetation must continue to be monitored and eradicated annually throughout the life of the project.
- Alien vegetation, within the development footprints, must be removed from the site as they appear and must be disposed of at a registered waste disposal site.

10.3.3. Decommissioning Phase Recommendations

It is highly unlikely that the proposed grid infrastructure development would be decommissioned in the short term because the infrastructure will form part of the Albany WEF, which has a lifespan of approximately 20 to 25 years. In the unlikely event that the grid infrastructure is decommissioned subsequent to the WEF lifespan, the impacts are likely to be similar to those identified for the construction phase. The mitigation measures, which have been identified for the construction phase, will need to be updated by a suitably qualified specialist and implemented during the decommissioning phase to reduce the likelihood of adverse ecological impacts within the development site.

10.4. CONCLUSION

Based on the findings of this Ecological Impact Assessment, it is the opinion of the Ecological Specialist/(s) that, provided that the recommended mitigation measures are implemented, the proposed Albany WEF development will have no high residual negative impacts associated with it. It is important to note that no-go areas must be avoided and the recommended mitigation measures which are stipulated in this report and in the EMP, are carefully implemented and monitored during the phases of development. No fatal flaws, relating to the ecological aspects of the proposed site, have been identified for the preferred layout alternative.

There is therefore no reason, in terms of the ecological sensitivity, that the proposed Albany WEF development should not be authorised.

11. ALBANY GRID INFRASTRUCTURE: CONCLUDING REMARKS

11.1. SUMMARY OF IMPACTS ASSOCIATED WITH THE GRID INFRASTRUCTURE

Table 9-2 below consists of a summary of the ecological impacts associated with the proposed Albany grid infrastructure, including both overhead line alternatives, as well as the impacts associated within the no-go alternative.

Table 9-2: Albany Grid Infrastructure Ecological Impacts Summary.

IMPACT	PREFERRED ALTERNATIVE		NO-GO ALTERNATIVE
	WITHOUT MITIGATION	WITH MITIGATION	
PLANNING & DESIGN PHASE			
<i>No direct, indirect or cumulative ecological impacts have been identified for the Planning and Design Phase of the proposed Albany grid infrastructure because no tangible alterations to the environment will occur within the proposed site during this phase.</i>			
CONSTRUCTION PHASE			
1. Faunal Habitat Loss and Fragmentation	MODERATE (-)	LOW (-)	LOW (-)
2. Loss of Reptile Diversity	MODERATE (-)	LOW (-)	LOW (-)
3. Loss of Amphibian Diversity	MODERATE (-)	LOW (-)	LOW (-)
4. Loss of Mammal Diversity	LOW (-)	LOW (-)	LOW (-)
5. Impact of Noise and Dust on Faunal Species	LOW (-)	LOW (-)	LOW (-)
6. Loss of Vegetation Communities	MODERATE (-)	LOW (-)	LOW (-)
7. Removal of Alien Vegetation	LOW (+)	LOW (+)	LOW (-)
8. Pollution of Surface Water Resources	MODERATE (-)	LOW (-)	N/A
9. Rehabilitation	MODERATE (-)	LOW (-)	N/A
OPERATIONAL PHASE			
7. Invasion of alien vegetation	MODERATE (-)	LOW (+)	LOW (-)
DECOMMISSIONING PHASE			

It is highly unlikely that the proposed grid infrastructure development would be decommissioned in the short term because the infrastructure will form part of the Albany WEF, which has a lifespan of approximately 20 to 25 years. In the unlikely event that the grid infrastructure is decommissioned subsequent to the WEF lifespan, the impacts are likely to be similar to those identified for the construction phase. The mitigation measures, which have been identified for the construction phase, will need to be updated by a suitably qualified specialist and implemented during the decommissioning phase to reduce the likelihood of adverse ecological impacts within the development site.

11.2. SPECIALIST STATEMENT

No fatal flaws were identified during the ecological impact assessment; however, the following areas of high ecological sensitivity, in proximity to the proposed development, must be “no-go” areas for the Proposed Albany Grid Infrastructure development:

- The patches of Southern Mistbelt Forest vegetation (Beggars Bush State Forest); and
- The Ecca Local Authority Nature Reserve.

It must be noted that, with the exception of a section of the overhead line corridor – within which the overhead line will be routed, the current grid infrastructure layout avoids all of these no-go areas.

11.3. RECOMMENDATIONS FOR THE GRID INFRASTRUCTURE DEVELOPMENT

Micro-siting must be undertaken to determine the least sensitive locations for the placement of overhead line pylons. If species are encountered which require removal and/or relocation, the appropriate permissions must be obtained prior to the commencement of vegetation clearance in the identified areas. The approvals/permits may be subject to certain conditions, for example allowing various nurseries to collect plants before vegetation clearance commences or the removal of specific species for rehabilitation purposes.

It is recommended that the mitigation measures which are listed in sections 10.3.1, 10.3.2 and 10.3.3 are included in the Environmental Management Programme (EMPr) to reduce the potential ecological impacts associated with the proposed Albany Grid Infrastructure development.

11.3.1. Construction Phase Recommendations

- Ground truthing must be undertaken within the overhead line corridor to determine the route with the least possible damage to faunal habitats.
- Clearing of vegetation must be kept to a minimum and rocky outcrops and wetlands must be avoided, where possible.
- Construction areas must be demarcated with hazard tape and no clearing must occur outside of these areas.
- Maintain habitat connectivity, particularly to intact habitats, via habitat corridors.
- All the lizards and tortoises, which are likely to occur within the proposed site, are listed as Schedule II species on the PNCO List, and it is therefore illegal for any construction staff to remove them from the site. It will be difficult to avoid all areas where reptiles are likely to occur, but it is recommended that construction staff are educated with regards to reptile conservation and that all staff employed by the developer ensure that any reptiles encountered are not killed. Any reptiles encountered should be allowed to move away from the area but those which require relocation should be relocated in accordance with local legislation.
- No reptiles must be removed from the site.

- A rescue plan should be developed to protect reptiles which could fall into construction pits.
- The construction of grid infrastructure on rocky outcrops should be avoided.
- Speed restrictions (40 km per hour is recommended) should be in place to reduce the likelihood of animals being killed along the access roads during construction and reduce dust generated by large vehicles.
- It is recommended that construction staff are educated regarding poaching and any such activities must be strictly prohibited.
- All frogs and toads are listed as Schedule II species on the PNCO List and it is therefore illegal to remove them from the site.
- Where possible, the placement of pylons should avoid sensitive areas or areas which have been described as valuable habitats for protected amphibian species (i.e. all aquatic habitats).
- If amphibians are encountered during construction works, all construction staff should be educated with regards to amphibian conservation to ensure that they are not harmed or killed. Any amphibians encountered should be allowed to move away from the area or carefully relocated to an area within the same catchment.
- No amphibians will be allowed to be removed from the site.
- The construction of pylons should avoid the wetland areas.
- Vehicles should be well maintained so as not to leak oils and fuels which could pollute surface water sources.
- Oils and fuels should be stored on impermeable surfaces, and preferably under lock and key, to reduce the likelihood of the pollution of surface water.
- Where possible, existing service/access/haul roads should be used.
- In the event of the unearthing of any mole species during construction, all construction staff should be educated with regards to mammal conservation to ensure that they are not killed, and any mammals encountered should be allowed to move away from the area or carefully moved to an area outside of the project activities.
- Soil stockpiles should be limited to 1.5 m in height.
- Construction activities such as the digging of trenches, which could result in excessive dust pollution, should preferably cease during period of high winds.
- Newly cleared and exposed areas must be managed for dust and landscaped with indigenous vegetation to avoid soil erosion. Where necessary, temporary stabilization measures must be used until vegetation establishes.
- Where possible, fine materials should be covered or kept in containers during transportation to avoid contamination of the surrounding areas.
- A comprehensive Plant Search and Rescue must be undertaken by a suitably qualified specialist prior to vegetation clearance.
- All relevant plant permits must be in place prior to the removal or removal and relocation of protected species.
- Plant SCC found within the proposed site should either be housed in an onsite nursery for use during rehabilitation or be relocated to suitable areas where vegetation clearance will not occur.
- Areas of the proposed site which contain large populations of SCC should be avoided where possible.
- The clearance of vegetation, at any given time, should be kept to a minimum to reduce the possibility of soil erosion.
- The clearing of vegetation and damage to plants must be avoided in any areas which have been demarcated as no-go areas, these include the Southern Mistbelt Forest patches (Beggars Bush State Forest) as well as the Ecca Local Authority Nature Reserve.
- Where possible, all temporary infrastructure should be placed in areas which have already been transformed.

- A site-specific Alien Vegetation Management Plan must be implemented during the construction phase.
- Alien vegetation, within the development footprints, should be removed from the site and disposed of at a registered waste disposal site.
- The development footprints and immediate surroundings should be monitored for the growth/regrowth of alien vegetation throughout the construction phase.
- Where possible, the placement of pylons should avoid wetlands and tributaries.
- No concrete mixing must take place within 50 m of a wetland or watercourse during the construction phase.
- Concrete mixing must only take place on impermeable surfaces.
- No stationary construction machinery must be stored within 50 m of a wetland or watercourse.
- Construction machinery must be maintained regularly to reduce the risk of oil and fuel leaks.
- All stationary machinery should be equipped with drip trays to retain potential oil and fuel leaks.
- Emergency plans must be in place to remedy oil and fuel spill leaks.
- A Rehabilitation Management Plan should be developed and implemented during the construction phase.
- Measures should be put in place to prevent the accidental or unintentional introduction of alien vegetation during rehabilitation.
- The development footprints and immediate surroundings should be monitored for the growth/regrowth of alien vegetation throughout the construction phase.
- Indigenous species must be used for rehabilitation.

11.3.2. Operational Phase Recommendations

- The site-specific Alien Vegetation Management Plan must be implemented for the first two (2) years of the operational phase. Thereafter, alien vegetation should continue to be monitored and eradicated annually throughout the life of the project.
- Alien vegetation, within the development footprints, should be removed from the site as they appear and must be disposed of at a registered waste disposal site.

11.3.3. Decommissioning Phase Recommendations

It is highly unlikely that the proposed grid infrastructure will be decommissioned in the short term because the infrastructure will form part of the Albany WEF, which has a lifespan of approximately 20 to 25 years. In the unlikely event that the grid infrastructure is decommissioned subsequent to the WEF lifespan, the impacts are likely to be similar to those identified for the construction phase. The mitigation measures, which have been identified for the construction phase, will need to be updated by a suitably qualified specialist and implemented during the decommissioning phase to reduce the likelihood of adverse ecological impacts within the development site.

11.4. CONCLUSION

Based on the findings of this Ecological Impact Assessment, it is the opinion of the Ecological Specialist/(s) that the proposed Albany Grid Infrastructure development will have no high residual negative impacts associated with it, and the careful implementation of the recommended mitigation measures, which are stipulated in this report and in the EMP, are likely to reduce the significance of the identified impacts to that of low significance. No fatal flaws, relating to the ecological aspects of the proposed site, have been identified for the proposed Grid Infrastructure development. Where

possible, the placement of the overhead line pylons should avoid sensitive surface water features and rocky outcrops due to the value that these areas have for reptiles, amphibians and mammals.

There is therefore no reason, in terms of the ecological sensitivity, that the proposed Albany Grid Infrastructure development should not be authorised.

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APPENDIX A-1 CES IMPACT ASSESSMENT METHODOLOGY

The CES impact assessment methodology below was used to determine the significance of the potential ecological impacts associated with the proposed Albany WEF and the proposed Albany Grid Infrastructure developments.

DESCRIPTION	NATURE		
	Positive	Beneficial/positive impact.	
	Negative	Adverse/negative impact.	
	TYPE		
	Direct	Direct interaction of an activity with the environment.	
	Indirect	Impacts on the environment that are not a direct result of the project or activity.	
	Cumulative	Impacts which may result from a combination of impacts of this project and similar related projects.	
EFFECT	DURATION		
	Short term	Less than 5 years	
	Medium term	Between 5 and 20 years	
	Long term	Between 20 and 40 years (a generation) and from a human perspective also permanent	
	Permanent	Over 40 years and resulting in a permanent and lasting change that will always be there	
	EXTENT		
	Localised	At localised scale and a few hectares in extent	
	Study Area	The proposed site and its immediate surroundings	
	Regional	District and Provincial level	
	National	Country	
	International	Internationally	
	CONSEQUENCE		
	Slight/ Slightly Beneficial	Slight impacts or benefits on the affected system(s) or party(ies).	
	Moderate / Moderately Beneficial	Moderate impacts or benefits on the affected system(s) or party(ies).	
Severe/ Beneficial	Severe impacts or benefits on the affected system(s) or party(ies).		
Very Severe/ Very Beneficial	Very Severe impacts or benefits to the affected system(s) or party(ies).		
LIKELIHOOD	LIKELIHOOD		
	Unlikely	The likelihood of these impacts occurring is slight.	
	May Occur	The likelihood of these impacts occurring is possible.	
	Probable	The likelihood of these impacts occurring is probable.	
	Definite	The likelihood is that this impact will occur.	
SIGNIFICANCE RATE	Low (-)	Low (+)	An acceptable impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in either positive or negative medium to short term effects on the social and/or natural environment
	Moderate (-)	Moderate (+)	An important impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in either a positive or negative medium to long term effect on the social and/or natural environment
	High (-)	High (+)	A serious impact, if not mitigated, may prevent the implementation of the project (if it is a negative impact). These impacts would be considered by society as constituting a major and usually long-term change to the (natural and/or social) environment and result in severe effects or beneficial effect.
	Very High (-)	Very High (+)	A very serious impact which, if negative, may be sufficient by itself to prevent implementation of the project. The impact may result in permanent change. Very often these impacts are immitigable and usually result in very severe effects, or very beneficial effects.

APPENDIX A-2 REPTILE SPECIES WHICH ARE LIKELY TO OCCUR WITHIN THE PROPOSED SITE

SCIENTIFIC NAME	COMMON NAME	SA RED LIST CATEGORY (SARCA)	IUCN	NEM:BA	CITES	PNCO	REGION ENDEMIC	RECORDED ON SITE
<i>Acontias gracilicauda</i>	Thin-tailed Legless Skink	Least Concern	-	-	-	-	Yes	-
<i>Acontias meleagris</i>	Cape Legless Skink	Least Concern	-	-	-	-	Yes	-
<i>Acontias orientalis</i>	Eastern Legless Skink	Least Concern	-	-	-	-	Yes	Yes
<i>Afrotrophops bibronii</i>	Bibron's Blind Snake	Least Concern	-	-	-	-	-	Yes
<i>Agama atra</i>	Southern Rock Agama	Least Concern	-	-	-	-	-	Yes
<i>Aparallactus capensis</i>	Black-headed Centipede-eater	Least Concern	-	-	-	-	-	-
<i>Bitis arietans arietans</i>	Puff Adder	Least Concern	-	-	-	-	-	-
<i>Boaedon capensis</i>	Brown House Snake	Least Concern	-	-	-	Schedule II	-	Yes
<i>Bradypodion ventrale</i>	Eastern Cape Dwarf Chameleon	Least Concern	-	-	Appendix II	-	Yes	-
<i>Causus rhombeatus</i>	Rhombic Night Adder	Least Concern	-	-	-	-	-	Yes
<i>Chamaesaura anguina anguina</i>	Cape Grass Lizard	Least Concern	-	-	-	Schedule II	Yes	-
<i>Chersina angulata</i>	Angulate Tortoise	Least Concern	-	-	Appendix II	Schedule II	-	-
<i>Chondrodactylus bibronii</i>	Bibron's Gecko	Least Concern	-	-	-	-	-	-
<i>Cordylus cordylus</i>	Cape Girdled Lizard	Least Concern	-	-	Appendix II	Schedule II	Yes	Yes
<i>Crotaphopeltis hotamboeia</i>	Red-lipped Snake	Least Concern	-	-	-	-	-	-
<i>Dasypeltis scabra</i>	Rhombic egg-eater	Least Concern	-	-	-	Schedule II	-	-
<i>Dasypeltis inornata</i>	Southern Brown Egg-eater	Least Concern	-	-	-	Schedule II	Yes	-

<i>Dispholidus typus typus</i>	Boomslang	Least Concern	-	-	-	-	-	-
<i>Duberria lutrix lutrix</i>	South African Slug-eater	Least Concern	-	-	-	Schedule II	Yes	Yes
<i>Goggia essexi</i>	Essex's Pygmy Gecko	Least Concern	-	-	-	-	Yes	Yes
<i>Hemachatus haemachatus</i>	Rinkhals	Least Concern	-	-	-	-	-	-
<i>Homopus areolatus</i>	Parrot-beaked Tortoise	Least Concern	-	-	Appendix II	Schedule II	Yes	Yes
<i>Homoroselaps lacteus</i>	Spotted Harlequin Snake	Least Concern	-	-	-	-	Yes	-
<i>Lamprophis fuscus</i>	Yellow-bellied House Snake	Least Concern	-	-	-	Schedule II	Yes	-
<i>Leptotyphlops nigricans</i>	Black Thread Snake	Least Concern	-	-	-	-	Yes	-
<i>Lycodonomorphus rufulus</i>	Brown Water Snake	Least Concern	-	-	-	Schedule II	-	Yes
<i>Lycodonomorphus inornatus</i>	Olive House Snake	Least Concern	-	-	-	Schedule II	Yes	-
<i>Lycodonomorphus laevisissimus</i>	Dusky-bellied Water Snake	Least Concern	-	-	-	Schedule II	Yes	-
<i>Lycophidion capense capense</i>	Cape Wolf Snake	Least Concern	-	-	-	Schedule II	-	-
<i>Lygodactylus capensis capense</i>	Common Dwarf Gecko	Least Concern	-	-	-	-	-	-
<i>Naja mossambica</i>	Mozambique Spitting Cobra	Least Concern	-	-	-	-	-	-
<i>Naja nivea</i>	Cape Cobra	Least Concern	-	-	-	-	-	-
<i>Nucras lalandii</i>	Delalande's Sandveld Lizard	Least Concern	-	-	-	Schedule II	-	Yes
<i>Nucras taeniolata</i>	Albany Sandveld Lizard	Near Threatened	-	-	-	Schedule II	Yes	-
<i>Pachydactylus maculatus</i>	Spotted Gecko	Least Concern	-	-	-	-	-	Yes
<i>Pachydactylus maculatus</i>	Spotted Gecko	Least Concern	-	-	-	-	-	-
<i>Pachydactylus mariquensis</i>	Marico Gecko	Least Concern	-	-	-	-	Yes	-

<i>Pedioplanis burchelli</i>	Burchell's Sand Lizard	Least Concern	-	-	-	Schedule II	Yes	Yes
<i>Pedioplanis lineoocellata pulchella</i>	Common Sand Lizard	Least Concern	-	-	-	Schedule II	-	-
<i>Pelomedusa galeata</i>	South African Marsh Terrapin	Not evaluated	-	-	-	-	-	-
<i>Pelomedusa subrufa</i>	Central Marsh Terrapin	Least Concern	-	-	-	-	-	-
<i>Philothamnus natalensis occidentalis</i>	Western Natal Green Snake	Least Concern	-	-	-	Schedule II	Yes	-
<i>Philothamnus semivariegatus</i>	Spotted Bush Snake	Least Concern	-	-	-	Schedule II	-	-
<i>Psammophis crucifer</i>	Cross-marked Whip Snake	Least Concern	-	-	-	-	-	Yes
<i>Psammophis crucifer</i>	Cross-marked Grass Snake	Least Concern	-	-	-	-	-	-
<i>Psammophis crucifer</i>	Cross-marked Grass Snake	Least Concern	-	-	-	-	-	-
<i>Psammophis notostictus</i>	Karoo Sand Snake	Least Concern	-	-	-	-	-	-
<i>Psammophis notostictus</i>	Karoo Sand Snake	Least Concern	-	-	-	-	-	-
<i>Psammophylax rhombeatus rhombeatus</i>	Spotted Grass Snake/Skaapsteker	Least Concern	-	-	-	-	-	Yes
<i>Python natalensis</i>	Southern African Python	Least Concern	-	P	Appendix II	-	-	-
<i>Rhinotyphlops lalandei</i>	Delalande's Beaked Blind Snake	Least Concern	-	-	-	-	-	Yes
<i>Scelotes caffer</i>	Cape Dwarf Burrowing Skink	Least Concern	-	-	-	-	Yes	-
<i>Stigmochelys pardalis</i>	Leopard Tortoise	Least Concern	-	-	Appendix II	Schedule II	-	-
<i>Trachylepis capensis</i>	Cape Skink	Least Concern	-	-	-	-	-	-
<i>Trachylepis capensis</i>	Cape Skink	Least Concern	-	-	-	-	-	Yes
<i>Trachylepis capensis</i>	Cape Skink	Least Concern	-	-	-	-	-	-

<i>Trachylepis homalocephala</i>	Red-sided Skink	Least Concern	-	-	-	-	Yes	-
<i>Trachylepis varia</i>	Variable Skink	Least Concern	-	-	-	-	-	Yes
<i>Trachylepis varia</i>	Variable Skink	Least Concern	-	-	-	-	-	-
<i>Tropidosaura montana rangeri</i>	Ranger's Mountain Lizard	Not listed	-	-	-	Schedule II	-	Yes
<i>Varanus albigularis albigularis</i>	Rock Monitor	Least Concern	-	-	-	-	-	-
<i>Varanus niloticus</i>	Water Monitor	Least Concern	-	-	Appendix II	-	-	-

APPENDIX A-3 AMPHIBIAN SPECIES WHICH ARE LIKELY TO OCCUR WITHIN THE PROPOSED SITE

SCIENTIFIC NAME	COMMON NAME	IUCN	NEM:BA	CITES	PNCO	RECORDED ON SITE
<i>Amietia delalandii</i>	Delalande's River Frog	Least Concern	-	-	Schedule II	
<i>Breviceps adspersus</i>	Bushveld Rain Frog	Least Concern	-	-	Schedule II	Yes
<i>Cacosternum boettgeri</i>	Boettger's Caco	Least Concern	-	-	Schedule II	Yes
<i>Cacosternum nanum</i>	Bronze Caco	Least Concern	-	-	Schedule II	Yes
<i>Hyperolius marmoratus</i>	Painted Reed Frog	Least Concern	-	-	Schedule II	Yes
<i>Hyperolius semidiscus</i>	Yellowstriped Reed Frog	Least Concern	-	-	Schedule II	
<i>Kassina senegalensis</i>	Bubbling Kassina	Least Concern	-	-	Schedule II	Yes
<i>Pyxicephalus adspersus</i>	Giant Bull Frog	Near Threatened	-	-	Schedule II	
<i>Sclerophrys capensis</i>	Raucous Toad	Least Concern	-	-	Schedule II	Yes
<i>Sclerophrys pardalis</i>	Leopard Toad	Least Concern	-	-	Schedule II	
<i>Semnodactylus wealii</i>	Rattling Frog	Least Concern	-	-	Schedule II	
<i>Strongylopus fasciatus</i>	Striped Stream Frog	Least Concern	-	-	Schedule II	
<i>Tomopterna natalensis</i>	Natal Sand Frog	Least Concern	-	-	Schedule II	
<i>Tomopterna tandyi</i>	Tandy's Sand Frog	Least Concern	-	-	Schedule II	
<i>Vandijkophrynus gariensis gariensis</i>	Karoo Toad (subsp. gariensis)	Not listed	-	-	Schedule II	
<i>Xenopus laevis</i>	Common Platanna	Least Concern	-	-	Schedule II	Yes
<i>Strongylopus grayii</i>	Clicking Stream Frog	Least Concern	-	-	Schedule II	Yes

APPENDIX A-4 MAMMAL SPECIES WHICH HAVE DISTRIBUTION RANGES WHICH INCLUDE THE PROPOSED SITE

SCIENTIFIC NAME	COMMON NAME	SA RED LIST	IUCN	NEM:BA	PNCO
<i>Acomys subspinosus</i>	Cape Spiny Mouse	LC	LC	-	-
<i>Amblysomus hottentotus</i>	Hottentot Golden Mole	LC	LC	-	-
<i>Aonyx capensis</i>	African Clawless Otter	LC	LC	-	-
<i>Atelerix frontalis</i>	South African Hedgehog	NT	LC	PR	Schedule II
<i>Atilax paludinosus</i>	Marsh Mongoose	LC	LC	-	-
<i>Canis mesomelus</i>	Black-backed Jackal	LC	LC	-	-
<i>Caracal caracal</i>	African Caracal	LC	LC	-	-
<i>Cercopithecus pygerythrus</i>	Vervet Monkey	LC	LC	-	-
<i>Chrysospalax trevelyani</i>	Giant Golden Mole	VU	EN	VU	-
<i>Crocidura cyanea</i>	Reddish-gray Musk Shrew	LC	LC	-	-
<i>Crocidura flavescens</i>	Greater Red Musk Shrew	LC	LC	-	-
<i>Cryptomys hottentotus</i>	African Mole Rat	LC	LC	-	-
<i>Cynictis penicillata</i>	Yellow Mongoose	LC	LC	-	-
<i>Dendrohyrax arboreus</i>	Southern Tree Hyrax	LC	LC	-	-
<i>Dendromus melanotis</i>	Gray African Climbing Mouse	LC	LC	-	-
<i>Desmodillus auricularis</i>	Cape Short-eared Gerbil	LC	LC	-	-
<i>Elephantulus rupestris</i>	Western Rock Sengi	LC	LC	-	-
<i>Elephantulus edwardii</i>	Cape Rock Elephant-shrew	LC	LC	-	-
<i>Epomophorus wahlbergi</i>	Wahlberg's Epauletted Fruit Bat	LC	LC	-	Schedule II
<i>Eptesicus hottentotus</i>	Long-tailed Greater Serotine Bat	LC	LC	-	-
<i>Felis silvestris lybica</i>	Wildcat, Wild Cat	LC	LC	-	-
<i>Felis nigripes</i>	Black-footed Cat	LC	PR	-	Schedule II
<i>Galerella pulverulenta</i>	Cape Grey Mongoose	LC	LC	-	-
<i>Genetta genetta</i>	Common Genet	LC	LC	-	-
<i>Genetta tigrina</i>	Cape Genet	LC	LC	-	-
<i>Georychus capensis</i>	Cape Mole Rat	LC	LC	-	-
<i>Grammomys dolichurus</i>	Woodland Thicket Rat	LC	LC	-	-

<i>Graphiurus kelleni</i>	Kellen's Dormouse	LC	LC	-	-
<i>Graphiurus murinus</i>	Woodland Dormouse	LC	LC	-	-
<i>Graphiurus ocularis</i>	Spectacled Dormouse	LC	LC	-	-
<i>Hyaena brunnea</i>	Brown Hyaena	NT	LC	PR	Schedule II
<i>Hystrix africaeaustralis</i>	Cape Porcupine	LC	LC	-	-
<i>Ichneumia albicauda</i>	White-tailed Mongoose	LC	LC	-	-
<i>Ictonyx stictus</i>	Striped Polecat	LC	LC	-	Schedule II
<i>Kerivoula lanosa</i>	Lesser Woolly Bat	NT	LC	-	Schedule II
<i>Lepus saxatilis</i>	Scrub Hare	LC	LC	-	-
<i>Mastomys coucha</i>	Southern Multimammate Mouse	LC	LC	-	-
<i>Mastomys natalensis</i>	Natal Multimammate Mouse	LC	LC	-	-
<i>Mellivora capensis</i>	Honey Badger	NT	LC	PR	-
<i>Micaelamys namaquensis</i>	Namaqua Rock Rat	LC	LC	-	-
<i>Miniopterus schreibersii</i>	Schreiber's Bent-winged Bat	LC	NT	-	Schedule II
<i>Miniopterus fraterculus</i>	Lesser Long-fingered bat	NT	LC	-	Schedule II
<i>Miniopterus natalensis</i>	Natal Long-fingered bat	NT	LC	-	Schedule II
<i>Mus minutooides</i>	Pygmy Mouse	LC	LC	-	-
<i>Mus musculus</i>	House Mouse	LC	LC	-	-
<i>Myosorex sclateri</i>	Sclater's Tiny Mouse Shrew	EN	LC	-	Schedule II
<i>Myotis tricolor</i>	Temminck's Mouse-eared Bat	NT	LC	-	Schedule II
<i>Mystromys albicaudatus</i>	White-tailed Mouse	EN	LC	-	-
<i>Neoromicia capensis</i>	Cape Bat	LC	LC	-	-
<i>Nycteris thebaica</i>	Egyptian Slit-faced bat	LC	LC	-	Schedule II
<i>Orycteropus afer</i>	Aardvark, Antbear	LC	LC	-	Schedule II
<i>Otocyon megalotis</i>	Bat-eared Fox	LC	LC	-	Schedule II
<i>Otomys irroratus</i>	Southern African Vlei Rat	LC	LC	-	-
<i>Otomys saundersiae</i>	Saunders's Vlei Rat	LC	LC	-	-
<i>Panthera pardus</i>	Leopard	LC	LC	VU	Schedule II
<i>Papio cynocephalus ursinus</i>	Chacma Baboon	LC	LC	-	-
<i>Pedetes capensis</i>	Spring Hare	LC	LC	-	-

<i>Phacochoerus africanus</i>	Common Warthog	LC	LC	-	Schedule II
<i>Philantomba monticola</i>	Blue Duiker	VU	LC	VU	Schedule II
<i>Pipistrellus hesperidus</i>	African Pipistrelle	LC	LC	-	Schedule II
<i>Poecilogale albinucha</i>	African Striped Weasel	LC	LC	-	-
<i>Potamochoerus larvatus</i>	Bushpig	LC	LC	-	-
<i>Procavia capensis</i>	Rock Dassie	LC	LC	-	-
<i>Pronolagus saundersiae</i>	Hewitt's Red Rock Hare	LC	LC	-	-
<i>Pronolagus rupestris rupestris</i>	Smith's Red Rock Hare	LC	LC	-	-
<i>Proteles cristatus</i>	Aardwolf	LC	LC	-	Schedule II
<i>Raphicerus campestris</i>	Steenbok	LC	LC	-	-
<i>Raphicerus melanotis</i>	Cape Grysbok	LC	LC	-	-
<i>Rattus rattus</i>	House Rat	LC	LC	-	-
<i>Redunca fulvorufula</i>	Mountain Reedbuck	LC	LC	-	Schedule II
<i>Rhabdomys pumilio</i>	Four-striped Grass Mouse	LC	LC	-	-
<i>Rhinolophus capensis</i>	Cape Horseshoe Bat	NT	LC	-	Schedule II
<i>Rhinolophus clivosus</i>	Geoffroy's Horseshoe Bat	LC	LC	-	Schedule II
<i>Rhinolophus swinnyi</i>	Swinny's Horseshoe Bat	EN	LC	-	Schedule II
<i>Rousettus aegyptiacus</i>	Egyptian Fruit Bat	LC	LC	-	Schedule II
<i>Scotophilus dinganii</i>	African Yellow House Bat	LC	LC	-	Schedule II
<i>Suncus infinitesimus</i>	Least Dwarf Shrew	LC	LC	-	-
<i>Suncus varilla</i>	Lesser Dwarf Shrew	LC	LC	-	-
<i>Suricata suricata</i>	Meerkat	LC	LC	-	-
<i>Sylvicapra grimmia</i>	Common duiker	LC	LC	-	-
<i>Tadarida aegyptiaca</i>	Egyptian Free-tailed Bat	LC	LC	-	Schedule II
<i>Taphozous mauritanus</i>	Mauritian Tomb Bat	LC	LC	-	Schedule II
<i>Thryonomys swinderianus</i>	Greater Cane Rat	LC	LC	-	-
<i>Tragelaphus scriptus</i>	Bushbuck	LC	LC	-	Schedule II
<i>Tragelaphus strepsiceros</i>	Greater Kudu	LC	LC	-	Schedule II
<i>Vulpes chama</i>	Cape Fox	LC	LC	PR	Schedule II

APPENDIX A-5 BIRD SPECIES WHICH ARE LIKELY TO OCCUR WITHIN THE PROPOSED SITE

COMMON NAME	SCIENTIFIC NAME	SA RED LIST	IUCN	NEM:BA	CITES	PNCO
Apalis, Bar-throated	<i>Apalis thoracica</i>	-	-	-	-	-
Apalis, Yellow-breasted	<i>Apalis flavida</i>	-	-	-	-	-
Barbet, Acacia Pied	<i>Tricholaema leucomelas</i>	-	-	-	-	-
Barbet, Black-collared	<i>Lybius torquatus</i>	-	-	-	-	-
Batis, Cape	<i>Batis capensis</i>	-	-	-	-	-
Batis, Chinspot	<i>Batis molitor</i>	-	-	-	-	-
Bee-eater, European	<i>Merops apiaster</i>	-	-	-	-	-
Bishop, Southern Red	<i>Euplectes orix</i>	-	-	-	-	-
Bishop, Yellow	<i>Euplectes capensis</i>	-	-	-	-	-
Bishop, Yellow-crowned	<i>Euplectes afer</i>	-	-	-	-	-
Blackcap, Bush	<i>Lioptilus nigricapillus</i>	VU	NT	-	-	Schedule II
Bokmakierie, Bokmakierie	<i>Telophorus zeylonus</i>	-	-	-	-	-
Boubou, Southern	<i>Laniarius ferrugineus</i>	-	-	-	-	-
Brownbul, Terrestrial	<i>Phyllastrephus terrestris</i>	-	-	-	-	-
Bulbul, Cape	<i>Pycnonotus capensis</i>	-	-	-	-	-
Bulbul, Dark-capped	<i>Pycnonotus tricolor</i>	-	-	-	-	-
Bunting, Cape	<i>Emberiza capensis</i>	-	-	-	-	-
Bunting, Cinnamon-breasted	<i>Emberiza tahapisi</i>	-	-	-	-	-
Bunting, Golden-breasted	<i>Emberiza flaviventris</i>	-	-	-	-	-
Bush-shrike, Grey-headed	<i>Malaconotus blanchoti</i>	-	-	-	-	-
Bush-shrike, Olive	<i>Telophorus olivaceus</i>	-	-	-	-	-
Bush-shrike, Orange-breasted	<i>Telophorus sulfureopectus</i>	-	-	-	-	-
Bustard, Denham's	<i>Neotis denhami</i>	VU	NT	PR	-	Schedule II
Buzzard, Jackal	<i>Buteo rufofuscus</i>	-	LC	-	-	-
Buzzard, Steppe	<i>Buteo vulpinus</i>	-	-	-	-	-
Camaroptera, Green-backed	<i>Camaroptera brachyura</i>	-	LC	-	-	-
Camaroptera, Grey-backed	<i>Camaroptera brevicaudata</i>	-	-	-	-	-
Canary, Brimstone	<i>Crithagra sulphuratus Gonepteryx cleobule</i>	-	VU	-	-	-
Canary, Cape	<i>Serinus canicollis</i>	-	-	-	-	-
Canary, Forest	<i>Crithagra scotops Serinus scotops</i>	-	-	-	-	-

Canary, White-throated	<i>Crithagra albogularis Serinus albogularis</i>	-	-	-	-	-
Canary, Yellow	<i>Crithagra flaviventris Serinus flaviventris</i>	-	-	-	-	-
Canary, Yellow-fronted	<i>Crithagra mozambicus Serinus mozambicus</i>	-	-	-	-	-
Chat, Anteater	<i>Myrmecocichla formicivora</i>	-	-	-	-	-
Chat, Familiar	<i>Cercomela familiaris</i>	-	-	-	-	-
Cisticola, Cloud	<i>Cisticola textrix</i>	-	-	-	-	-
Cisticola, Grey-backed	<i>Cisticola subruficapilla</i>	-	-	-	-	-
Cisticola, Lazy	<i>Cisticola aberrans</i>	-	-	-	-	-
Cisticola, Levillant's	<i>Cisticola tinniens</i>	-	-	-	-	-
Cisticola, Wailing	<i>Cisticola lais</i>	-	-	-	-	-
Cisticola, Wing-snapping	<i>Cisticola ayresii</i>	-	-	-	-	-
Cisticola, Zitting	<i>Cisticola juncidis</i>	-	-	-	-	-
Cliff-chat, Mocking	<i>Thamnolaea cinnamomeiventris</i>	-	-	-	-	-
Coot, Red-knobbed	<i>Fulica cristata</i>	-	-	-	-	-
Cormorant, Reed	<i>Phalacrocorax africanus</i>	-	-	-	-	-
Cormorant, White-breasted Great	<i>Phalacrocorax carbo</i>	-	-	-	-	-
Coucal, Burchell's	<i>Centropus burchellii</i>	-	-	-	-	-
Coucal, White-browed	<i>Centropus superciliosus</i>	-	-	-	-	-
Crane, Blue	<i>Anthropoides paradiseus</i>	NT	VU	EN	-	Schedule II
Crested-flycatcher, Blue-mantled	<i>Trochocercus cyanomelas</i>	-	-	-	-	-
Crombec, Long-billed Cape	<i>Sylvietta rufescens</i>	-	-	-	-	-
Crow, Cape	<i>Corvus capensis</i>	-	-	-	-	-
Crow, Pied	<i>Corvus albus</i>	-	-	-	-	-
Cuckoo, African Emerald	<i>Chrysococcyx cupreus</i>	-	-	-	-	-
Cuckoo, Black	<i>Cuculus clamosus</i>	-	-	-	-	-
Cuckoo, Diderick	<i>Chrysococcyx caprius</i>	-	-	-	-	-
Cuckoo, Jacobin	<i>Clamator jacobinus</i>	-	-	-	-	-
Cuckoo, Klaas's	<i>Chrysococcyx klaas</i>	-	-	-	-	-

Cuckoo, Red-chested	<i>Cuculus solitarius</i>	-	-	-	-	-
Cuckoo-shrike, Black	<i>Campephaga flava</i>	-	-	-	-	-
Cuckoo-shrike, Grey	<i>Coracina caesia</i>	-	-	-	-	-
Darter, African	<i>Anhinga rufa</i>	-	-	-	-	-
Dove, Laughing	<i>Streptopelia Spilopelia senegalensis</i>	-	-	-	-	-
Dove, Lemon	<i>Aplopelia larvata</i>	-	-	-	-	-
Dove, Namaqua	<i>Oena capensis</i>	-	-	-	-	-
Dove, Red-eyed	<i>Streptopelia semitorquata</i>	-	-	-	-	-
Dove, Rock	<i>Columba livia</i>	-	-	-	-	-
Dove, Tambourine	<i>Turtur tympanistria</i>	-	-	-	-	-
Drongo, Fork-tailed	<i>Dicrurus adsimilis</i>	-	-	-	-	-
Duck, African Black	<i>Anas sparsa</i>	-	-	-	-	-
Duck, Yellow-billed	<i>Anas undulata</i>	-	-	-	-	-
Eagle, African Crowned	<i>Stephanoaetus coronatus</i>	VU	NT	-	-	Schedule II
Eagle, Booted	<i>Aquila pennatus Hieraaetus pennatus</i>	-	LC	-	-	-
Eagle, Long-crested	<i>Lophaetus occipitalis</i>	-	LC	-	-	-
Eagle, Martial	<i>Polemaetus bellicosus</i>	EN	VU	VU	-	Schedule II
Eagle-owl, Spotted	<i>Bubo africanus</i>	-	LC	-	-	-
Egret, Cattle	<i>Bubulcus ibis</i>	-	LC	-	-	-
Egret, Great White	<i>Egretta Ardeaalba</i>	-	LC	-	-	-
Egret, Little	<i>Egretta garzetta</i>	-	LC	-	-	-
Egret, Yellow-billed	<i>Egretta intermedia Ardea brachyrhyncha</i>	-	LC	-	-	-
Falcon, Lanner	<i>Falco biarmicus</i>	VU	LC	-	-	Schedule II
Finch, Red-headed	<i>Amadina erythrocephala</i>	-	LC	-	-	-
Finfoot, African	<i>Podica senegalensis</i>	VU	LC	-	-	Schedule II
Firefinch, African	<i>Lagonosticta rubricata</i>	-	-	-	-	-
Fiscal, Common (Southern)	<i>Lanius collaris</i>	-	-	-	-	-
Fish-eagle, African	<i>Haliaeetus vocifer</i>	-	-	-	-	-
Flufftail, Red-chested	<i>Sarothrura rufa</i>	-	-	-	-	-

Flycatcher, African Dusky	<i>Muscicapa adusta</i>	-	-	-	-	-
Flycatcher, Fiscal	<i>Sigelus silens</i>	-	-	-	-	-
Flycatcher, Southern Black	<i>Melaenornis pammelaina</i>	-	-	-	-	-
Flycatcher, Spotted	<i>Muscicapa striata</i>	-	-	-	-	-
Francolin, Grey-winged	<i>Scleroptila africanus afra</i>	-	-	-	-	-
Francolin, Red-winged	<i>Scleroptila levaillantii</i>	-	-	-	-	-
Goose, Egyptian	<i>Alopochen aegyptiacus</i>	-	-	-	-	-
Goose, Spur-winged	<i>Plectropterus gambensis</i>	-	-	-	-	-
Goshawk, African	<i>Accipiter tachiro</i>	-	-	-	-	-
Goshawk, Southern Pale Chanting	<i>Melierax canorus</i>	-	-	-	-	-
Grassbird, Cape	<i>Sphenoeacus afer</i>	-	-	-	-	-
Grebe, Black-necked	<i>Podiceps nigricollis</i>	-	-	-	-	-
Grebe, Little	<i>Tachybaptus ruficollis</i>	-	-	-	-	-
Green-pigeon, African	<i>Treron calvus</i>	-	-	-	-	-
Greenbul, Sombre	<i>Andropadus importunus</i>	-	-	-	-	-
Greenshank, Common	<i>Tringa nebularia</i>	-	-	-	-	-
Ground-hornbill, Southern	<i>Bucorvus leadbeateri</i>	-	VU	PR	-	Schedule II
Guineafowl, Helmeted	<i>Numida meleagris</i>	-	-	-	-	-
Hamerkop, Hamerkop	<i>Scopus umbretta</i>	-	-	-	-	-
Harrier, Black	<i>Circus maurus</i>	EN	VU	-	-	Schedule II
Harrier-Hawk, African	<i>Polyboroides typus</i>	-	-	-	-	-
Heron, Black-headed	<i>Ardea melanocephala</i>	-	-	-	-	-
Heron, Grey	<i>Ardea cinerea</i>	-	-	-	-	-
Honeybird, Brown-backed	<i>Prodotiscus regulus</i>	-	-	-	-	-
Honeyguide, Greater	<i>Indicator indicator</i>	-	-	-	-	-
Honeyguide, Lesser	<i>Indicator minor</i>	-	-	-	-	-
Honeyguide, Scaly-throated	<i>Indicator variegatus</i>	-	-	-	-	-
Hoopoe, African	<i>Upupa africana</i>	-	-	-	-	-
Hornbill, Crowned	<i>Tockus alboterminatus</i>	-	-	-	-	-
House-martin, Common	<i>Delichon urbicum</i>	-	-	-	-	-

Ibis, African Sacred	<i>Threskiornis aethiopicus</i>	-	-	-	-	-
Ibis, Hadedea	<i>Bostrychia hagedash</i>	-	-	-	-	-
Indigobird, Dusky	<i>Vidua funerea</i>	-	-	-	-	-
Jacana, African	<i>Actophilornis africanus</i>	-	-	-	-	-
Kestrel, Rock	<i>Falco rupicolus</i>	-	-	-	-	-
Kingfisher, Brown-hooded	<i>Halcyon albiventris</i>	-	-	-	-	-
Kingfisher, Giant	<i>Megaceryle maximus</i>	-	-	-	-	-
Kingfisher, Half-collared	<i>Alcedo semitorquata</i>	NT	LC	-	-	Schedule II
Kingfisher, Malachite	<i>Alcedo cristata</i>	-	-	-	-	-
Kingfisher, Pied	<i>Ceryle rudis</i>	-	-	-	-	-
Kite, Black-shouldered	<i>Elanus caeruleus</i>	-	-	-	-	-
Kite, Yellow-billed	<i>Milvus aegyptius</i>	-	-	-	-	-
Korhaan, Southern Black	<i>Afrotis afra</i>	VU	VU	-	-	Schedule II
Lapwing, Black-winged	<i>Vanellus melanopterus</i>	-	-	-	-	-
Lapwing, Blacksmith	<i>Vanellus armatus</i>	-	-	-	-	-
Lapwing, Crowned	<i>Vanellus coronatus</i>	-	-	-	-	-
Lark, Agulhas Clapper	<i>Mirafra marjoriae</i>	-	-	-	-	-
Lark, Cape Clapper	<i>Mirafra apiata</i>	-	-	-	-	-
Lark, Eastern Clapper	<i>Mirafra fasciolata</i>	-	-	-	-	-
Lark, Red-capped	<i>Calandrella cinerea</i>	-	-	-	-	-
Lark, Rufous-naped	<i>Mirafra africana</i>	-	-	-	-	-
Longclaw, Cape	<i>Macronyx capensis</i>	-	-	-	-	-
Mannikin, Bronze	<i>Spermestes cucullatus</i>	-	-	-	-	-
Marsh-harrier, African	<i>Circus ranivorus</i>	-	-	-	-	-
Martin, Brown-throated	<i>Riparia paludicola</i>	-	-	-	-	-
Martin, Rock	<i>Hirundo fuligula</i>	-	-	-	-	-
Masked-weaver, Southern	<i>Ploceus velatus</i>	-	-	-	-	-
Moorhen, Common	<i>Gallinula chloropus</i>	-	-	-	-	-
Mousebird, Red-faced	<i>Urocolius indicus</i>	-	-	-	-	-
Mousebird, Speckled	<i>Colius striatus</i>	-	-	-	-	-

Neddicky, Neddicky	<i>Cisticola fulvicapilla</i>	-	-	-	-	-
Night-Heron, Black-crowned	<i>Nycticorax nycticorax</i>	-	-	-	-	-
Nightjar, Fiery-necked	<i>Caprimulgus pectoralis</i>	-	-	-	-	-
Olive-pigeon, African	<i>Columba arquatrix</i>	-	-	-	-	-
Oriole, Black-headed	<i>Oriolus larvatus</i>	-	-	-	-	-
Oriole, Eurasian Golden	<i>Oriolus oriolus</i>	-	-	-	-	-
Ostrich, Common	<i>Struthio camelus</i>	-	-	-	-	-
Owl, Barn	<i>Tyto alba</i>	-	-	-	-	-
Owl, Marsh	<i>Asio capensis</i>	-	-	-	-	-
Palm-swift, African	<i>Cypsiurus parvus</i>	-	-	-	-	-
Paradise-flycatcher, African	<i>Terpsiphone viridis</i>	-	-	-	-	-
Penduline-tit, Cape	<i>Anthoscopus minutus</i>	-	-	-	-	-
Petronia, Yellow-throated	<i>Petronia supercilialis</i>	-	-	-	-	-
Pigeon, Speckled	<i>Columba guinea</i>	-	-	-	-	-
Pipit, African	<i>Anthus cinnamomeus</i>	-	-	-	-	-
Pipit, Buffy	<i>Anthus vaalensis</i>	-	-	-	-	-
Pipit, Long-billed	<i>Anthus similis</i>	-	-	-	-	-
Pipit, Plain-backed	<i>Anthus leucophrys</i>	-	-	-	-	-
Plover, Kittlitz's	<i>Charadrius pecuarius</i>	-	-	-	-	-
Plover, Three-banded	<i>Charadrius tricollaris</i>	-	-	-	-	-
Pochard, Southern	<i>Netta erythrophthalma</i>	-	-	-	-	-
Prinia, Drakensberg	<i>Prinia hypoxantha</i>	-	-	-	-	-
Prinia, Karoo	<i>Prinia maculosa</i>	-	-	-	-	-
Prinia, Tawny-flanked	<i>Prinia subflava</i>	-	-	-	-	-
Puffback, Black-backed	<i>Dryoscopus cubla</i>	-	-	-	-	-
Pygmy-Kingfisher, African	<i>Ispidina picta</i>	-	-	-	-	-
Quail, Common	<i>Coturnix coturnix</i>	-	-	-	-	-
Quailfinch, African	<i>Ortygospiza atricollis</i>	-	-	-	-	-
Raven, White-necked	<i>Corvus albicollis</i>	-	-	-	-	-
Robin, White-starred	<i>Pogonocichla stellata</i>	-	-	-	-	-

Robin-chat, Cape	<i>Cossypha caffra</i>	-	-	-	-	-
Robin-chat, Chorister	<i>Cossypha dichroa</i>	-	-	-	-	-
Rock-thrush, Cape	<i>Monticola rupestris</i>	-	-	-	-	-
Rock-thrush, Sentinel	<i>Monticola explorator</i>	-	-	-	-	-
Ruff, Ruff	<i>Philomachus pugnax</i>	-	-	-	-	-
Rush-warbler, Little	<i>Bradypterus baboecala</i>	-	-	-	-	-
Sandpiper, Common	<i>Actitis hypoleucos</i>	-	-	-	-	-
Sandpiper, Marsh	<i>Tringa stagnatilis</i>	-	-	-	-	-
Sandpiper, Wood	<i>Tringa glareola</i>	-	-	-	-	-
Saw-wing, Black (Southern race)	<i>Psalidoprocne holomelaena</i>	-	-	-	-	-
Scrub-robin, Brown	<i>Cercotrichas signata</i>	-	-	-	-	-
Scrub-robin, Karoo	<i>Cercotrichas coryphoeus</i>	-	-	-	-	-
Scrub-robin, White-browed	<i>Cercotrichas leucophrys</i>	-	-	-	-	-
Secretarybird, Secretarybird	<i>Sagittarius serpentarius</i>	VU	VU	-	-	Schedule II
Seedeater, Streaky-headed	<i>Crithagra gularis</i>	-	-	-	-	-
Shelduck, South African	<i>Tadorna cana</i>	-	-	-	-	-
Shoveler, Cape	<i>Anas smithii</i>	-	-	-	-	-
Snipe, African	<i>Gallinago nigripennis</i>	-	-	-	-	-
Sparrow, Cape	<i>Passer melanurus</i>	-	-	-	-	-
Sparrow, House	<i>Passer domesticus</i>	-	-	-	-	-
Sparrow, Northern Grey-headed	<i>Passer griseus</i>	-	-	-	-	-
Sparrow, Southern Grey-headed	<i>Passer diffusus</i>	-	-	-	-	-
Sparrowhawk, Black	<i>Accipiter melanoleucus</i>	-	-	-	-	-
Sparrowhawk, Little	<i>Accipiter minullus</i>	-	-	-	-	-
Sparrowhawk, Rufous-chested	<i>Accipiter rufiventris</i>	-	-	-	-	-
Spoonbill, African	<i>Platalea alba</i>	-	-	-	-	-
Spurfowl, Red-necked	<i>Pternistis afer</i>	-	-	-	-	-
Starling, Black-bellied	<i>Lamprotornis corruscus</i>	-	-	-	-	-
Starling, Cape Glossy	<i>Lamprotornis nitens</i>	-	-	-	-	-
Starling, Common	<i>Sturnus vulgaris</i>	-	-	-	-	-

Starling, Pied	<i>Spreo bicolor</i>	-	-	-	-	-
Starling, Red-winged	<i>Onychognathus morio</i>	-	-	-	-	-
Starling, Wattled	<i>Creatophora cinerea</i>	-	-	-	-	-
Stilt, Black-winged	<i>Himantopus himantopus</i>	-	-	-	-	-
Stint, Little	<i>Calidris minuta</i>	-	-	-	-	-
Stonechat, African	<i>Saxicola torquatus</i>	-	-	-	-	-
Stork, Black	<i>Ciconia nigra</i>	VU	LC	VU	Appendix II	Schedule II
Stork, White	<i>Ciconia ciconia</i>	-	-	-	-	-
Stork, Yellow-billed	<i>Mycteria ibis</i>	EN	LC	-	-	Schedule II
Sugarbird, Cape	<i>Promerops cafer</i>	-	-	-	-	-
Sunbird, Amethyst	<i>Chalcomitra amethystina</i>	-	-	-	-	-
Sunbird, Collared	<i>Hedydipna collaris</i>	-	-	-	-	-
Sunbird, Greater Double-collared	<i>Cinnyris afer</i>	-	-	-	-	-
Sunbird, Grey	<i>Cyanomitra veroxii</i>	-	-	-	-	-
Sunbird, Malachite	<i>Nectarinia famosa</i>	-	-	-	-	-
Sunbird, Southern Double-collared	<i>Cinnyris chalybeus</i>	-	-	-	-	-
Swallow, Barn	<i>Hirundo rustica</i>	-	-	-	-	-
Swallow, Greater Striped	<i>Hirundo cucullata</i>	-	-	-	-	-
Swallow, Lesser Striped	<i>Hirundo abyssinica</i>	-	-	-	-	-
Swallow, Pearl-breasted	<i>Hirundo dimidiata</i>	-	-	-	-	-
Swallow, White-throated	<i>Hirundo albigularis</i>	-	-	-	-	-
Swamp-warbler, Lesser	<i>Acrocephalus gracilirostris</i>	-	-	-	-	-
Swift, African Black	<i>Apus barbatus</i>	-	-	-	-	-
Swift, Alpine	<i>Tachymarptis melba</i>	-	-	-	-	-
Swift, Horus	<i>Apus horus</i>	-	-	-	-	-
Swift, Little	<i>Apus affinis</i>	-	-	-	-	-
Swift, White-rumped	<i>Apus caffer</i>	-	-	-	-	-
Tchagra, Southern	<i>Tchagra tchagra</i>	-	-	-	-	-
Teal, Red-billed	<i>Anas erythrorhyncha</i>	-	-	-	-	-
Tern, Whiskered	<i>Chlidonias hybrida</i>	-	-	-	-	-

Tern, White-winged	<i>Chlidonias leucopterus</i>	-	-	-	-	-
Thick-knee, Spotted	<i>Burhinus capensis</i>	-	-	-	-	-
Thrush, Karoo	<i>Turdus smithi</i>	-	-	-	-	-
Thrush, Olive	<i>Turdus olivaceus</i>	-	-	-	-	-
Tinkerbird, Red-fronted	<i>Pogoniulus pusillus</i>	-	-	-	-	-
Tit, Southern Black	<i>Parus niger</i>	-	-	-	-	-
Tit-babbler, Chestnut-vented	<i>Parisoma subcaeruleum</i>	-	-	-	-	-
Trogon, Narina	<i>Apaloderma narina</i>	-	-	-	-	-
Turaco, Knysna	<i>Tauraco corythaix</i>	-	-	-	-	-
Turaco, Livingstone's	<i>Tauraco livingstonii</i>	-	-	-	-	-
Turaco, Schalow's	<i>Tauraco schalowi</i>	-	-	-	-	-
Turtle-dove, Cape	<i>Streptopelia capicola</i>	-	-	-	-	-
Wagtail, Cape	<i>Motacilla capensis</i>	-	-	-	-	-
Wagtail, Mountain	<i>Motacilla clara</i>	-	-	-	-	-
Warbler, Barratt's	<i>Bradypterus barratti</i>	-	-	-	-	-
Warbler, Garden	<i>Sylvia borin</i>	-	-	-	-	-
Warbler, Marsh	<i>Acrocephalus palustris</i>	-	-	-	-	-
Warbler, Willow	<i>Phylloscopus trochilus</i>	-	-	-	-	-
Waxbill, Common	<i>Estrilda astrild</i>	-	-	-	-	-
Waxbill, Swee	<i>Coccyzygia melanotis</i>	-	-	-	-	-
Weaver, Cape	<i>Ploceus capensis</i>	-	-	-	-	-
Weaver, Dark-backed	<i>Ploceus bicolor</i>	-	-	-	-	-
Weaver, Spectacled	<i>Ploceus ocularis</i>	-	-	-	-	-
Weaver, Thick-billed	<i>Amblyospiza albifrons</i>	-	-	-	-	-
Weaver, Village	<i>Ploceus cucullatus</i>	-	-	-	-	-
Weaver, Yellow	<i>Ploceus subaureus</i>	-	-	-	-	-
White-eye, Cape	<i>Zosterops virens</i>	-	-	-	-	-
White-eye, Orange River	<i>Zosterops pallidus</i>	-	-	-	-	-
Whydah, Pin-tailed	<i>Vidua macroura</i>	-	-	-	-	-
Widowbird, Fan-tailed	<i>Euplectes axillaris</i>	-	-	-	-	-

Widowbird, Long-tailed	<i>Euplectes progne</i>	-	-	-	-	-
Widowbird, Red-collared	<i>Euplectes ardens</i>	-	-	-	-	-
Wood-dove, Emerald-spotted	<i>Turtur chalcospilos</i>	-	-	-	-	-
Wood-hoopoe, Green	<i>Phoeniculus purpureus</i>	-	-	-	-	-
Wood-owl, African	<i>Strix woodfordii</i>	-	-	-	-	-
Woodland-warbler, Yellow-throated	<i>Phylloscopus ruficapilla</i>	-	-	-	-	-
Woodpecker, Cardinal	<i>Dendropicos fuscescens</i>	-	-	-	-	-
Woodpecker, Knysna	<i>Campethera notata</i>	NT	NT	-	-	Schedule II
Woodpecker, Olive	<i>Dendropicos griseocephalus</i>	-	-	-	-	-
Wryneck, Red-throated	<i>Jynx ruficollis</i>	-	-	-	-	-

APPENDIX A-6 SPECIALIST *CURRICULUM VITAE*

GREER HAWLEY-McMASTER *Curriculum Vitae*



CONTACT DETAILS

Name of Company	Coastal and Environmental Services (Pty) Ltd. t/a CES
Designation	East London Branch – Principal Consultant
Profession	Environmental Consultant
Years with firm	12 (twelve) Years
E-mail	g.hawley@cesnet.co.za
Office number	+27 (0) 43 – 7267809 / 8313
Nationality	South African
Professional Affiliations	SACNASP: South African Council for Natural Scientific Profession
Key areas of expertise	<ul style="list-style-type: none"> • Environmental Impact Assessment (Aquaculture, renewable energy, waste water treatment, agriculture) • Environmental Management and Planning • Biodiversity/Conservation Management • Biodiversity/Ecological Assessments

PROFILE

Dr Greer Hawley-McMaster

Dr Greer Hawley 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 assisted with the completion of the Eastern Cape Biodiversity Conservation Plan (2019), the Eastern Cape Biodiversity Strategy and Action Plan and assisted with the generation of the Western Cape State of the Coast Report. She is currently involved with developing the Environmental Management Framework for the King Cetshwayo District Municipality.

GREER HAWLEY-McMASTER*Curriculum Vitae***EMPLOYMENT
EXPERIENCE**

- 1998 : Botanical consultant: University of Cape Town
- Laboratory assistant: University of Cape Town
- 1999 : Undergraduate Tutor: University of Cape Town
- 2000- 2001 : Temporary administrative positions:
- Robert Half International, London
- Assistant Office Manager: Warwick House, London
- Office administration: West London Magistrates Court, London
- 2002: Laboratory Assistant: Amphigro
- 2002- 2007: Undergraduate Tutor: Botany and Microbiology, Rhodes University
- 2006- 2007: Laboratory researcher: Abalone Probiotic isolation and testing, Rhodes University
- 2007: Laboratory assistant and product quality control: Mycoroot (Pty) Ltd, Grahamstown
- 2007- present : Principal Environmental Consultant - Coastal & Environmental Services

- **POST GRADUATE STUDENT SUPERVISION**

- 2005 – 2007: 3 Honours students in the Mycology Unit, Rhodes University
- 2006: MSc student in the Mycology Unit, Rhodes University.
- 2016-2018: Co-supervisor of a PhD student in the Mycology Unit, Rhodes University

**ACADEMIC
QUALIFICATIONS**

- PhD Microbiology Rhodes University 2008
- BSc Hons Botany University of Cape Town 1999
- BSc Natural Science (Botany and Zoology) University of Cape Town 1998

**CONTINUING
PROFESSIONAL
DEVELOPMENT**

- Rhodes University-Coastal & Environmental Services: Environmental Impact Assessment Course 2008
- Training in Greenhouse Gas Accounting for Forest Inventories Greenhouse Gas Management Institute 2009

GREER HAWLEY-McMASTER

Curriculum Vitae



PROFESSIONAL EXPERIENCE

ENVIRONMENTAL MANAGEMENT EXPERIENCE

Specialist studies

- Eastern Cape Biodiversity Conservation Plan review and Biodiversity Strategy and Action Plan (2016-2019). I am currently responsible for a number of roles on this project, including the following:
 - Project manager
 - Biodiversity data collection and analysis
 - Part of planning team
 - One of the report writing authors
 - Client and stakeholder liaison

- Waaihoek Wind Energy Facility (2013-2015): EIA and Ecological Sensitivity Assessment
- This assessment, located just east of Utrecht in KZN, involved two elements: an EIA and a detailed vegetation survey of Grassland and Thornveld (Savanna) culminating in an ecological sensitivity map.
- Olivewood Golf Estate (2014): EIA and Ecological Sensitivity Assessment
- This assessment, located 25km north of East London in the Eastern Cape, involved two elements: an EIA and a detailed vegetation survey of Thicket, Thornveld (Savanna) and Forest vegetation culminating in an ecological sensitivity map.
- Eastern Cape Biofuel Strategic Environmental Assessment (2014-2016)
- This assessment involved the detailed assessment of optimal grow areas against environmental constraints. The product was aimed at selecting the best clustered areas of growth potential, outlining the respective environmental constraints within these clusters, in order to guide investor interests. Detailed mapping analysis was undertaken.
- Balama Graphite Mine and Tete Iron Mine, Mozambique (2013): Biodiversity Survey and Ecological Sensitivity Assessment
- These assessments were both located in Mozambique. Detailed biodiversity surveying and assessment of ecological sensitivity (identify NO-GO areas) were undertaken.
- Addax BioEnergy (2009/2010), Biodiversity and Ecological Impact Assessment AND Carbon Stock Impact Assessment, Sierra Leone.
- The above specialist studies were submitted as separate deliverables and are described separately.
- Biodiversity and Ecological Impact Assessment: This study involved the survey of a 60 000 ha site in Sierra Leone. The vegetation types were described and assessed in terms of biodiversity and overall ecological sensitivity. In addition, the area was surveyed by local experts for the presence of rare and endangered faunal species, for inclusion into the report. All vegetation types were mapped using GIS. The assessment was compiled for international review in accordance with World Bank standards.
- Carbon Stock Impact Assessment: In accordance with the EU directive, Biofuel production needs to demonstrate a 30% reduction in carbon emissions compared to fossil fuels. For this reason, a Carbon Stock study was carried out to determine site specific carbon stocks. This study included field calculations,

GREER HAWLEY-McMASTER

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vegetation and soil sampling and carbon stock calculations according to internationally accepted standards and using best practice guidelines. Using the detailed GIS vegetation maps, total carbon stocks could be calculated. Sample collection included local academic soil scientists. This study and associated methodology was compiled according to the International Panel on Climate Change (IPCC) standards.

- Wild Coast Forest Survey: (2009-2010) Department of Water and Forestry / Eastern Cape Parks Board initiative
- The forest survey included substantial field work and data collection of the following: plant species identification, GPS mapping of forest boundaries, forest-typing and identifying and quantifying disturbance impacts.
- Mncwasa Water Scheme (2009): Ecological Sensitivity Assessment
- This assessment involved a detailed vegetation survey of forest vegetation and wetlands along anticipated and alternative pipeline routes. The survey included an assessment of the environmental sensitivity along the route and recommendations for mitigation and environmentally acceptable alternatives.
- Peregrine Dunes Golf Estate (2009): Vegetation Rehabilitation Plan and Ecological Impact Assessment
- The Ecological Impact Assessment and Rehabilitation Plan were represented as two reports for the same project. The work carried out on the Ecological Impact Assessment included report revision writing.
- The Rehabilitation Plan was submitted as part of the Environmental Management Plan and incorporated elements of re-vegetation, alien plant removal and rehabilitation, landscape restoration, based on widely accepted concepts of soil ecology and plant succession ecology.

Feasibility studies

- Coega IDZ Aquaculture Feasibility Study:
- Aspects of this study included the consideration of the environmental sustainability, economic and financial viability of the proposed project as well as an assessment of environmental risks and alternative project designs.
- Ndakana Wind farm Feasibility Study
- Nkanya Lodge Feasibility Study: Eastern Cape Development Corporation (ECDC) initiative
- Aspects of this study included the consideration of the economic and financial viability of the proposed project as well as the environmental risks and alternative technologies.

Full Scoping and Environmental Impact Assessments (South African National Environmental Management: EIA regulations)

- Buffalo City Municipality R72 national road re-alignment (2007-2008): Sleeper site
- Responsibilities included: Project Management, budget management, written report, public participation and engagement with key stakeholders throughout the EIA process. Environmental approval obtained.
- Wild Coast Abalone expansion and processing plant (2008)
- Responsibilities included: Project management, budget management, written

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reports, public participation and stakeholder engagement with key stakeholders. Environmental approval obtained.

- Qolora Aquaculture Development Zone (2011)
- Responsibilities included: Project management, budget management, written reports, public participation and stakeholder engagement with key stakeholders. Environmental approval obtained.
- All Saints Hospital Waste Water Treatment Works (2012)
- written reports, public participation and stakeholder engagement with key stakeholders. Environmental approval obtained.
- Jamestown Waste Water Treatment Works (2012)
- Responsibilities included: Project management, budget management, written reports, public participation and stakeholder engagement with key stakeholders. Environmental approval obtained.
- Ntabankulu Waste Water Treatment Works (2012)
- Responsibilities included: Project management, budget management, written reports, public participation and stakeholder engagement with key stakeholders. Environmental approval obtained.
- Qamata: No-gate Waste Water Treatment Works (2012)
- Responsibilities included: Project management, budget management, written reports, public participation and stakeholder engagement with key stakeholders. Environmental approval obtained.
- St Patricks Hospital Waste Water Treatment Works (2014)
- Responsibilities included: Project management and report review.

State of Environment (SoER), Environmental Management Plans (EMP) and Environmental Management Frameworks (EMF) for:

- OR Tambo District Municipality SoER and EMP, Eastern Cape Province, South Africa (2009-2010). Accepted by council.
- Joe Gqabi District Municipality SoER and EMP, Eastern Cape Province, South Africa. (2011)
- Mnquma Local Municipality SoER and EMP, Eastern Cape Province, South Africa (2012)
- Western Cape Province, State of the Coast Report, South Africa (2018)
- King Cetswayo District Municipality Environmental Management Framework, KwaZulu-Natal Province, 2017-2019.

Activities:

- o Field survey of district municipality through aerial surveying and field work reporting of whole district municipality (incorporating 4-7 local municipalities).
- o Continued interaction with municipal representatives and key stakeholders
- o Workshops held with key role-players and decision-makers
- o Review of planning documents and integrated development programs.
- o Identification of key environmental issues
- o Selection of priority environmental issues
- o Development of Environmental Management Action Plans directly aimed at mitigating priority issues.
- o Collection and analysis of data

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- o Reporting on selected indicators
- o Collection and analysis of spatial data

Responsibilities:

- o Project manager,
- o Project lead,
- o Budget management,
- o Report writing,
- o Team delegation and management and
- o Client liaison.

Additional Specialist studies

- o Sensitive Ecology Assessment: Mncwasa Water Scheme (2009)
- o Vegetation Rehabilitation Plan: Peregrine Dunes Golf Estate (2009)
- o Ecological Impact Assessment: Peregrine Dunes Golf Estate (2009)
- o Vegetation Assessment: Atterbury Development (2008)
- o Wild Coast Forest Survey: (current) DWAF/EC Parks initiative (2009-2010)
- o Biodiversity and Ecological Impact Assessment, Sierra Leone, Addax Biofuels (2009-2010)
- o Land use Impact Assessment, Sierra Leone, Addax Biofuels (2009-2010)
- o Thyspunt – Melkhout Eskom Power line, Ecological Impact Assessment
- o Ecological Impact Assessment: Chaba WEF
- o Ecological Impact Assessment: Thomas River WEF
- o Ecological Impact Assessment: Qunu Renewable Energy Facility
- o Ecological Impact Assessment: Ncora Renewable Energy Facility
- o Ecological Impact Assessment: Ngqamakwe Renewable Energy Facility
- o Ecological Impact Assessment: Qumbu Wind Energy Facility
- o Terrestrial Ecology Impact Assessment: Qolora Aquaculture Zone
- o Toboshane Valley Estate: Ecological Impact Assessment
- o Toboshane Valley Estate: Conservation Management Plan
- o Biodiversity and Impact Assessment: Niassa Green Resource, Mozambique
- o Biodiversity and Impact Assessment: Balama Graphite Mine
- o Biodiversity and Impact Assessment: Tete Iron Ore Mine

Alien Invasive Monitoring, Control and Eradication Plans

- ACSA East London Alien Invasive Plant assessment and eradication programme (2009 and 2016)
- Rehabilitation and Restoration (including alien plant removal) Plan: Peregrine Dunes Golf Estate (2010)
- Alien Invasive Plant Monitoring and Control Plan for the following Wind Energy Facilities:
 - o Chaba WEF (2011)
 - o Komga WEF (2016)
- 2018 (June): Hawley G and Desmet P. Eastern Cape Biodiversity Conservation Plan (Draft 3) and the Strategy and Action Plan. Thicket Forum
- 2017 (June): Hawley, G, Berliner, D and Desmet P. Eastern Cape Biodiversity

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Sector Plan and Biodiversity Strategy and Action Plan. Biodiversity Planning Forum.

- 2017: Hawley, G, Berliner, D and Desmet P. Eastern Cape Biodiversity Sector Plan and Biodiversity Strategy and Action Plan. Thicket Forum
- 2016 (June): Hawley, G, Berliner, D and Desmet P. Eastern Cape Biodiversity Sector Plan and Biodiversity Strategy and Action Plan. Biodiversity Planning Forum.
- 2016: Hawley, G, Berliner, D and Desmet P. Eastern Cape Biodiversity Sector Plan and Biodiversity Strategy and Action Plan. Thicket Forum
- 2016: Hawley, G, Berliner, D and Desmet P. Eastern Cape Biodiversity Sector Plan and Biodiversity Strategy and Action Plan. International Association of Impact Assessment, South Africa.
- 2010: Hawley, GL, McMaster AR and Carter AR. The Environmental and Social Impact Assessment, and associated issues and challenges associated with Biofuels. African, Caribbean and Pacific Group of States (ACP), Science and Technology Programme, Sustainable Crop Biofuels in Africa.
- 2009: Hawley, GL, McMaster AR and Carter AR. Carbon, carbon stock and life-cycle assessment in assessing cumulative climate change impacts in the environmental impact process. International Association of Impact Assessors.
- 2008: Hawley GL and Dames JF. Ectomycorrhizal species diversity above- and below ground comparison in *Pinus patula* (Schlecht et Cham) plantations, South Africa. South African Society for Microbiology (Poster).
- 2006: Hawley, GL and Dames, JF. Morphological and molecular identification of ectomycorrhizal fungi in *Pinus* plantations. South African Society of Microbiology.

CERTIFICATION

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes me, my qualifications, and my experience. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if engaged.

Greer Hawley-McMaster

Date: 22 January 2020

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CONTACT DETAILS

Legal Name of Company	Coastal and Environmental Services (Pty) Ltd
Trading Name of Company	CES
Designation	Port Elizabeth Branch
Profession	Senior Environmental Consultant
Years with firm	Five (5) Years & six (6) months
E-mail	r.evans@cesnet.co.za
Office number	+27 (0)41 393 0700 +27 (0)41 045 0494
Nationality	South African
Professional Body	International Association for Impact Assessment (IAIA) Member No. 5809 Land Rehabilitation Society of Southern Africa (LaRSSA) Member No. 52119
Key areas of expertise	<ul style="list-style-type: none"> ➤ Basic Assessments & Environmental Impact Assessments ➤ GIS Mapping ➤ Project Management ➤ Public Participation Process ➤ NEMA Section 24 (G) Applications ➤ MPRDA Section 53 Applications ➤ Agriculture & Soils Assessments

PROFILE

Ms Rosalie Evans

Rosalie is a Senior Environmental Consultant with five (5) and a half years' experience and she is based in the Port Elizabeth branch. She holds a BA degree in Social Dynamics with majors in Geography and Psychology as well as a BA Honours degree in Geography and Environmental Studies, both from Stellenbosch University. Rosalie's honours dissertation analysed the role of small grains in soil carbon sequestration in the agricultural sector of the Western Cape.

Rosalie completed the Introduction to Environmental Impact Assessment Procedure Short Course by Coastal & Environmental Services and the Department of Environmental Science Rhodes University as well as the Estuary Management Short Course by Nelson Mandela University (NMU). In addition, Rosalie is a member of the Land Rehabilitation Society of Southern Africa (LaRSSA) and a member of the International Association for Impact Assessment (IAIA).

Her main focuses include the general Environmental Impact Assessment (EIA) process, project management, the Public Participation Process, NEMA Section 24 (G) Applications and associated reports, GIS Mapping, and Agriculture and Soils Assessments.

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EMPLOYMENT EXPERIENCE	<p>Senior Environmental Consultant, CES 1 August 2018 - present <i>Project Management, Report Reviewing, GIS Mapping, BA and EIA Report Writing, NEMA Section 24 (G) Applications, Sub-consultant Management, MPRDA Section 53 Applications, Specialist Report Writing, Water Use Licensing Process & Public Participation Process.</i></p> <p>Environmental Consultant, CES 1 August 2014 – 31 July 2018 <i>GIS Mapping, BA and EIA Report Writing, NEMA Section 24 (G) Applications, MPRDA Section 53 Applications, Specialist Report Writing, Water Use Licensing Process & Public Participation Process.</i></p> <p>Online Tutor (2nd year Geography, GGH2602), University of South Africa (UNISA) 1 August 2014 – present <i>Responding to/resolving e-tutor group student queries, maintaining the myUnisa GGH2602 e-tutor module site & preparing online activities for GGH2602.</i></p> <p>Geography Junior Lecturer (1st year Geography, GGH1501), University of South Africa (UNISA) 1 June 2013 – 31 July 2014 <i>Marking undergraduate and post-graduate assignments and examinations, responding to/resolving student queries and maintaining the myUnisa GGH1501 module site, assisting with writing study material for GGH1501 & Assisting with setting up assignments for GGH1501.</i></p>
ACADEMIC QUALIFICATIONS	<p>Stellenbosch University, Stellenbosch BA Honours in Geography & Environmental Studies 2012</p> <p>Stellenbosch University, Stellenbosch BA in Social Dynamics (Geography & Psychology) 2011</p>
COURSES	<ol style="list-style-type: none"> Coastal & Environmental Services and the Department of Environmental Science Rhodes University, Grahamstown. <i>"Introduction to Environmental Impact Assessment Procedure Short Course."</i> 2016. Nelson Mandela Metropolitan University, Port Elizabeth. <i>"Estuary Management Short Course."</i> 2016.
CONSULTING EXPERIENCE	<ol style="list-style-type: none"> Potsdam Housing Development EIA, Potsdam, EC. 2016. <i>DEDEAT Application & DEDEAT Scoping Report.</i> Waaihoek Wind Energy Facility EIA, Utrecht, KZN. 2015/2016. <i>Amended DEA Applications (WEF & Powerline), Amended DEA Powerline, Environmental Impact Report, Appeals Process Public Participation Process & Tourism Assessment Report.</i> National Route N2 Bypass Road EIA, King William's Town, EC. 2016. <i>DEA Application & DEA Scoping Report</i> Umsobomvu Wind Energy Facility EIA, Middelburg, EC / Noupoot, NC. 2015. <i>Assisting DEA Environmental Impact Report, Visual Assessment Report & DMR Section 53 Application.</i> Matatiele to KZN Border Road Upgrade & Borrow Pits BA, Matatiele, EC. 2016. <i>Baseline Sensitivity Report, DEA Application, DEA Basic Assessment Report, Environmental Management Programme, Public Participation Process, DMR Application, DMR Scoping Report & PPP on the Environmental Authorisation.</i> Upington SEZ & PV Solar EIA, Upington, NC. 2017. <i>Assisting DEA Scoping Report & Tourism Assessment Report.</i> Molteno Sewer & Sewage Pump Stations BA, Molteno, EC. 2015/2016. <i>Project Management, DEDEAT Application, DEDEAT Basic Assessment Report, Environmental Management Programme, DWS Water Use Applications, Public Participation Process, Rehabilitation, Erosion Management & Alien Invasive Management Plan & PPP on the Environmental Authorisation.</i>

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8. Green River to Zwelitsha and the new Breidbach Interchange Road Upgrade BA, King William's Town, EC. 2016.
Baseline Sensitivity Report, DEA Application, DEA Basic Assessment Report, Environmental Management Programme, DWS Water Use Applications, Public Participation Process & PPP on the Environmental Authorisation.
9. Olivewood Golf & Country Estate BA, Chintsa, EC. 2015/2016.
DEDEAT Basic Assessment Report & Public Participation Process.
10. Lizmore to Heidelberg Road Upgrade & Borrow Pits BA, Heidelberg, WC. 2017.
Baseline Sensitivity Report, DEA Application, DEA Basic Assessment Report, Environmental Management Programme, DMR Regulation 2.2 Maps & Specialist Mapping.
11. Phase 4 Housing Development BA, East London, EC. 2016.
Assisting DEDEAT Basic Assessment Report.
12. Dassiesridge Wind Energy Facility EIA, Uitenhage, EC. 2015.
DMR Section 53 Application & Visual Assessment Report.
13. Lusikisiki Regional Water Supply Scheme EIA: Zalu Dam, Lusikisiki, EC. 2015.
Visual Assessment Report & Environmental Management Programme.
14. Tyityaba Game Reserve Conservation Management Plan, Komga, EC. 2016.
Assisting Conservation Management Plan.
15. Port St Johns Beach Infrastructure EIA, Port St Johns, EC. 2017.
Estuarine Assessment Report.
16. Scarlet Ibis Wind Energy Facility BA, Motherwell, EC. 2017.
Agriculture & Soils Assessment Report, DMR Section 53 Application, DMR Regulation 2.2 Map, Public Participation Process Material, Biophysical Mapping & PPP on the Environmental Authorisation.
17. Albany Wind Energy Facility EIA, Grahamstown, EC. 2018/2019.
Agriculture & Soils Assessment Report, DMR Regulation 2.2 Map, Updating Ecological Assessment Report, Assisting DEA Scoping Report, Biophysical Mapping & Public Participation Process Material.
18. Bodeux Fuel Station EMP, East London, EC. 2015.
Assisting Environmental Management Programme.
19. Specialist Input for the Route Location of possible Bypasses at Butterworth on National Route N2 Section 17 and 18, Butterworth, EC. 2016.
Project Management & Biophysical Mapping.
20. Specialist Input for the Route Location of possible Bypasses at Dutywa on National Route N2 Section 17 and 18, Dutywa, EC. 2016.
Project Management & Biophysical Mapping.
21. Eastern Cape Biodiversity Conservation Strategy and Action Plan, EC. 2016.
Assisting Mapping Specialist Data.
22. Gonubie Boardwalk NEMA Section 24G Application, Gonubie, EC. 2014.
Assisting NEMA Section 24G Application.
23. Great Kei Wind Energy Facility Section 53 Application, Komga, EC. 2015.
DMR Section 53 Application.
24. Environmental Screening for a Pumped Storage Scheme, Hogsback, EC. 2016.
Biophysical Mapping.
25. Ndlambe Bulk Water Supply Project BA, Ndlambe Municipality, EC. 2016/2017.
Route Assessment & DWS Consultation & DWS Water Use Applications.
26. Justin Le Roux NEMA Section 24G Application, EC. 2017.
NEMA Section 24G Application, Basic Assessment Report (for rectification), Environmental Management Programme & Public Participation Process Material.

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27. Thriftwood NEMA Section 24G Application, EC. 2017.
Project Management & Biophysical Mapping.
28. Kurlandbrik Mine Social and Labour Plan, WC. 2017.
Updated Social & Labour Plan.
29. Brickvest NEMA Section 24G Application, EC. 2017.
Project Management, Biophysical Mapping, Public Participation Process Material, NEMA Section 24G Application, DWS Water Use Applications & DWS Risk Assessment.
30. Wells Estate Social Housing Development BA, Port Elizabeth, EC. 2017.
Project Management, DEDEAT Basic Assessment Report, Environmental Management Programme & ELC Meeting Presentation.
31. St Christopher's Private School BA, Port Elizabeth, EC. 2017.
Project Management, DEDEAT Application, Biophysical Mapping & DEDEAT Basic Assessment Report.
32. Pofadder Prospecting Right, NC. 2017.
Biophysical Mapping.
33. Kenmare Moma Titanium Minerals Mine ESIA, Mozambique. 2018.
Biophysical Mapping, Assisting Estuarine Assessment Report, Assisting PPP Posters & Presentation.
34. Toliara Sand Heavy Minerals Mine ESHIA, Madagascar. 2017.
PPP Presentation & Posters & Infrastructure Mapping.
35. Subdivision & Mixed-Use Development on Erf 1 Parsonsvei EIA, EC.2017.
Project Management, DEDEAT Scoping Report & Public Participation Process.
36. Bayview Wind Energy Facility EIA, EC. 2017.
Agriculture & Soils Assessment Report, Biophysical Mapping, Public Participation Process Material, Chapters of the DEA Scoping Report, Chapters of the DEA Environmental Impact Report, Environmental Management Programme & PPP on the Environmental Authorisation.
37. General Motors NEMA Section 24G, EC. 2017.
Project Management, NEMA Section 24G Application, Public Participation Process Material, Biophysical Mapping, DWS Water Use Applications & DWS Risk Assessment.
38. Grahamstown to Fish River Pass: Phase 2 Road Upgrade ECO, EC. 2017-2019.
Project Management & Review of Monthly Audit Reports.
39. Joubert Dorndraai Citrus Farm EIA, EC. 2018.
DEDEAT Application, Public Participation Process Material, DEDEAT Scoping Report & Biophysical Mapping.
40. Part 2 Amendment of the Makana Residential Development EA, Grahamstown, EC. 2018.
DEDEAT Application for Amendment of Environmental Authorisation, Part 2 Amendment Report, Public Participation Process Material & PPP on the Amended Environmental Authorisation.
41. Roode Heuwel Prospecting Right, Garies, NC. 2018.
Biophysical Mapping.
42. Citrus Development Section 24(G), Cookhouse, EC. 2018.
DEDEAT Basic Assessment Report (for rectification), Environmental Management Programme, Public Participation Process & Biophysical Mapping.
43. Phase 1 & Phase 2 West End Student Residence Development BA, Port Elizabeth, EC. 2018.
Project Management, Public Participation Process Material, Biophysical Mapping, DEDEAT Basic Assessment Report, Environmental Management Programme & PPP on the Environmental Authorisation.
44. Phase 3 & Phase 4 West End Student Residence Development BA, Port Elizabeth, EC. 2018.

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Project Management, Public Participation Process Material, Biophysical Mapping, DEDEAT Basic Assessment Report, Environmental Management Programme & PPP on the Environmental Authorisation.

45. Central Balama Graphite Mine ESIA, Balama, Mozambique. 2018.
Land & Natural Resource Use Report.

46. Waainek Post-Construction Bird and Bat Monitoring, Grahamstown, EC. 2018.
Assisting Bat Data Analysis.

47. Victoria Drive ECO, Port Elizabeth, EC. 2019.
Review of Monthly Audit Reports & Quarterly Report Review.

48. Part 2 Amendment of the Umsobomvu Wind Energy Facility Environmental Authorisation, Middelburg, EC/Noupoort, NC. 2019.

DEA Application for Part 2 Amendment, Part 2 Amendment Report, Public Participation Material, DEA Environmental Impact Report for the Umsobomvu I WEF, DEA Environmental Impact Report for the Coleskop WEF, DEA Environmental Impact Report for the Eskom Infrastructure MTS, Agriculture & Soils Assessment Report for the Umsobomvu I WEF, Agriculture & Soils Assessment Report for the Coleskop WEF, Agriculture & Soils Assessment Report for the Eskom MTS, Agriculture & Soils Opinion Letter & Biophysical Mapping.

49. The Refurbishment of the Kwanobuhle Wastewater Treatment Plant ECO, Nelson Mandela Bay Municipality, EC. 2019.
Review of Monthly Audit Reports.

50. Fishwater Flats Wastewater Treatment Works ECO, Nelson Mandela Bay Municipality, EC. 2019.
Review of Monthly Audit Reports.

51. Residential Development on a Portion of Erf 1226 in Fairview ECO, Port Elizabeth, EC. 2019.
Review of Monthly Audit Reports.

52. Eskom Substation and Powerlines EIA, Heidelberg, GP. 2019.
Visual Assessment Report.

53. Impofu Wind Farms (North, East and West) Section 53 Applications, Oyster Bay, EC. 2019.
Project Management & Three (3) Separate DMR Section 53 Applications.

54. Coleskop Infrastructure Development BA, Middelburg, EC / Noupoort, NC. 2019.
Project Management, DEA Application, DEA Draft Basic Assessment Report, DEA Environmental Management Programme Template (March 2019) & Public Participation Process Material.

55. Umsobomvu Infrastructure Development BA, Middelburg, EC / Noupoort, NC. 2019.
Project Management, DEA Application, DEA Draft Basic Assessment Report, DEA Environmental Management Programme Template (March 2019) & Public Participation Process Material.

56. Khayamnandi Extension on Erven 114, 609, 590 and 24337 ECO, Bethelsdorp, EC. 2019.
Review of Monthly Audit Reports & Quarterly Report Review.

57. Development of Agricultural Lands Section 24(G), Cookhouse, EC. 2019.
Section 24(G) Application and Reporting, Environmental Management Programme, Public Participation Process & Biophysical Mapping.

58. Development of Agricultural Lands Section 24(G), Klipfontein, EC. 2019.
Section 24(G) Application and Reporting, Environmental Management Programme, Public Participation Process & Biophysical Mapping.

59. Development of Citrus and Associated Infrastructure on Nomzamo Farm EIA, Kirkwood, EC. 2019.
Project Management, Specialist Coordination & the review of the Application.

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60. Development of Citrus and Associated Infrastructure on Siyahhluma Farm EIA, Addo, EC. 2019.

Project Management, Specialist Coordination & the review of the Application.

61. Development of 19.8 ha of Citrus BA, Kirkwood, EC. 2019.

Project Management, DEDEAT Application, DEDEAT Basic Assessment Report, Environmental Management Programme & Public Participation Process.

62. Development of a Facility for the Recycling & Smelter of Non-ferrous Metals in the Coega SEZ, Port Elizabeth, EC. 2019.

Project Management & Specialist Coordination.

63. Water Use for 7 Wind Farms, EC & NC. 2019.

Project Management & DWS Liaison.

64. Part 2 Amendment of the Ukomeleza Wind Energy Facility EA, Uitenhage, EC. 2019.

Biophysical Mapping.

65. Part 2 Amendment of the Motherwell Wind Energy Facility EA, Uitenhage, EC. 2019.

Biophysical Mapping.

66. Part 2 Amendment of the Dassiesridge Wind Energy Facility EA, Uitenhage, EC. 2019.

Biophysical Mapping & Assisting Report Writing.

67. Part 2 Amendment of the Great Kei Wind Energy Facility EA, Komga, EC. 2019.

Biophysical Mapping & Assisting Report Writing.

68. Driftsands Sewer Collector Augmentation (Phase II) ECO, Port Elizabeth, EC. 2019.

Review of Monthly Audit Reports.

69. Dwarsleegte Farm Citrus Development BA, Kirkwood, EC. 2019.

Report Review.

CERTIFICATION

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes me, my qualifications, and my experience. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if engaged.

ROSALIE ANN EVANS

Date: January 2020