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# MAIN ACCESS ROAD FOR THE WOLF WIND FARM, EASTERN CAPE PROVINCE

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## ENVIRONMENTAL MANAGEMENT PROGRAMME

May 2022

**Prepared for**

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## PROJECT DETAILS

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<b>DFFE Reference</b>	:	14/12/16/3/3/1/2516
<b>Title</b>	:	Main Access Road for the Wolf Wind Farm Environmental Management Programme
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<b>Applicant</b>	:	Wolf Wind Farm (RF) (Pty) Ltd
<b>Report Status</b>	:	Environmental Management Programme as part of the Basic Assessment Report
<b>Date</b>	:	May 2022

**When used as a reference this report should be cited as:** Savannah Environmental (2022). Environmental Management Programme: Main Access road for the Wolf Wind Farm

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## DEFINITIONS AND TERMINOLOGY

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The following definitions and terminology may be applicable to this project and may occur in the report below:

**Alien species:** A species that is not indigenous to the area or out of its natural distribution range.

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

**Assessment:** The process of collecting, organising, analysing, interpreting and communicating information which is relevant.

**Biological diversity:** The variables among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes they belong to.

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

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

**Cumulative impacts:** The impact of an activity that in itself may not be significant, but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

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

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

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

**Ecosystem:** A dynamic system of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

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

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

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

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

**Environmental Authorisation (EA):** means the authorisation issued by a competent authority (Department of Forestry, Fisheries and the Environment) of a listed activity or specified activity in terms of the National Environmental Management Act (No 107 of 1998) and the EIA Regulations promulgated under the Act.

**Environmental Assessment Practitioner (EAP):** An individual responsible for the planning, management and coordinating of environmental management plan or any other appropriate environmental instruments introduced by legislation.

**Environmental Control Officer (ECO):** An individual appointed by the Owner prior to the commencement of any authorised activities, responsible for monitoring, reviewing and verifying compliance by the EPC Contractor with the environmental specifications of the EMPr and the conditions of the Environmental Authorisation

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

**Environmental impact assessment:** Environmental Impact Assessment, as defined in the NEMA EIA Regulations, is a systematic process of identifying, assessing and reporting environmental impacts associated with an activity.

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

**Environmental Management Programme (EMPr):** A plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a project or facility and its ongoing maintenance after implementation.

**Environmental Officer (EO):** The Environmental Officer (EO), employed by the Contractor, is responsible for managing the day-to-day on-site implementation of this EMPr, and for the compilation of regular (usually weekly) Monitoring Reports. The EO must act as liaison and advisor on all environmental and related issues

and ensure that any complaints received from the public are duly recorded and forwarded to the Site Manager and Contractor.

**Habitat:** The place in which a species or ecological community occurs naturally.

**Hazardous waste:** Any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment.

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

**Incident:** An unplanned occurrence that has caused, or has the potential to cause, environmental damage.

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

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

**Method Statement:** a written submission by the Contractor in response to the environmental specification or a request by the Site Manager, setting out the plant, materials, labour and method the Contractor proposes using to conduct an activity, in such detail that the Site Manager is able to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications.

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

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

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

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

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

**Vulnerable species:** A taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future.

**Waste:** Any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 to the Waste Amendment Act (as amended on June 2014); or any other substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister by notice in the *Gazette*.

## ABBREVIATIONS

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The following abbreviations may be applicable to this project and may occur in the report below:

BA	Basic Assessment
BGIS	Biodiversity Geographic Information System
CEMP	Construction Environmental Management Plan
DEADP	Department of Environmental Affairs, and Development Planning
DFFE	Department of Forestry, Fisheries, and the Environment
DMRE	Department of Minerals and Energy
EAP	Environmental Impact Practitioner
EHS	Environmental, Health and Safety
EMPr	Environmental Management Programme
GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
LUDS	Land Use Decision Support
LUPO	Land Use Planning Ordinance
NEMA	National Environmental Management Act
NEMAA	National Environmental Management Amendment Act
NEMBA	National Environmental Management: Biodiversity Act
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act
NID	Notice of Intent to Develop
NSBA	National Spatial Biodiversity Assessment
NWA	National Water Act
PIA	Paleontological Impact Assessment
SACAA	South African Civil Aviation Authority
SAHRA	South African National Heritage Resources Agency
SANBI	South Africa National Biodiversity Institute
SANS	South Africa National Standards
SDF	Spatial Development Framework

## TABLE OF CONTENTS

	<b>PAGE</b>
<b>PROJECT DETAILS</b> .....	<b>i</b>
<b>DEFINITIONS AND TERMINOLOGY</b> .....	<b>ii</b>
<b>TABLE OF CONTENTS</b> .....	<b>vii</b>
<b>CHAPTER 1: INTRODUCTION</b> .....	<b>1</b>
<b>CHAPTER 2: PROJECT DETAILS</b> .....	<b>2</b>
<b>2.1 Project Site</b> .....	<b>2</b>
<b>2.2 Project Description</b> .....	<b>2</b>
<b>2.3 Findings of the Basic Assessment (BA)</b> .....	<b>2</b>
<b>2.4 Environmental Sensitivity</b> .....	<b>Error! Bookmark not defined.</b>
<b>2.3. Life-cycle Phases of the Access Road</b> .....	<b>9</b>
<b>CHAPTER 3: PURPOSE AND OBJECTIVES OF THE EMPr</b> .....	<b>11</b>
<b>CHAPTER 4: STRUCTURE OF THIS EMPr</b> .....	<b>13</b>
<b>4.1 Contents of this Environmental Management Programme (EMPr)</b> .....	<b>14</b>
<b>4.2 Project Team</b> .....	<b>15</b>
<b>4.2.1 Details and Expertise of the Environmental Assessment Practitioner (EAP)</b> .....	<b>15</b>
<b>4.2.2 Details of the Specialist Consultants</b> .....	<b>16</b>
<b>CHAPTER 5: PLANNING AND DESIGN MANAGEMENT PROGRAMME</b> .....	<b>18</b>
<b>5.1 Objectives</b> .....	<b>18</b>
OBJECTIVE 1: Ensure the access road design responds to identified environmental constraints and opportunities .....	<b>18</b>
OBJECTIVE 2: Ensure that relevant permits and plans are in place to manage impacts on the environment .....	<b>19</b>
OBJECTIVE 4: Ensure appropriate planning is undertaken by contractors .....	<b>20</b>
<b>CHAPTER 6: MANAGEMENT PROGRAMME: CONSTRUCTION</b> .....	<b>22</b>
<b>6.1 Institutional Arrangements: Roles and Responsibilities for the Construction Phase</b> .....	<b>22</b>
OBJECTIVE 1: Establish clear reporting, communication, and responsibilities in relation to the overall implementation of the EMPr .....	<b>22</b>
<b>6.2 Objectives</b> .....	<b>27</b>
OBJECTIVE 2: Minimise impacts related to inappropriate site establishment .....	<b>27</b>
OBJECTIVE 5: Protection of sensitive areas, flora, fauna and soils .....	<b>29</b>
OBJECTIVE 6: Minimise the establishment and spread of alien invasive plants .....	<b>32</b>
OBJECTIVE 7: Minimise impact water quality and sediment balance of the watercourses .....	<b>34</b>
OBJECTIVE 9: Protection of heritage resources .....	<b>36</b>
<b>OBJECTIVE 10: Management of dust and air emissions</b> .....	<b>37</b>
OBJECTIVE 12: Appropriate handling and management of waste .....	<b>39</b>
<b>6.3 Detailing Method Statements</b> .....	<b>42</b>
OBJECTIVE 15: Ensure all construction activities are undertaken with the appropriate level of environmental awareness to minimise environmental risk .....	<b>42</b>
<b>6.4 Awareness and Competence: Construction Phase</b> .....	<b>44</b>
OBJECTIVE 16: To ensure all construction personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm .....	<b>44</b>
<b>6.4.1 Environmental Awareness and Induction Training</b> .....	<b>45</b>
<b>6.4.2 Toolbox Talks</b> .....	<b>45</b>
<b>6.5 Monitoring Programme: Construction Phase</b> .....	<b>46</b>

OBJECTIVE 17: To monitor the performance of the control strategies employed against environmental objectives and standards ..... 46

**6.5.1. Non-Conformance Reports** ..... 46

**6.5.2. Monitoring Reports** ..... 47

**6.5.3. Audit Reports** ..... 47

**6.5.4. Final Audit Report** ..... 47

**CHAPTER 7: OPERATION MANAGEMENT PROGRAMME**..... 48

**OBJECTIVE 2: Limit the ecological footprint of the Access Road**..... 48

OBJECTIVE 3: Minimise the establishment and spread of alien invasive plants..... 49

OBJECTIVE 4: Minimise dust ..... 51

**CHAPTER 8: MANAGEMENT PROGRAMME: DECOMMISSIONING** ..... 52

8.2.3. Soil rehabilitation ..... 52

9.2.4. Establishment of vegetation ..... 52

**APPENDICES**

**Appendix A:**           Layout and Sensitivity Maps

**Appendix B:**           Curriculum Vitae

## CHAPTER 1: INTRODUCTION

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This Environmental Management Programme (EMPr) has been compiled for the main access road for the Wolf Wind Farm proposed by Wolf Wind Farm (RF) (Pty) Ltd (the developer). The project site is located within Ward 7 of the Dr Beyers Naudé Local Municipality and Ward 12 of the Sunday's River Valley Local Municipality, which falls within the jurisdiction of the greater Sarah Baartman District Municipality in the Eastern Cape Province. The proposed access road is located within the footprint of the authorised Wolf Wind Farm. The proposed project site can be accessed via the R75 regional road located west of the project site. The project is located on Portion 1 and the Remainder of Portion 2 of the Farm Salt Pans Neck 287.

This EMPr has been developed on the basis of the findings of the Basic Assessment (BA), and must be implemented to protect sensitive on-site and off-site features through controlling construction, operation and decommissioning activities that could have a detrimental effect on the environment, and through avoiding or minimising potential impacts. All mitigation measures recommended in the BA Report and specialist reports must be implemented.

This EMPr is applicable to all employees and contractors working on the pre-construction, construction, and operation and maintenance phases of the project. In terms of the Duty of Care provision in S28(1) of NEMA, the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to ensure that any pollution or degradation of the environment associated with this project is avoided, halted or minimised. The document must therefore be adhered to and updated as relevant throughout the project life cycle. This document fulfils the requirement of the EIA Regulations, 2014 (as amended) and forms part of the BA Report for the project.

## CHAPTER 2: PROJECT DETAILS

Wolf Wind Farm (RF) (Pty) Ltd, an independent power developer in South Africa, is proposing the development of a main access road for the Wolf Wind Farm. The Wolf Wind Farm is a Round 5 REIPPPP Preferred Bidder project, with construction planned to commence shortly. The access road is proposed in order to provide access to the wind farm. The proposed development will consist of a road approximately 1.6 km in length and up to 9m wide.

### 2.1 Project Site

The project site is located within the Dr Beyers Naudé Local Municipality and the Sunday's River Valley Local Municipality, which falls within the jurisdiction of the greater Sarah Baartman District Municipality in the Eastern Cape Province. The proposed access road is located within the footprint of the authorised Wolf Wind Farm. The proposed project site can be accessed via the R75 regional road located west of the project site (refer to **Figure 2.1**). The project is located on the Portion 1 and the remainder of Portion 2 of the Farm Salt Pans Neck 287.

A locality map illustrating the location of the project site and access road is provided in Appendix A.

### 2.2 Project Description

Table 2.1 provides a summary of the details and dimensions of the proposed access road for the Wolf Wind Farm considered as part of the Basic Assessment process.

**Table 2.1:** Details of the proposed access road for the Wolf Wind Farm

Description	Footprint, dimensions and details
Access road	Surfaced road Length: 1.6 km Width: up to 9m
Coordinates of access road	Start: 33°14'55.99"S 24°51'48.44"E Middle: 33°14'55.99"S 24°51'1.62"E End: 33°15'4.60"S 24°50'16.00"E

**Figure 2.2** provides an overview of the layout proposed for the project.

### 2.3 Findings of the Basic Assessment (BA)

No environmental fatal flaws were identified in the detailed specialist studies conducted, and no impacts of unacceptable or high significance are expected to occur with the implementation of the recommended mitigation measures. These measures include, amongst others, the avoidance of sensitive features such as episodic drainage line and restricting the removal of vegetation to the access road footprint.

Impacts identified to be associated with the proposed project and considered within this report include:

- » Impacts on ecology (including flora, fauna);
- » Impacts on freshwater resources;
- » Visual impacts;

- » Impact on soils and agricultural potential; and
- » Impact on heritage resources

### **2.3.1. Impacts on Ecology**

The Study Area is situated within the Albany Thicket and the Fynbos biome. The proposed access road occurs in two vegetation types, namely the located within the Eastern Gwarrieveld and the Suurberg Quartzite Fynbos (Mucina and Rutherford, 2006). The Eastern Gwarrieveld is classified as a Least Concern (LC) and Poorly Protected (MP) vegetation unit and the Suurberg Quartzite Fynbos regarded as LC and Moderately Protected (PP) when considering their conservation status.

For the Terrestrial Biodiversity Theme (Online Web Based National Environmental Screening Tool), the Study Area is considered to have a Very High Sensitivity. The triggered sensitivity features include a Critical Biodiversity Area 2 and a Freshwater Ecosystem Priority Area (FEPA). For the Animal Species Theme the Study Area largely fall in a High Sensitivity area, which was triggered by the potential occurrence (POC) of the avifauna species *Aves-Aquila verreauxii* (Verreauxii eagle) (Vulnerable VU) and two medium sensitive species; *Reptilia-Chersobius boulengeri* (Boulenger's cape tortoise: Endangered EN) and 7 Sensitive Species (VU). For the Plant Species Theme, the Study Area is within a Medium Sensitivity area that were triggered by the POC of the following Species of Conservation Concern (SCC); *Adromischus bicolor* (Rare; R), *Cotyledon tomentosa* subsp. *tomentosa* (VU), Sensitive species 997 (EN), Sensitive species 234 (Critically Rare; CR) and Sensitive species 654 (VU).

The Study Area is further located in the Albany Centre of Endemism, this region is therefore associated with endemic species found within the limited extent of the Eastern Cape.

The data gathered during the site visit indicate that the Transformed Areas is of Low Sensitivity, the Eastern Gwarrieveld and the Watercourse Habitat Units were considered as, Moderately High Sensitivity, this sensitivity was attributed to the good natural condition, potential habitat for SCC and low abundance of AIP, additionally the Episodic Drainage Lines are protected under the National Water Act. The Suurberg Quartzite Fynbos are High Sensitivity area. The findings of the assessment revealed that the vegetation communities within the Escarpment Quartzite Fynbos Habitat Unit are floristically diverse, host numerous floral SCC, and sustain important ecological processes in the larger landscape. Impacts to the vegetation and species associated with the survey area can be kept to a minimum and can stay localised; however, this will require adherence to the mitigation measures and protocols as presented in this report (refer to Part B of the report series). Furthermore, of great concern if the potential for AIP spread resulting from the activities associated with the access road, as well as impacts to floral SCCs if recommended protocols and mitigation measures as presented in Part B of this report series are not adhered to.

From a faunal perspective the Transformed Areas is of Low Sensitivity. The Eastern Gwarrieveld and Suurberg Quartzite Fynbos including the watercourse were assigned an Intermediate Sensitivity. The habitat integrity and availability in these areas are compromised by disturbances such as livestock and game grazing, and barriers such as fences and small dirt roads. These habitats provides suitable potential habitat for several SCC; however, none are severely range restricted nor is their habitat considered threatened.

The ecology specialist concluded that proposed access road will inevitably impact on the local biodiversity as a result of vegetation clearance and regular disturbance during the operational phase. The majority of the proposed access road is located within an area of high sensitivity from a floral perspective due to the

confirmed presence of SCC and Red Listed Plant Species (SANBI 2010). With comprehensive and cogently developed, managed and executed mitigation efforts this impact can be decreased but due to the sensitivity of the vegetation and the high abundance of floral SCC the impact will still be regarded as having a significant residual impact on CBAs.

The proposed project could further impact on the floral and faunal habitat and diversity as well as SCC through fragmentation of habitat units with increased biodiversity importance and sensitivity.

AIP spread can potentially become severe if these species are not monitored and managed, especially along linear developments that typically serve as a corridor for spread. These species can potentially spread to adjacent natural areas, thus impacting on the indigenous biodiversity of the region. The abundance of *Opuntia ficus-indica*, within the Suurberg Quartzite Fynbos Habitat-Unit, if not managed and controlled, will continue to spread and displace floral communities within or outside of the proposed impact area.

It is the opinion of the ecologists that this study provides the relevant information required to implement Integrated Environmental Management (IEM) and to ensure that the best long-term use of the ecological resources in the Study Area will be made in support of the principle of sustainable development.

### **2.3.2. Impacts on Freshwater Resources**

Several headwater episodic drainage lines (EDLs) without riparian vegetation which flow into larger ephemeral tributaries and rivers in the valley bottom position were identified. These watercourses form part of the Wolwefonteinspoortspuit and Sundays River systems. Although these EDLs cannot be classified as riparian resources in the traditional sense, due to the lack of saturated soil and riparian vegetation, they do still function as waterways, due to the episodic conveyance of water.

One of these EDLs, located to the east of the R75, will be traversed by the proposed access road along its upper reach. The remainder of the proposed access road alignment falls outside the delineated extent of the EDLs identified in the investigation area. The EDL to be traversed by the proposed access road and EDLs in the investigation area were assessed collectively given the similar in characteristics and location of these EDLs in an upslope position where they are exposed to the same level of impacts.

The construction of the proposed access road within a watercourse was determined to pose a moderate/medium risk significance to the watercourse. However, the installation of appropriate culverts or subsurface drainage within the new watercourse crossing is considered a positive long-term benefit for the maintenance and potential improvement of the hydrological functionality of the EDL and associated downstream systems. Therefore, also provided that the construction of the proposed access road is undertaken during the driest period of the year when no surface water is present within the watercourses and the recommended mitigation measures are applied, the risk significance can be reduced to Low.

With implementation and strict enforcement of cogent, well-developed mitigation measures as outlined in this report, with specific mention of ensuring all instream construction footprints are rehabilitated and the watercourses monitored for any alien and invasive species establishment, no fatal flaws in terms of freshwater ecological aspects were identified and the proposed access road can be considered acceptable.

### **2.3.3. Visual Impacts**

Based on the outcome from both the desktop and field assessments, it is evident that there are very limited receptors situated within the visual assessment zone as well as a 5 km radius, comprising a few farms, the R75 roadway and gravel roads. It is important to note that visual impacts are only experienced when there are receptors present to experience the impact, thus in this context there are sparse and scattered receptors present, thus there are not likely to be many visual impacts experienced. Since roads are common linear features and a necessity in transportation and connecting people, the few sensitive receptors present are used to the presence thereof.

The proposed access road is located in a remote area with isolated farmsteads, mostly associated with the surrounding Game Farms. The proposed access road is situated on the escarpment of the Klein Winterhoek Mountain range which form part of the dominant features in the mountainous landscape. The Klein Winterhoek Mountains form part of a transition zone between two landscape types, i.e. a Karoo landscape which lies to the north of the mountain, and Valley Bushveld to the south thereof. Both landscapes are associated with unique topographical features consisting of mountain ranges, hills and koppies connected by valleys and wide flood plains, giving it a unique sense of place and providing significant topographical variety in the area, therefore the visual quality and viewing experience of the landscape is considered high.

Based on the impact assessment, it was evident that the proposed access road will have a medium visual impact during the development phases of the project, prior to mitigation measures being implemented. The main visual impact is attributed to the vegetation clearing and cut and fill during the construction phase and increased human activity and vehicles in a quiet area. Once operational, the proposed access road will not have significant visual impacts and human activity, as the proposed access road is not open to the public.

Based on the outcome of the visual assessment it is the specialist's opinion that the proposed access road may be considered for authorisation with the knowledge that the significance of risk to the receiving environment is limited.

### **2.3.4. Impacts on Soil and Agricultural Potential**

One dominant soil form is expected within the assessment corridor by means of desktop data, namely the Hutton soil form. This soil form is associated with a land capability class "II" and a land potential level 6. The land capability sensitivities (DAFF, 2017) indicate land capabilities with "Moderate" sensitivities, which correlates with the findings from the baseline assessment.

Regardless of the "Moderate" potential of the soil resources in the area, it is the specialist's opinion that no segregation of farming practices nor loss of high potential land capability is expected. It is therefore recommended that the proposed activity may proceed as has been planned.

### **2.3.5 Impacts on Heritage Resources (including archaeology and palaeontology)**

As per the previous heritage studies completed in the area, the proposed road development is not anticipated to impact significant built environment or palaeontological heritage resources. While the cultural landscape within which the proposed development is located has heritage value, as this road forms part of an approved WEF, it is not anticipated that this road will have a negative impact on the broader sense of place.

While no archaeological resources of heritage significance were identified during the assessment completed in 2014, the specialists noted that the impacts of the road development on archaeological heritage have not been assessed. The recommend that existing farm tracks be re-used or upgraded to minimise the amount of change to un-transformed landscape and during the detailed planning phase, drawings of proposed road alignments, infrastructure and near-final turbine positions should be submitted to an archaeologist for review and field-proofing. Micro-adjustment of alignments is likely to be sufficient to achieve adequate mitigation. To this end, it is recommended that, prior to construction, a walkdown of the final road layout be completed by an archaeologist to ensure that no significant archaeological heritage is impacted by the proposed road development.

### **2.3.6. Assessment of Cumulative Impacts**

The access road development is located within the authorised footprint of the Wolf Wind Farm, and ties into an existing authorised road network and is surrounded by similar linear developments. Based on the specialist cumulative assessments and findings regarding the development of the access road (refer to **Chapter 5** and specialist reports contained within **Appendix D - H**) and its contribution to the overall impact within the surrounding area, it can be concluded that there are no cumulative impacts or risks identified as unacceptable with the development of the access road within the surrounding area. In addition, no impacts that will result in whole-scale change are expected as a result of the access road. Considering all aspects, cumulative impacts associated with the access road have been assessed to be acceptable, with no unacceptable loss or risk are expected.

### **2.3.7. Environmental Sensitivity Mapping**

As part of the specialist investigations undertaken for the access road, specific environmental features and areas were identified which will be impacted by the construction of the access road. The current condition of the features identified informed the sensitivity of the environmental features and the capacity for disturbance and change associated with the proposed development. The sensitive features identified specifically relate to ecology, and freshwater resources. These are illustrated in Figure 2.1 and are detailed below:

- » The proposed access road will traverse an episodic drainage line to the east of the R75.
- » The entire study area is assigned a **Very High** terrestrial sensitivity by the DFFE screening tool. The very high sensitivity is attributed to the presence of a CBA 2 and Freshwater Ecosystem Priority Area (FEPA) Sub-catchments. The presence of CBAs was confirmed for all habitat units namely the Eastern Gwarrieveld, Suurberg Quartzite Fynbos and the Watercourse Habitat unit. Habitat sensitivity confirmed during the field work confirmed ecological sensitivity ranging between Low and High, depending on the habitat under consideration.
- » The majority of the road alignment is of low agricultural potential, with a small section defined as medium sensitivity.

### **2.3.8. Overall Conclusion (Impact Statement)**

The construction and operation of the access road for the Wolf Wind Farm has been proposed by Wolf Wind Farm (RF) (Pty) Ltd. The need and desirability for the proposed access road is directly linked to the need of the Wolf Wind Farm, as the main purpose of the proposed road is to support the development of the wind

farm. The proposed access road is required to provide access to the wind farm. The assessment of the proposed access road was undertaken by independent specialists and their findings have informed the results of this BA Report.

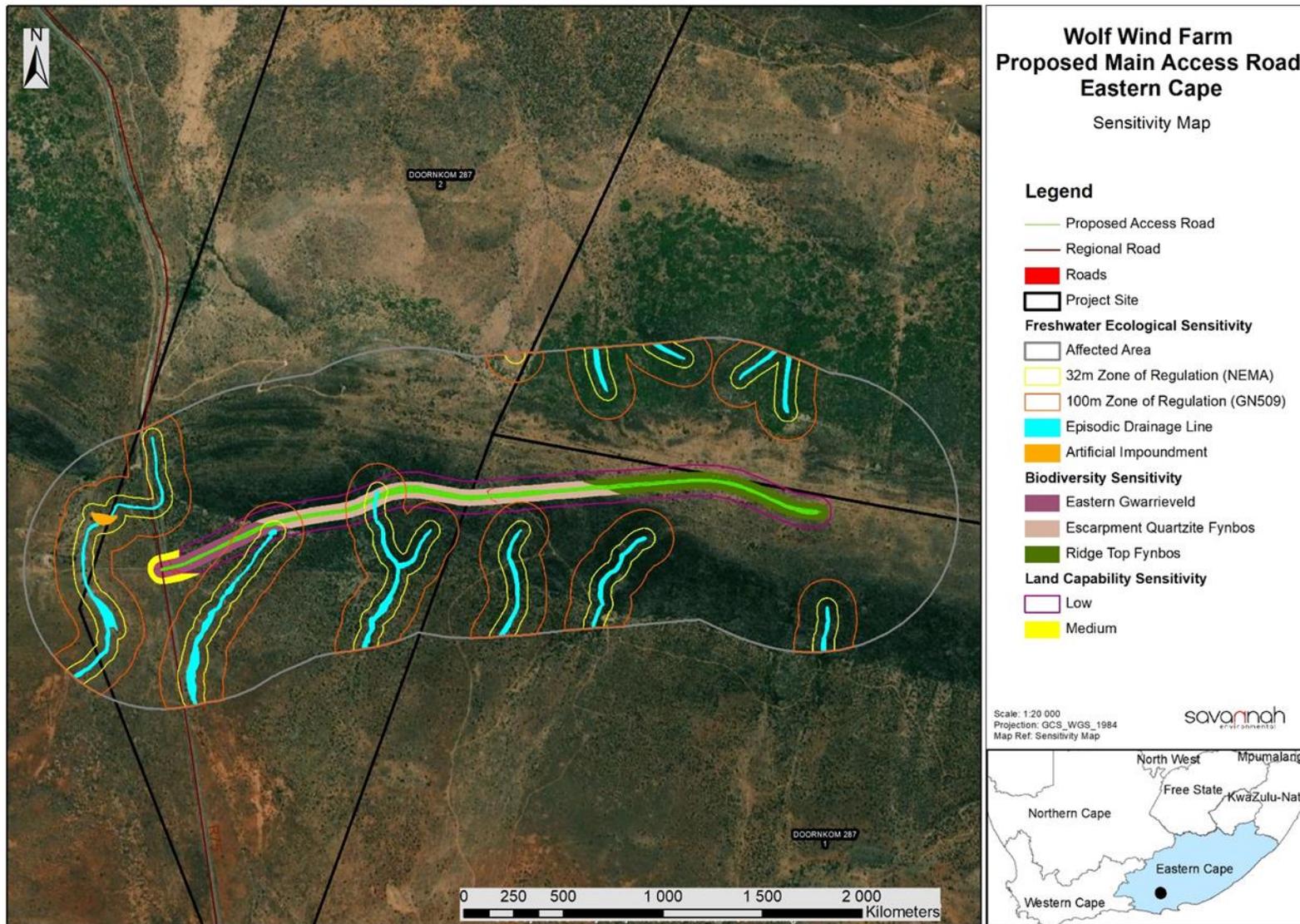
The specialist findings have indicated that there are no environmental fatal flaws associated with the development of the access road provided that the recommended mitigation measures are implemented. The access road is considered suitable for development, provided areas of sensitivity (i.e., potential floral species of concern and the episodic drainage line) as determined by the specialists and detailed in section 6.3 of this report are considered and recommended mitigation implemented. All impacts associated with the access road can be mitigated to acceptable levels.

### **2.3.9. Overall Recommendation**

Considering the findings of the independent specialist studies, the impacts identified, as well as the potential to further minimise the impacts identified to acceptable levels through mitigation, it is the reasoned opinion of the Environmental Assessment Practitioner (EAP) that the development of the access road is acceptable within the landscape and can reasonably be authorised. The recommended validity period for the environmental authorisation is 10 years.

The following key conditions would be required to be included within the environmental authorisation issued for the access road:

- » The project footprint must be minimised and must remain within the demarcated development area to avoid impacts on episodic drainage lines and SCCs in the surrounding areas.
- » The access road layout and EMPr should be approved along with the environmental authorisation (should authorisation be issued for the project).
- » All mitigation measures detailed within this BA Report, as well as the specialist reports contained within **Appendices D to H**, are to be implemented.
- » The EMPr as contained within **Appendix I** of the BA Report should form part of the contract with the Contractor appointed to construct and maintain access road in order to ensure compliance with environmental specifications and management measures. The implementation of the EMPr for all life cycle phases of the access road is considered key in achieving the appropriate environmental management standards as detailed for this project.
- » A pre-construction walk-through of the access road route for species of conservation concern (SCC) that would be affected and that can be translocated must be undertaken by an ecologist prior to the commencement of the construction phase. Permits from the relevant national and provincial authorities, i.e., CapeNature and the Department of Forestry, Fisheries, and the Environment (DFFE), must be obtained before the individual species of concern are disturbed.
- » Prior to construction, a walkdown of the final road layout must be completed by an archaeologist to ensure that no significant archaeological heritage is impacted by the proposed road development.
- » Obtain all other environmental permits for the project, as required.



**Figure 2.1:** Layout and overall environmental sensitivity map

### 2.3. Life-cycle Phases of the Access Road

<b>Construction Phase</b>	
<b>Requirements</b>	<p>The construction of the proposed access road will be undertaken as part of the construction for the Wolf Wind Farm.</p> <ul style="list-style-type: none"> <li>» Duration of the construction phase of the road is expected to be approximately 6 months.</li> <li>» Create direct construction employment opportunities. Up to 50 employment opportunities will be created during the construction phase.</li> <li>» No on-site labour camps. Employees to be transported to and from housing to site daily via a local transportation company.</li> <li>» Construction waste will be temporarily stored on site and waste removal and sanitation will be undertaken by a sub-contractor or appointed contractor on a regular basis.</li> <li>» Electricity required for construction activities will be generated by a generator or will be sourced from available Eskom distribution networks in the area.</li> <li>» Water will be required for the construction phase and potable needs. If required, water will be sourced from the local municipality, existing borehole/s on or near the project site (subject to agreement with landowners and authorisation from DWS).</li> </ul>
<b>Construction sequence</b>	<p>The access road will be undertaken in the following sequence:</p> <ul style="list-style-type: none"> <li>» Step 1: Surveying of the development area, engaging with affected landowners, environmental specialist walkthroughs</li> <li>» Step 2: Final design based on geo-technical, topographical conditions and potential environmental sensitivities</li> <li>» Step 3: Vegetation clearance and the construction of the road</li> <li>» Step 4: Rehabilitation of disturbed areas</li> <li>» Step 5: Continued maintenance</li> </ul>
<b>Activities to be undertaken</b>	
Conduct surveys prior to construction	<ul style="list-style-type: none"> <li>» Including, but not limited to: a geotechnical survey, final environmental walkthroughs, site survey (including the final location of the development footprint) of access road.</li> </ul>
Undertake site preparation	<ul style="list-style-type: none"> <li>» Including the clearance of vegetation.</li> <li>» Stripping of topsoil to be stockpiled, backfilled, removed from site and/or spread on site.</li> <li>» To be undertaken in a systematic manner to reduce the risk of exposed ground being subjected to erosion.</li> <li>» Include search and rescue for identified species of concern before construction.</li> </ul>
Infrastructure construction	<ul style="list-style-type: none"> <li>» Construction of the access road.</li> </ul>
Undertake site rehabilitation	<ul style="list-style-type: none"> <li>» Commence with rehabilitation efforts once construction is completed in an area, and all construction equipment is removed.</li> </ul>
<b>Operation Phase</b>	
<b>Requirements</b>	<ul style="list-style-type: none"> <li>» Duration will be 20 years, or longer as needed for the operation of the Wolf Wind Farm.</li> <li>» Requirements for maintenance of access road.</li> </ul>

### **Activities to be undertaken**

Operation and Maintenance	<ul style="list-style-type: none"><li>» Ad hoc road maintenance activities.</li><li>» On-going rehabilitation of those areas which were disturbed during the construction phase.</li><li>» During this operation phase vegetation surrounding the road will require management only if it impacts on the safety and operational objectives of the project.</li></ul>
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### **Decommissioning Phase**

<b>Requirements</b>	<ul style="list-style-type: none"><li>» Decommissioning of the access road for the Wolf Wind Farm will occur at the end of the economic life of the wind farm.</li><li>» Decommissioning activities to comply with the legislation relevant at the time.</li><li>» Requirement for rehabilitation of disturbed area</li></ul>
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## CHAPTER 3 : PURPOSE AND OBJECTIVES OF THE EMPr

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An Environmental Management Programme (EMPr) is defined as “an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented or mitigated, and that the positive benefits of the projects are enhanced”. The objective of this EMPr is to provide consistent information and guidance for implementing the management and monitoring measures established in the permitting process and help achieve environmental policy goals. The purpose of an EMPr is to help ensure continuous improvement of environmental performance, reducing negative impacts and enhancing positive effects during the construction and operation of the access road. An effective EMPr is concerned with both the immediate outcome as well as the long-term impacts of the project.

The EMPr provides specific environmental guidance for the construction and operation phases of a project, and is intended to manage and mitigate construction and operation activities so that unnecessary or preventable environmental impacts do not result. These impacts range from those incurred during start up (site clearing and site establishment) through to those incurred during the construction activities themselves (erosion and dust) to those incurred during site rehabilitation (soil stabilisation, re-vegetation) and operation. The EMPr also defines monitoring requirements in order to ensure that the specified objectives are met.

This EMPr is applicable to all employees and contractors working on the pre-construction, construction, and operation and maintenance phases of the project. The document must be adhered to and updated as relevant throughout the project life cycle.

This EMPr has been compiled in accordance with Appendix 4 of the EIA Regulations, 2014 (as amended). This is a dynamic document and will be further developed in terms of specific requirements listed in any authorisations issued for the proposed project and/or as the project develops. This will ensure that the construction and operation activities are planned and implemented taking sensitive environmental features into account. The EMPr has been developed as a set of environmental specifications (i.e. principles of environmental management), which are appropriately contextualised to provide clear guidance in terms of the on-site implementation of these specifications (i.e. on-site contextualisation is provided through the inclusion of various monitoring and implementation tools).

The EMPr has the following objectives:

- » Outline mitigation measures and environmental specifications which are required to be implemented for the planning, construction, rehabilitation and operation phases of the project in order to minimise the extent of environmental impacts, and to manage environmental impacts associated with the access road.
- » Ensure that the construction and operation phases do not result in undue or reasonably avoidable adverse environmental impacts, and ensure that any potential environmental benefits are enhanced.
- » Identify entities who will be responsible for the implementation of the measures and outline functions and responsibilities.
- » Propose mechanisms and frequency for monitoring compliance, and prevent long-term or permanent environmental degradation.
- » Facilitate appropriate and proactive responses to unforeseen events or changes in project implementation that were not considered in the BA process.

The mitigation measures identified within the BA process are systematically addressed in the EMPr, ensuring the minimisation of adverse environmental impacts to an acceptable level.

The Developer must ensure that the implementation of the project complies with the requirements of all environmental authorisations, permits, and obligations emanating from relevant environmental legislation. This obligation is partly met through the development and the implementation of this EMPr, and through its integration into the relevant contract documentation provided to parties responsible for construction and/or operation activities on the site. Since this EMPr is part of the BA process for the project, it is important that this document be read in conjunction with the BA Report compiled for this project. This will contextualise the EMPr and enable a thorough understanding of its role and purpose in the integrated environmental management process. Should there be a conflict of interpretation between this EMPr and the Environmental Authorisation, the stipulations in the Environmental Authorisation shall prevail over that of the EMPr, unless otherwise agreed by the authorities in writing. Similarly, any provisions in legislation overrule any provisions or interpretations within this EMPr.

This EMPr shall be binding on all the parties involved in the planning, construction and operational phases of the project, and shall be enforceable at all levels of contract and operational management within the project. The document must be adhered to and updated as relevant throughout the project life cycle.

## CHAPTER 4: STRUCTURE OF THIS EMPr

The preceding chapters provide background to the EMPr and the proposed project, while the chapters which follow consider the following:

- » Planning and design activities;
- » Construction activities;
- » Operation activities; and
- » Decommissioning activities.

These chapters set out the procedures necessary for the project owner to minimise environmental impacts and achieve environmental compliance. For each of the phases of implementation for the project, an overarching environmental **goal** is stated. In order to meet this goal, a number of **objectives** are listed. The management programme has been structured in table format in order to show the links between the goals for each phase and their associated objectives, activities/risk sources, mitigation actions, monitoring requirements and performance indicators. A specific EMPr table has been established for each environmental objective. The information provided within the EMPr table for each objective is illustrated below:

**OBJECTIVE: Description of the objective, which is necessary to meet the overall goals; which take into account the findings of the specialist studies**

<b>Project Component/s</b>	List of project components affecting the objective, i.e.: » Access Road.
<b>Potential Impact</b>	Brief description of potential environmental impact if objective is not met.
<b>Activity/Risk Source</b>	Description of activities which could affect achieving the objective.
<b>Mitigation: Target/Objective</b>	Description of the target and/or desired outcomes of mitigation.

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
List specific action(s) required to meet the mitigation target/objective described above.	Who is responsible for the measures	Time periods for implementation of measures

<b>Performance Indicator</b>	Description of key indicator(s) that track progress/indicate the effectiveness of the management programme.
<b>Monitoring</b>	Mechanisms for monitoring compliance; the key monitoring actions required to check whether the objectives are being achieved, taking into consideration responsibility, frequency, methods, and reporting.

The objectives and EMPr tables are required to be reviewed and possibly modified whenever changes, such as the following, occur:

- » Planned activities change (i.e. in terms of the components and/or layout of the access road);

- » Modification to or addition to environmental objectives and targets;
- » Additional or unforeseen environmental impacts are identified and additional measures are required to be included in the EMPr to prevent deterioration or further deterioration of the environment.
- » Relevant legal or other requirements are changed or introduced; and
- » Significant progress has been made on achieving an objective or target such that it should be re-examined to determine if it is still relevant, should be modified, etc.

#### 4.1 Contents of this Environmental Management Programme (EMPr)

This Environmental Management Programme (EMPr) has been prepared as part of the BA process being conducted in support of the application for Environmental Authorisation (EA) for the access road. This EMPr has been prepared in accordance with DFFE's requirements as contained in Appendix 4 of the 2014 EIA Regulations (GNR 326). It provides recommended management and mitigation measures with which to minimise impacts and enhance benefits associated with the project.

An overview of the contents of this EMPr, as prescribed by Appendix 4 of the 2014 EIA Regulations (GNR 326), and where the corresponding information can be found within this EMPr is provided in Table 4.1.

**Table 4.1:** Summary of where the requirements of Appendix 4 of the 2014 NEMA EIA Regulations (GNR 326) are provided in this EMPr.

Requirement	Location in this EMPr
(1) An EMPr must comply with section 24N of the Act and include –	
(a) Details of –	Chapter 4 Appendix B
(i) The EAP who prepared the EMPr.	
(ii) The expertise of that EAP to prepare an EMPr, including a curriculum vitae.	
(b) A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.	Chapter 2
(c) A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers.	Chapter 2 Figure 2.1 Appendix A
(d) A description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including –	
(i) Planning and design.	Chapter 5
(ii) Pre-construction activities.	Chapter 5
(iii) Construction activities.	Chapter 6
(iv) Rehabilitation of the environment after construction and where applicable post closure.	Chapter 7
(v) Where relevant, operation activities.	Chapter 8
(f) A description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to –	
(i) Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation.	Chapters 5 - 8
(ii) Comply with any prescribed environmental management standards or practices.	
(iii) Comply with any applicable provisions of the Act regarding closure, where applicable.	

Requirement	Location in this EMPr
(iv) Comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable.	
(g) The method of monitoring the implementation of the impact management actions contemplated in paragraph (f).	Chapters 5 - 8
(h) The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f).	Chapters 5 - 8
(i) An indication of the persons who will be responsible for the implementation of the impact management actions.	Chapters 5 - 8
(j) The time periods within which the impact management actions contemplated in paragraph (f) must be implemented.	Chapters 5 - 8
(k) The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f).	Chapters 5 - 8
(l) A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations.	Chapter 6
(m) An environmental awareness plan describing the manner in which – (i) The applicant intends to inform his or her employees of any environmental risk which may result from their work. (ii) Risks must be dealt with in order to avoid pollution or the degradation of the environment.	Chapter 6
(n) Any specific information that may be required by the competent authority.	N/A
(2) Where a government notice gazetted by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.	N/A

## 4.2 Project Team

In accordance with Regulation 12 of the 2014 EIA Regulations (GNR 326) the applicant appointed Savannah Environmental (Pty) Ltd as the independent environmental consultants responsible for managing the application for EA and the supporting BA process. The application for EA and the BA process, is being managed in accordance with the requirements of NEMA, the 2014 EIA Regulations (GNR 326), and all other relevant applicable legislation.

### 4.2.1 Details and Expertise of the Environmental Assessment Practitioner (EAP)

Savannah Environmental is a leading provider of integrated environmental and social consulting, advisory and management services with considerable experience in the fields of environmental assessment and management. The company is wholly woman-owned (51% black woman-owned) and is rated as a Level 2 Broad-Based Black Economic Empowerment (B-BBEE) Contributor. The company was established in 2006 with a clear objective to provide services to the infrastructure development sector. Savannah Environmental benefits from the pooled resources, diverse skills and experience in the environmental field held by its team that has been actively involved in undertaking environmental studies for a wide variety of projects throughout South Africa and neighbouring countries. Strong competencies have been developed in project management of environmental processes, as well as strategic environmental assessment and compliance advice, and the assessment of environmental impacts, the identification of environmental management solutions and mitigation/risk minimising measures.

This BA process is being managed by Jo-Anne Thomas. She is supported by Raquel Peters and Lehlogonolo Mashego.

- » **Jo-Anne Thomas.** She holds a Master of Science Degree in Botany (M.S.c Botany) from the University of the Witwatersrand and is registered as a Professional Natural Scientist (400024/2000) with SACNASP and a registered Environmental Assessment Practitioner (EAP) with EAPASA (2019/726). She has over 24 years of experience in the field of environmental assessment and management, and the management of large environmental assessment and management projects. During this time, she has managed and coordinated a multitude of large-scale infrastructure EIAs and is also well versed in the management and leadership of teams of specialist consultants, and dynamic stakeholders. She has been responsible for providing technical input for projects in the environmental management field, specialising in Strategic Environmental Advice, EIA studies, environmental permitting, public participation, EMPs and EMPrs, environmental policy, strategy and guideline formulation, and integrated environmental management (IEM). Her responsibilities for environmental studies include project management, review and integration of specialist studies, identification and assessment of potential negative environmental impacts and benefits, and the identification of mitigation measures, and compilation of reports in accordance with applicable environmental legislation.
- » **Raquel Peters,** the principle author of this BA Report holds a BA (Hons) Environmental Management degree (with distinction) from the University of South Africa. She is a Junior Environmental Consultant, and her key focus is on undertaking environmental impact assessments, GIS mapping, environmental permitting and authorisations, compliance auditing, public participation, and environmental management plans and programmes.
- » **Lehlogonolo Mashego,** the Public Participation Consultant on this project, holds an M.Sc. in Environmental Science as obtained from the University of Witwatersrand. She is a Gauteng Branch Committee Member for International Association for Impact Assessment South Africa (IAIASA) facilitating the students and young professionals' division. She has 5 years of professional working experience in the public participation field; specializing in overall public facilitation, stakeholder engagement, public awareness, stakeholder liaison and project administration. She is responsible for project management of public involvement participation processes for a wide range of projects across South Africa in industries which include but not limited to mining, renewable energy, infrastructure, and recreation. Through her role as an environmental practitioner, she has facilitated a range of Screening Assessments, Basic Assessments, Scoping and Environmental Impact Assessments, Environmental Auditing and Environmental Training.

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

Curricula Vitae (CVs) detailing the Savannah Environmental team's expertise and relevant experience are provided in **Appendix B** of the EMPr.

#### **4.2.2 Details of the Specialist Consultants**

A number of independent specialist consultants have been appointed as part of the BA project team in order to adequately identify and assess potential impacts associated with the project (refer to **Table 4.1**). The specialist consultants have provided input into the BA Report as well as this EMPr.

**Table 4.1: Specialist Consultants which form part of the EIA project team.**

<b>Specialist Area of Expertise</b>	<b>Specialist Company</b>	<b>Specialists Names</b>
Ecology	Scientific Terrestrial Services FEN Consulting	Charne Gouws, Christien Steyn Christopher Hooton Jandre Potgieter Nelanie Cloete
Soils and Agricultural Potential Impact Assessment	The Biodiversity Company	Andrew Husted
Heritage (Archaeology and Palaeontology)	CTS Heritage	Jenna Lavin
Visual Impact Assessment	Scientific Aquatic Services	Sanja Erwee Stephen van Staden

## CHAPTER 5: PLANNING AND DESIGN MANAGEMENT PROGRAMME

**Overall Goal:** undertake the pre-construction activities (planning and design phase) in a way that:

- » Ensures that the preferred design and layout of the access road responds to the identified environmental constraints and opportunities.
- » Ensures that pre-construction activities are undertaken in accordance with all relevant legislative requirements.
- » Ensures that adequate regard has been taken of any landowner and community concerns and that these are appropriately addressed through design and planning (where appropriate).
- » Enables the construction activities to be undertaken without significant disruption to other land uses and activities in the area.

In order to meet this goal, the following objectives have been identified, together with necessary actions and monitoring requirements.

### 5.1 Objectives

**OBJECTIVE 1: Ensure the access road design responds to identified environmental constraints and opportunities**

The main sensitive feature of the project site is the episodic drainage line which is adjacent to the access road. Floral species of concern have also been noted in the area immediately surrounding the access road.

<b>Project Component/s</b>	» Access road
<b>Potential Impact</b>	» Impact on identified sensitive areas. » Design fails to respond optimally to the environmental considerations.
<b>Activities/Risk Sources</b>	» Positioning of all project components » Pre-construction activities (site surveys and environmental walk-through surveys)
<b>Mitigation: Target/Objective</b>	» Site sensitivities are taken into consideration and avoided as far as possible, thereby mitigating potential impacts.

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Plan and conduct pre-construction activities in an environmentally acceptable manner.	Developer Contractor	Pre-construction
It is imperative that all construction works be undertaken during periods of low to no rainfall (thus preferably during the dry, winter months) when the flow/level of water is very low in the watercourses.	Developer Contractor	Pre-construction
The throughflow structures must be designed to ensure that the structures are geotechnically sound and that they are hydraulically stable, even if a 1:100 year flood event was to occur. The designs should include culverts installed intermittently to ensure a free draining landscape that does not lead to erosion, incision and sedimentation.	Developer Contractor	Pre-construction

Mitigation: Action/Control	Responsibility	Timeframe
It is recommended that a suitably qualified hydrologist be consulted to provide guidance on the relevant sizes and width requirements to ensure that hydraulic functioning of the system is maintained.		
In addition, the crossings must be designed such that should they be overtopped, they remain stable and do not lead to excessive downstream erosion and incision. Similarly, a freshwater ecologist must ensure that the final design accounts for appropriate wetting frequencies and patterns are maintained in the pre-development condition.	Developer Contractor	Pre-construction
Ensure that no clearing or stockpiling occurs within the episodic drainage line and possible buffer zones as defined by the freshwater specialists	Developer Contractor	Pre-construction
The delineated extent of the episodic drainage line must be clearly demarcated with danger tape as a 'no-go area' by an Environmental Control Officer (ECO). No construction personnel and equipment/vehicles may enter the episodic drainage line	Developer Contractor	Pre-construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» The design meets the objectives and does not degrade the environment.</li> <li>» Demarcated sensitive areas are avoided at all times.</li> <li>» Design and layouts respond to the mitigation measures and recommendations in the BA Report.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Review of the design by the Project Manager and the Environmental Control Officer (ECO) prior to the commencement of construction.</li> <li>» Monitor ongoing compliance with the FMP and method statements.</li> </ul>

**OBJECTIVE 2: Ensure that relevant permits and plans are in place to manage impacts on the environment**

<b>Project Component/s</b>	» Access road
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Impact on identified sensitive areas and protected species.</li> <li>» Design fails to respond optimally to the environmental considerations.</li> </ul>
<b>Activities/Risk Sources</b>	» Pre-construction activities (environmental walk-through surveys).
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To ensure that pre-construction activities are undertaken in an environmentally friendly manner.</li> <li>» To ensure that the design of the access road responds to the identified constraints identified through pre-construction surveys.</li> </ul>

Mitigation: Action/Control	Responsibility	Timeframe
Obtain any additional environmental permits required prior to the commencement of construction. Copies of permits/licenses must be submitted to the Director: Environmental Impact Evaluation at the DFFE.	Developer	Pre-construction
Before the commencement of any construction and clearing for the proposed realigned access road, a walkthrough must be conducted during the winter season to ensure all occurring species	Developer Specialist	Pre-construction

Mitigation: Action/Control	Responsibility	Timeframe
of concern are marked for relocation or destruction, for which the relevant permits must be applied for.		
Affected individuals of selected protected species (i.e. those that are of high conservation value or which have a high probability of surviving translocation) which cannot be avoided should be translocated to a safe area on the site prior to construction. This does not include woody species which cannot be translocated and where these are protected by DFFF and permit for their destruction would be required.	Developer Contractor Specialist	Pre-construction
A walkdown of the final road layout must be completed by an archaeologist to ensure that no significant archaeological heritage is impacted by the proposed road development.	Developer Contractor Specialist	Pre-construction
A chance find procedure must be developed and implemented in the event that archaeological or palaeontological resources are found.	Developer Contractor	Pre-construction
A Ecological walkdown of the footprint area is required before construction activities can commence, where all anticipated floral SCC are searched for and marked. Wherever possible micro-siting must take place to avoid SCC, and especially SCC which cannot be rescued and relocated.	Developer Contractor Specialist	Pre-construction
Wherever possible micro-siting must take place to avoid SCC, and especially SCC which cannot be rescued and relocated. An assessment must be undertaken to determine those that are eligible for relocation and/or destruction so that all necessary permits and authorisations can be obtained from authorities.	Developer Contractor Specialist	Pre-construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Permits are obtained and relevant conditions complied with.</li> <li>» Impact on protected plant species reduced to some degree through Search and Rescue.</li> <li>» Relevant management plans and Method Statements prepared and implemented.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Review of the design by the Project Manager and the Environmental Control Officer (ECO) prior to the commencement of construction.</li> <li>» Monitor ongoing compliance with the EMP and method statements.</li> </ul>

**OBJECTIVE 4: Ensure appropriate planning is undertaken by contractors**

<b>Project Component/s</b>	» Access road
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Impact on identified sensitive areas.</li> <li>» Design and planning fail to respond optimally to the environmental considerations.</li> </ul>
<b>Activities/Risk Sources</b>	» Pre-construction activities.
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To ensure that the design of the access road responds to the identified environmental constraints and opportunities.</li> <li>» To ensure that pre-construction activities are undertaken in an environmentally friendly manner.</li> </ul>

Mitigation: Action/Control	Responsibility	Timeframe
The terms of this EMPr and the Environmental Authorisation must be included in all tender documentation and Contractors contracts.	Developer Contractor	Pre-construction
Pre-construction environmental induction for all construction staff on site must be provided to ensure that basic environmental principles are adhered to. This includes awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas etc.	EO	Pre-construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Conditions of the EMPr form part of all contracts.</li> <li>» Local employment and procurement is encouraged.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Monitor ongoing compliance with the EMP and method statements.</li> </ul>

## CHAPTER 6: MANAGEMENT PROGRAMME: CONSTRUCTION

**Overall Goal:** Undertake the construction phase in a way that:

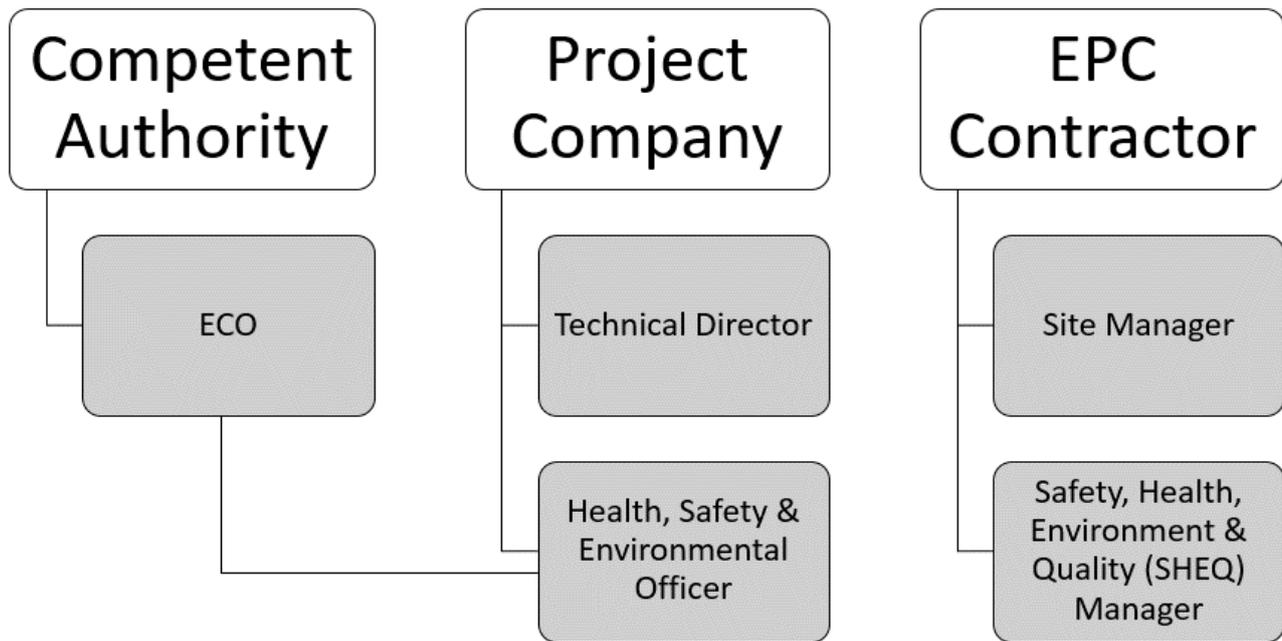
- » Ensures that construction activities are appropriately managed in respect of environmental aspects and impacts.
- » Enables construction activities to be undertaken without significant disruption to other land uses and activities in the area, in particular concerning noise impacts, farming practices, traffic and road use, and effects on local residents.
- » Minimises the impact on the indigenous natural vegetation, and habitats of ecological value.
- » Minimises impacts on fauna (including birds) in the study area.
- » Minimises the impact on heritage sites should they be uncovered.
- » Establish an environmental baseline during construction activities on the site, where possible.

### 6.1 Institutional Arrangements: Roles and Responsibilities for the Construction Phase

As the proponent, Wolf Wind Power (RF)(Pty) Ltd must ensure that the project complies with the requirements of all environmental authorisations and permits, and obligations emanating from other relevant environmental legislation. This obligation is partly met through the development of the EMPr, and the implementation of the EMPr through its integration into the contract documentation. The Developer will retain various key roles and responsibilities during the construction phase.

**OBJECTIVE 1: Establish clear reporting, communication, and responsibilities in relation to the overall implementation of the EMPr**

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the Technical Director/Manager, Site Manager, Internal Environmental Officer, Safety and Health Representative, Independent Environmental Control Officer (ECO) and Contractor for the construction phase of this project are as detailed below. Formal responsibilities are necessary to ensure that key procedures are executed. **Figure 6.1** provides an organogram indicating the organisational structure for the implementation of the EMPr.



**Figure 6.4:** Organisational structure for the implementation of the EMPr

**Construction Manager** will:

- » Ensure all specifications and legal constraints specifically with regards to the environment are highlighted to the Contractor(s) so that they are aware of these.
- » Ensure that the Developer and its Contractor(s) are made aware of all stipulations within the EMPr.
- » Ensure that the EMPr is correctly implemented throughout the project by means of site inspections and meetings. This will be documented as part of the site meeting minutes through input from the independent ECO.
- » Be fully conversant with the EIA for the project, the EMPr, the conditions of the Environmental Authorisation, and all relevant environmental legislation.
- » Be fully knowledgeable with the contents of all relevant licences and permits.

**Site Manager** (The Contractor's on-site Representative) will:

- » Be fully knowledgeable with the contents of the BA.
- » Be fully knowledgeable with the contents and conditions of the Environmental Authorisation.
- » Be fully knowledgeable with the contents of the EMPr.
- » Be fully knowledgeable with the contents of all relevant environmental legislation, and ensure compliance with these.
- » Have overall responsibility of the EMPr and its implementation.
- » Conduct audits to ensure compliance to the EMPr.
- » Ensure there is communication with the Technical Director, the ECO, the Internal Environmental Officer and relevant discipline engineers on matters concerning the environment.
- » Be fully knowledgeable with the contents of all relevant licences and permits.

- » Ensure that no actions are taken which will harm or may indirectly cause harm to the environment, and take steps to prevent pollution on the site.
- » Confine activities to the demarcated construction site.

An independent **Environmental Control Officer (ECO)** must be appointed by the project proponent prior to the commencement of any authorised activities and will be responsible for monitoring, reviewing and verifying compliance by the Contractor with the environmental specifications of the EMPr and the conditions of the Environmental Authorisation. Accordingly, the ECO will:

- » Be fully knowledgeable of the contents of the EIA.
- » Be fully knowledgeable of the contents of the conditions of the EA (once issued).
- » Be fully knowledgeable of the contents of the EMPr.
- » Be fully knowledgeable of the contents of all relevant environmental legislation, and ensure compliance therewith.
- » Be fully knowledgeable with the contents of all relevant licences and permits issued for the project.
- » Ensure that the contents of the EMPr are communicated to the Contractors site staff and that the Site Manager and Contractors are constantly made aware of the contents through ongoing discussion.
- » Ensure that compliance with the EMPr is monitored through regular and comprehensive inspection of the site and surrounding areas.
- » Ensure that the Site Manager has input into the review and acceptance of construction methods and method statements.
- » Ensure that activities on site comply with all relevant environmental legislation.
- » Ensure that a removal is ordered of any person(s) and/or equipment responsible for any contravention of the specifications of the EMPr.
- » Ensure that any non-compliance or remedial measures that need to be applied are reported.
- » Keep records of all activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken by the ECO.
- » Independently report to the Department of Forestry, Fisheries and the Environment (DFFE) in terms of compliance with the specifications of the EMPr and conditions of the EA (once issued).
- » Keep records of all reports submitted to DFFE.

As a general mitigation strategy, the Environmental Control Officer (ECO) should be present for the site preparation and initial clearing activities to ensure the correct demarcation of no-go areas, facilitate environmental induction with construction staff and supervise any flora relocation and faunal rescue activities that may need to take place during the site clearing (i.e. during site establishment, and excavation of foundations). Thereafter, monthly site compliance inspections would probably be sufficient, which must be increased if required. The ECO will be supplemented with the EPC Contractor's/Project Company's Environmental Office (EO) who will be located on site on a daily basis and will guide the EPC Contractor's/Project Company's to ensure compliance with the environmental considerations. Therefore, in the absence of the ECO there will be a designated owner's environmental officer present to deal with any environmental issues that may arise such as fuel or oil spills. The ECO shall remain employed until all rehabilitation measures, as required for implementation due to construction damage, are completed and the site handed over for operation.

**Contractor's Safety, Health and Environment Representative and/or Environmental Officer:** The Contractor's Safety, Health and Environment (SHE) Representative, employed by the Contractor, is responsible for managing the day-to-day on-site implementation of this EMPr, and for the compilation of regular (usually weekly) Monitoring Reports. In addition, the SHE must act as liaison and advisor on all environmental and

related issues and ensure that any complaints received from the public are duly recorded and forwarded to the Site Manager and Contractor. In some instances, a separate Environmental Officer (EO) may be appointed to support this function.

The Contractor's Safety, Health and Environment Representative and/or Environmental Officer should:

- » Be well versed in environmental matters.
- » Understand the relevant environmental legislation and processes and the implementation thereof.
- » Understand the hierarchy of Environmental Compliance Reporting, and the implications of Non-Compliance.
- » Know the background of the project and understand the implementation programme.
- » Be able to resolve conflicts and make recommendations on site in terms of the requirements of this specification.
- » Keep accurate and detailed records of all EMPr-related activities on site. The EO shall keep a daily diary for monitoring the site specific activities as per project schedule.
- » Supervise any flora relocation and faunal rescue activities that may need to take place during the site clearing (i.e. during site establishment, and excavation of foundations) and therefore needs the relevant training/ experience. The EO will have overall responsibility for day-to day environmental management and implementation of mitigations.
- » The EO is responsible for reporting to the ECO on the day-to-day on-site implementation of this EMPr and other Project Permits/Authorisations.
- » Ensure or otherwise train and induct all contractor's employees prior to commencement of any works.
- » Ensure that there is daily communication with the Site Manager regarding the monitoring of the site.
- » Compilation of Weekly and Monthly Monitoring Reports to be submitted to the ECO and Site Manager.
- » In addition, the EO/ Environmental Representative must act as project liaison and advisor on all environmental and related issues and ensure that any complaints received from the public are duly recorded and forwarded to the Site Manager, ECO and Contractor(s).

**Contractors and Service Providers:** It is important that Contractors are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMPr. The Contractor must appoint an Internal Environmental Officer (EO) who will be responsible for informing contractor employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts. The Internal Environmental Officer and Contractor's obligations in this regard include the following:

- » Must be fully knowledgeable on all environmental features of the construction site and the surrounding environment.
- » Be fully knowledgeable with the contents and the conditions of the Environmental Authorisation.
- » Be fully knowledgeable with the contents with the EMPr.
- » Be fully knowledgeable of all the licences and permits issued for the site.
- » Ensure a copy of the Environmental Authorisation and EMPr is easily accessible to all on-site staff members.
- » Ensure contractor employees are familiar with the requirements of this EMPr and the environmental specifications as they apply to the construction of the proposed access road.
- » Ensure that prior to commencing any site works, all contractor employees and sub-contractors must have attended environmental awareness training included in the induction training which must provide staff with an appreciation of the project's environmental requirements, and how they are to be implemented.

- » Ensure that any complaints received from the public are duly recorded and forwarded to the Site Manager and Contractor.
- » Manage the day-to-day on-site implementation of this EMPr, and the compilation of regular (usually weekly) Monitoring Reports.
- » Keep record of all activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken, including those of the Independent ECO.
- » Inform staff of the environmental issues as deemed necessary by the Independent ECO.

All contractors (including sub-contractors and staff) and service providers are ultimately responsible for:

- » Ensuring adherence to the environmental management specifications.
- » Ensuring that Method Statements are submitted to the Site Manager (and ECO) for approval before any work is undertaken.
- » Ensuring that any instructions issued by the Site Manager on the advice of the ECO are adhered to.
- » Ensuring that a report is tabled at each site meeting, which will document all incidents that have occurred during the period before the site meeting.
- » Ensuring that a register is kept in the site office, which lists all transgressions issued by the ECO.
- » Ensuring that a register of all public complaints is maintained.
- » Ensuring that all employees, including those of sub-contractors, receive training before the commencement of construction in order for the sub-contractors to constructively contribute towards the successful implementation of the EMPr (i.e. ensure their staff are appropriately trained on the environmental obligations).

**Community Liaison Officer (CLO)** will represent the community and assist the Owner, Contractor and the Engineer with communication between them and the community. Inform community regarding the project details, safety precautions and programme. Duties and responsibilities of the community liaison officer include:

- » Be available at the site offices generally between the hours of 07:00 and 09:00 and again from 15:00 until end of working day. Normal working hours will be from 07:00 am till 17:00.
- » Maintain an up-to-date record of potential employees within the community and provide the contractor with copies of this information.
- » To identify, screen and nominate labour from the community in accordance with the Contractor's requirements and determine, in consultation with the Contractor, the needs of local labour for employment and relevant technical training, where applicable.
- » Liaise between Contractor and labour regarding wages and conditions of employment.
- » Communicate daily with the Contractor on labour related issues such as numbers and skills.
- » Identify possible labour disputes, unrest, strikes, etc., in advance and assist in their resolution.
- » Have a good working knowledge of the contents of the contract document regarding labour and training matters.
- » Attend all meetings at which the community and/or labour is represented or discussed.
- » Attend contract site meetings and report on community and labour issues at these meetings.
- » Co-ordinate and assist with the obtaining of information regarding the community's needs (questionnaires, etc.).
- » Inform local labour of their conditions of temporary employment, to ensure their timeous availability and to inform them timeously of when they will be relieved.
- » Ensure that all labour involved in activities when tasks have been set, are fully informed of the principle of task-based work.

- » Attend disciplinary proceedings to ensure that hearings are fair and reasonable.
- » Keep a daily written record of interviews and community liaison.
- » Arrange venues for training if required.
- » Assist with the training and education of the community regarding the correct usage of the services, where applicable.
- » Any other duties that may become necessary as the works progress.

## 6.2 Objectives

In order to meet the overall goal for construction, the following objectives, actions, and monitoring requirements have been identified.

### **OBJECTIVE 2: Minimise impacts related to inappropriate site establishment**

<b>Project Component/s</b>	» Access road
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Hazards to landowners and the public.</li> <li>» Damage to indigenous natural vegetation.</li> <li>» Loss of threatened plant species.</li> <li>» Visual impact of general construction activities, and the potential scarring of the landscape due to vegetation clearing and resulting erosion.</li> </ul>
<b>Activities/Risk Sources</b>	<ul style="list-style-type: none"> <li>» Any unintended or intended open excavations.</li> <li>» Movement of construction vehicles in the area and on-site.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To secure the site against unauthorised entry.</li> <li>» To protect members of the public/landowners/residents.</li> <li>» No loss of or damage to sensitive vegetation in areas outside the immediate development footprint.</li> <li>» Minimal visual intrusion by construction activities and intact vegetation cover outside of the immediate construction work areas.</li> </ul>

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Secure site, working areas and excavations in an appropriate manner.	Contractor	Site establishment, and duration of construction
Ensure that no activities infringe on identified no-go areas.	Contractor	Duration of construction
The siting of the construction equipment camp/s must take cognisance of any sensitive areas identified in the BA Report.	Contractor	Duration of construction
Ensure that vegetation is not unnecessarily cleared or removed during the construction phase.	Contractor	Site establishment, and duration of construction
Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.	Contractor	Construction
Access to adjacent areas to be strictly controlled.	Developer Contractor	Pre-construction Construction
Any individuals of protected species affected by and observed within the development footprint during construction should be translocated under the supervision of the Contractor's SHE or EO.	SHE/EO Specialist	Construction

Mitigation: Action/Control	Responsibility	Timeframe
Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.	Contractor	Construction
Appropriate shaping of disturbed areas is essential. To promote successful establishment of vegetation, the slopes must not be steeper than 1(V):5(H) or 1(V):3(H) (depending on engineering input and recommendations). New slopes should resemble/mimic the natural topography of the surrounding area. Where slopes are left steeper than what is recommended for whatever reason, additional measures will be required to prevent soil erosion and to appropriately manage stormwater.	Contractor	Site establishment, and duration of construction
Stabilizing slope regions and avoiding rocky outcrop areas could potentially limit the impact on the natural environment. Furthermore, rehabilitation of such sensitive microsites can be challenging.	Contractor	Site establishment, and duration of construction
Reduce and control construction dust through the use of approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).	Contractor	Construction
Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting.	Contractor	Construction
All unattended open excavations must be adequately demarcated and/or fenced.	Contractor	Construction
Establish appropriately bunded areas for storage of hazardous materials (e.g. fuel to be required during construction).	Contractor	Site establishment, and duration of construction
Visual impacts must be reduced during construction through minimising areas of surface disturbance, controlling erosion, using dust suppression techniques, and restoring exposed soil as closely as possible to their original contour and vegetation.	Contractor	Site establishment, and duration of construction
Cleared alien vegetation must not be dumped on adjacent intact vegetation during clearing but must be temporarily stored in a demarcated area.	Contractor	Site establishment, and duration of construction
Establish the necessary ablution facilities with chemical toilets and provide adequate sanitation facilities and ablutions for construction workers so that the surrounding environment is not polluted (at least one sanitary facility for each sex and for every 30 workers as per the 2014 Construction Regulations; Section 30(1) (b)) at appropriate locations on site). The facilities must be placed within the construction area and along the road.	Contractor	Site establishment, and duration of construction
Ablution or sanitation facilities must not be located within 100m from a watercourse or within the 1:100 year flood.	Contractor	Site establishment, and duration of construction
Supply adequate weather and vermin proof waste collection bins and skips (covered at minimum with secured netting or shade cloth) at the site where construction is being undertaken. Separate bins should be provided for general and hazardous waste. Provision should be made for separation of waste for recycling.	Contractor	Site establishment, and duration of construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Site is secure and there is no unauthorised entry.</li> <li>» No members of the public/ landowners injured.</li> <li>» Appropriate and adequate waste management and sanitation facilities provided at construction site.</li> <li>» Vegetation cover on and in the vicinity of the site is intact (i.e. full cover as per natural vegetation within the environment) with no evidence of degradation or erosion.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» An incident reporting system is used to record non-conformances to the EMPr.</li> <li>» EO and ECO to monitor all construction areas on a continuous basis until all construction is completed. Non-conformances will be immediately reported to the site manager.</li> <li>» Monitoring of vegetation clearing during construction (by contractor as part of construction contract).</li> <li>» Monitoring of rehabilitated areas quarterly for at least a year following the end of construction (by contractor as part of construction contract).</li> </ul>

### **OBJECTIVE 5: Protection of sensitive areas, flora, fauna and soils**

<b>Project Component/s</b>	<ul style="list-style-type: none"> <li>» Access road.</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Impacts on natural vegetation, habitats and fauna.</li> <li>» Loss of indigenous natural vegetation due to construction activities.</li> <li>» Impacts on soil.</li> <li>» Loss of topsoil.</li> <li>» Erosion.</li> </ul>
<b>Activity/Risk Source</b>	<ul style="list-style-type: none"> <li>» Vegetation clearing.</li> <li>» Site preparation and earthworks.</li> <li>» Excavation of foundations.</li> <li>» Construction of infrastructure.</li> <li>» Site preparation (e.g. compaction).</li> <li>» Excavation of foundations.</li> <li>» Stockpiling of topsoil, subsoil and spoil material.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To minimise the development area as far as possible.</li> <li>» To minimise impacts on surrounding sensitive areas.</li> <li>» To minimise impacts on soils.</li> <li>» Minimise spoil material.</li> <li>» Minimise erosion potential.</li> </ul>

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
In order to minimise impacts on flora, fauna, and ecological processes, the development footprint should be limited to the minimum necessary to accommodate the required infrastructure.	Contractor	Duration of contract
Restricting the movement and construction to and within the authorised footprint area, which must be clearly marked, thereby limiting the impact on surrounding vegetation;	Contractor	Duration of contract
No indiscriminate driving through the veld is allowed. As far as possible vehicles are to utilise the existing roads. Where this is not feasible, new roads are to be located in areas of existing high disturbance, and not encroach upon sensitive habitats;	Contractor	Duration of contract

Mitigation: Action/Control	Responsibility	Timeframe
Linear developments are often corridors along which disturbances occur and AIPs spread. The proposed project should thus manage disturbances and AIPs along the entire extent as well as within a 15 m buffer (Environmental buffer) surrounding the road. This will decrease the potential for AIPs to become a significant threat to indigenous flora; and	Contractor	Construction
Land clearance must only be undertaken immediately prior to construction activities.	Contractor	Construction
Retain and augment natural vegetation on all sides of the proposed project.	Contractor	Construction
During vegetation clearance, methods should be employed to minimise potential harm to fauna species.	Contractor	Construction
No dumping of litter or vegetation refuse must be allowed on-site. As such it is advised that vegetation cuttings from landscaped areas be carefully collected and disposed of at a separate waste facility.	Contractor	Construction
Prior and during vegetation clearance any larger fauna species noted should be given the opportunity to move away from the construction machinery.	Contractor	Construction
Floral SCC plants must be monitored to determine integrity of in situ specimens and the health of those that have been relocated.	Contractor	Construction
Edge effect control needs to be implemented to prevent further degradation and potential loss of floral SCC outside of the proposed disturbance footprint area.	Contractor	Construction
All RDL plant species that will be lost due to clearing of vegetation must be replaced either during rehabilitation initiatives or through translocation (for those which relocation is a viable option) to suitable habitat surrounding the disturbance footprint. The relocation site will need to be fenced-off (or somehow barricaded) and monitoring of relocated / transplanted species will be essential until it is evident that the species have successfully established.	Contractor	Construction
The removed vegetation and any soil/sediment or silt removed from the watercourse may be temporarily stockpiled outside of the delineated boundary of the watercourse. The footprint areas of these stockpiles should be kept to a minimum, and may not exceed a height of 2 m. Should the vegetation not be suitable for reinstatement after the construction phase or be alien/invasive vegetation species, all material must be disposed of at a registered garden refuse site and may not be burned or mulched on site.	Contractor	Construction
Areas to be cleared must be clearly marked on-site to eliminate the potential for unnecessary clearing. No vegetation removal must be allowed outside the designated project development footprint. Restrict construction activity to demarcated areas.	Contractor	Duration of Construction
Practical phased development and vegetation clearing must be practiced so that cleared areas are not left un-vegetated and vulnerable to erosion for extended periods of time. Where possible work should be restricted to one area at a time.	Contractor	Construction
No collection of indigenous floral species must be allowed by construction personnel, especially with regards to floral SCC.	Contractor	Duration of Construction

Mitigation: Action/Control	Responsibility	Timeframe
Access to adjacent areas to be strictly controlled.	Developer Contractor	Pre-construction Construction
No harvesting of plants for firewood, medicinal or any other purposes are to be permitted	Contractor	Construction
No killing and poaching of any wild animal to be allowed. This should be clearly communicated to all employees, including subcontractors.	Contractor	Construction
Enforce ban on hunting, collecting etc. of all plants and animals or their products.	Contractor EO	Construction
No construction activity should occur near to active raptor nests should these be discovered prior to or during the construction phase.	Contractor	Construction
Areas beyond the development footprint should be expressly off limits to construction personnel and construction vehicles and this should be communicated to them.	Contractor	Construction
If trenches need to be dug for electrical cabling or other purpose, these should not be left open for extended periods of time as fauna may fall in and become trapped in them. Trenches which are standing open should have places where there are soil ramps allowing fauna to escape the trench.	Contractor	Construction
Any fauna threatened or injured during construction should be removed to safety by a suitably qualified person, or allowed to passively vacate the area.	Suitably qualified person	Construction
Education of employees on the conservation importance of natural areas and fauna must be provided.	Contractor	Construction
All construction vehicles should adhere to clearly defined and demarcated roads	Contractor	Construction
No collecting of flora species to be permitted.	Contractor	Construction
Prior arrangements must be made with the landowners to ensure that livestock and game animals are moved to areas where they cannot be injured by vehicles traversing the area.	Contractor	Construction
No open fires made by the construction teams are allowable during the construction phase.	Contractor	Construction
Level any remaining soil removed from the road area that remained on the surface instead of allowing small stockpiles of soil to remain on the surface.	Contractor	Construction
Where possible, conduct the construction activities outside of the rainy season and not on days with strong winds blowing.	Contractor	Construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No disturbance outside of designated work areas.</li> <li>» Minimised clearing of existing vegetation.</li> <li>» Vegetation and habitat loss restricted to infrastructure footprint.</li> <li>» No poaching etc of fauna by construction personnel during construction.</li> <li>» Removal to safety of fauna encountered during construction.</li> <li>» Low mortality of fauna due to construction machinery and activities</li> <li>» Topsoil appropriately stored, managed and rehabilitated.</li> <li>» Limited soil erosion around site.</li> <li>» No activity in restricted areas.</li> </ul>
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	» Minimal level of soil degradation.
<b>Monitoring</b>	» Contractor's Environmental Officer (EO) to provide supervision and oversight of vegetation clearing activities within sensitive areas such as near the pan. » Supervision of all clearing and earthworks.

**OBJECTIVE 6: Minimise the establishment and spread of alien invasive plants**

Major factors contributing to invasion by alien invader plants include high disturbance activities. Consequences of this may include:

- » Loss of indigenous vegetation;
- » Change in vegetation structure leading to change in various habitat characteristics;
- » Change in plant species composition;
- » Change in soil chemical properties;
- » Loss of sensitive habitats;
- » Loss or disturbance to individuals of rare, endangered, endemic, and/or protected species;
- » Fragmentation of sensitive habitats;
- » Change in flammability of vegetation, depending on alien species; and
- » Hydrological impacts due to increased transpiration and runoff.

<b>Project Component/s</b>	» Access road
<b>Potential Impact</b>	» Invasion of natural vegetation surrounding the site by declared weeds or invasive alien species. » Impacts on soil. » Impact on faunal habitats. » Degradation and loss of agricultural potential.
<b>Activities/Risk Sources</b>	» Transport of construction materials to site. » Movement of construction machinery and personnel. » Site preparation and earthworks causing disturbance to indigenous vegetation. » Construction of site access roads. » Stockpiling of topsoil, subsoil and spoil material. » Routine maintenance work – especially vehicle movement.
<b>Mitigation: Target/Objective</b>	» To significantly reduce the presence of weeds and eradicate alien invasive species. » To avoid the introduction of additional alien invasive plants to the site. » To avoid distribution and thickening of existing alien plants in the site. » To complement existing alien plant eradication programs in gradually causing a significant reduction of alien plant species throughout the site.

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Develop and implement an IAP Control and Eradication Programme.	Contractor	Construction
Avoid creating conditions in which alien plants may become established: » Keep disturbance of indigenous vegetation to a minimum. » Rehabilitate disturbed areas as quickly as possible.	Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
» Do not import soil from areas with alien plants.		
When alien plants are detected, these must be controlled and cleared using the recommended control measures for each species to ensure that the problem is not exacerbated or does not re-occur.	Contractor	Construction
Eradicate all weeds and alien invasive plants as far as practically possible and ensure that material from invasive plants are adequately destroyed and not further distributed. Continually monitor the re-emergence of these species and manage according to the invasive species management plan.	Contractor	Construction
Any alien and invasive vegetation removed should be taken to a registered landfill site to prevent the proliferation of alien and invasive species	Contractor	Construction
The use of herbicides and pesticides and other related horticultural chemicals should be carefully controlled and only applied by personnel adequately certified to apply pesticides and herbicides. It must be ensured that WHO Recommended Classification of Pesticides by Hazard Class 1a (extremely hazardous) or 1b (highly hazardous) are not purchased, stored or used on site along with any other nationally or internationally similarly restricted/banned products.	Contractor	Construction
To prevent the dispersal of alien seeds, construction vehicles and machinery must be washed regularly and away from any watercourse.	Contractor	Construction

<b>Performance Indicator</b>	» Low abundance of alien plants. For each alien species: number of plants and aerial cover of plants within the site and immediate surroundings.
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» On-going monitoring of area by EO during construction.</li> <li>» Annual audit of development footprint and immediate surroundings by qualified botanist.</li> <li>» If any alien invasive species are detected then the distribution of these should be mapped (GPS co-ordinates of plants or concentrations of plants), number of individuals (whole site or per unit area), age and/or size classes of plants and aerial cover of plants.</li> <li>» The results should be interpreted in terms of the risk posed to sensitive habitats within and surrounding the site.</li> <li>» The environmental manager/site agent should be responsible for driving this process.</li> <li>» Reporting frequency depends on legal compliance framework.</li> </ul>

**OBJECTIVE 7: Minimise impact water quality and sediment balance of the watercourses.**

<b>Project Component/s</b>	» Access road
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Operation of the proposed access road and throughflow structure</li> <li>» Disturbance to soil and ongoing erosion as a result of periodic maintenance activities</li> <li>» Concentrated runoff from the road crossing leading to erosion and subsequent sedimentation of the lower watercourse reaches/downgradient watercourses (increase in the sediment load) and turbulent flows when surface water is present.</li> <li>» Higher flood peaks into the watercourses due to reduced surface roughness in the watercourses.</li> <li>» Altered water quality (if surface water is present) as a result of increased availability of pollutants.</li> </ul>
<b>Activities/Risk Sources</b>	» Possible indiscriminate movement of maintenance vehicles within and in close proximity to watercourses.
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» No indiscriminate movement of construction equipment through the watercourses may be permitted during standard operational activities or maintenance activities. Use must be made of the existing watercourse crossings only.</li> <li>» Stormwater runoff from the road crossings should be monitored (by the Operation and Maintenance (O&amp;M) Manager), to ensure it does not result in erosion of the watercourses. Stormwater should be allowed to diffusely spread across the landscape, by ensuring adequate surface roughness in the watercourse (through vegetation and rocky areas).</li> <li>» Routine maintenance of the roads must be undertaken to ensure that no concentration of flow and subsequent erosion occurs due to the road crossings/instream infrastructure. Such maintenance activities must specifically be undertaken after high rainfall events.</li> <li>» During periodic maintenance activities of the roads, monitoring for erosion should be undertaken;</li> <li>» Should erosion be observed, caused by the road crossings/instream infrastructure, the area must be rehabilitated by infilling the erosion gully and revegetation thereof with suitable indigenous vegetation. Use can also be made of rocks collected from the surrounding area to infill any area prone to erosion, as a natural dispersal mechanism.</li> <li>» Ensure that routine inspections and monitoring of any instream infrastructure are undertaken to monitor any build-up of debris that will impact on structure integrity or lead to erosion and sedimentation. Furthermore, monitoring to determine the establishment of indigenous vegetation and the presence of any alien or invasive plant species.</li> <li>» Hot spots for the build-up of debris and excess sediment must be identified and when necessary, debris/excess sediment must be removed by hand to prevent future flooding and potential damage to infrastructure.</li> </ul>
<b>Target / Objective</b>	» Prevent risk of sedimentation and/or impacts to water quality of the downgradient watercourses as a result of the operation and maintenance of the access road

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Ensure that routine inspections and monitoring of the access road and any instream infrastructure are undertaken to monitor any build-up of debris that will impact on structure integrity or lead to erosion and sedimentation. Furthermore, monitoring to determine the establishment of indigenous vegetation and the presence of any alien or invasive plant species.	Contractor	During Construction

Mitigation: Action/Control	Responsibility	Timeframe
It is imperative that all preparatory and foundational construction works be undertaken during the driest period of the year when there is no flow within the watercourses, and thus no diversion of flow would be necessary.	Contractor	During Construction
The removed vegetation and any soil/sediment or silt removed from the watercourse may be temporarily stockpiled outside of the delineated boundary of the watercourse. The footprint areas of these stockpiles should be kept to a minimum, and may not exceed a height of 2 m. Should the vegetation not be suitable for reinstatement after the construction phase or be alien/invasive vegetation species, all material must be disposed of at a registered garden refuse site and may not be burned or mulched on site.	Contractor	During Construction
The reaches of the EDLs where no activities are planned to occur must be considered no-go areas. These no-go areas can be marked at a maximum distance of 5 m upstream and downstream of the proposed access road crossing. This 5 m buffer area would allow for construction personal, vehicles (if applicable) to enter the watercourse crossing where the road is proposed to be constructed.	Contractor	During Construction
Care must be taken to ensure that no scouring or erosion occurs as a result of the proposed culvert crossing. Installation of riprap or gabion mattresses and/or concrete aprons associated with any culverts.	Contractor	During Construction
All construction material (with specific mention of prefabricated culvert structures) must be stockpiled in the laydown area and must only be imported to the construction site when required.	Contractor	During Construction
Machinery/vehicles used to install culvert structures remain on the existing road surface and may not enter the watercourses.	Contractor	During Construction
No mixed concrete may be deposited outside of the designated construction footprint. As far as possible, concrete mixing should be restricted to the contractor laydown area. Additionally, batter / dagga board mixing trays and impermeable sumps should be provided, onto which any mixed concrete can be deposited while it awaits placing.	Contractor	During Construction
Any concrete potentially spilled outside of the demarcated area must be promptly removed and taken to a suitably licensed waste disposal site.	Contractor	During Construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No signs of erosion and sedimentation of the watercourses.</li> <li>» Alien invasive species removal/establishment should be monitored.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Ensure that routine inspections and monitoring of any instream infrastructure are undertaken to monitor any build-up of debris that will impact on structure integrity or lead to erosion and sedimentation. Furthermore, monitoring to determine the establishment of indigenous vegetation and the presence of any alien or invasive plant species.</li> </ul>

**OBJECTIVE 9: Protection of heritage resources**

Two stone kraals are located in close proximity to the proposed road realignment however, the proposed access road realignment is at nearest 20m from the kraal (site 35171) and does not directly impact it. The area underlain by sediments have very high paleontological sensitivity. Although the likelihood of finding fossils appears to be low, the importance if they are found would be high to very high.

<b>Project Component/s</b>	» Access road.
<b>Potential Impact</b>	» Heritage objects or artefacts found on site are inappropriately managed or destroyed.
<b>Activity/Risk Source</b>	» Site preparation and earthworks.
<b>Mitigation: Target/Objective</b>	» To ensure that any heritage objects found on site are treated appropriately and in accordance with the relevant legislation.

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Contractors must be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow if they find sites. All staff should also be familiarised with procedures for dealing with heritage objects/sites.	Contractor, ESA and heritage specialist	Duration of contract, particularly during excavations
Any substantial fossil remains (e.g. vertebrate bones and teeth, shells) encountered during excavation should be reported to ECPHRA for possible mitigation by a professional palaeontologist	Contractor Heritage specialist	Construction
If concentrations of historical and pre-colonial archaeological heritage material and/or human remains (including graves and burials) are uncovered during construction, all work must cease immediately and be reported to ECPHRA so that systematic and professional investigation/excavation can be undertaken. Phase 2 mitigation in the form of test-pitting/sampling or systematic excavations and collections of the pre-colonial shell middens and associated artefacts will then be conducted to establish the contextual status of the sites and possibly remove the archaeological deposit before development activities continue.	Contractor Heritage specialist	Construction
Should substantial fossil remains such as vertebrate bones and teeth, plant-rich fossil lenses, fossil wood or dense fossil burrow assemblages be exposed during construction, the responsible ECO/EO/Environmental Representative should safeguard these, preferably in situ, and alert ECPHRA, i.e. The Eastern Cape Provincial Heritage Resources Authority, as soon as possible so that appropriate action can be taken by a professional palaeontologist, at the Proponent's expense. Mitigation would normally involve the scientific recording and judicious sampling or collection of fossil material as well as associated geological data (e.g. stratigraphy, sedimentology, taphonomy) by a suitably qualified palaeontologist.	Contractor Heritage specialist	Construction
A chance find procedure must be developed and implemented in the event that archaeological or palaeontological resources are found. In the case where the proposed development	Contractor Heritage specialist	Construction

Mitigation: Action/control	Responsibility	Timeframe
activities bring these materials to the surface, work must cease and HWC must be contacted immediately.		

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No disturbance outside of designated work areas.</li> <li>» All heritage items located are dealt with as per the legislative guidelines.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Observation of excavation activities by the EO throughout construction phase.</li> <li>» Supervision of all clearing and earthworks.</li> <li>» Due care taken during earthworks and disturbance of land by all staff and any heritage objects found reported.</li> <li>» Appropriate permits obtained from HWC prior to the disturbance or destruction of heritage sites (if required).</li> <li>» An incident reporting system will be used to record non-conformances to the EMPr.</li> </ul>

## OBJECTIVE 10: Management of dust and air emissions

During the construction phase, limited gaseous or particulate emissions are anticipated from exhaust emissions from construction vehicles and equipment on-site, as well as vehicle entrained dust from the movement of vehicles on the main and internal access roads.

<b>Project component/s</b>	» Access road
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Dust generation and particulates from vehicle movement to and on-site, , road construction activities, road maintenance activities, temporary stockpiles, and vegetation clearing affecting the surrounding residents and visibility.</li> <li>» Release of minor amounts of air pollutants (for example NO<sub>2</sub>, CO and SO<sub>2</sub>) from vehicles and construction equipment.</li> </ul>
<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» Clearing of vegetation and topsoil.</li> <li>» Excavation, grading, scraping, levelling, digging, drilling and associated construction activities.</li> <li>» Transport of materials, equipment, and components on internal access roads and the associated increased traffic.</li> <li>» Vehicle movement on gravel roads.</li> <li>» Re-entrainment of deposited dust by vehicle movements.</li> <li>» Wind erosion from topsoil and spoil stockpiles and unsealed roads and surfaces.</li> <li>» Fuel burning vehicle and construction engines.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To ensure emissions from all vehicles and construction engines are minimised, where possible, for the duration of the construction phase.</li> <li>» To minimise nuisance to the community from dust emissions and to comply with workplace health and safety requirements for the duration of the construction phase.</li> <li>» Suppression of dust, pollution control and minimise dust generation.</li> </ul>

Mitigation: Action/control	Responsibility	Timeframe
Implement appropriate dust suppression measures on a regular basis along the gravel access road and on the proposed site.	Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
Use of dust suppressants on roads and limit development of new roads.	Contractor	Construction
Appropriate dust suppressant must be applied on all gravel roads associated, exposed areas and stockpiles associated to the project as required to minimise/control airborne dust.	Contractor	Duration of contract
Speed of construction vehicles must be restricted to 40km/hr on all roads within the site.	Contractor	Duration of contract
Dust-generating activities or earthworks may need to be rescheduled or the frequency of application of dust control/suppressant increased during periods of high winds if visible dust is blowing toward nearby residences outside the site.	Contractor	Duration of contract
Disturbed areas must be re-vegetated as soon as practicable in line with the progression of construction activities.	Contractor	Completion of construction
Vehicles and equipment must be maintained in a road-worthy condition at all times.	Contractor	Duration of contract
All vehicles and containers used for moving waste must encapsulate the waste, which prevents the waste from causing odours and from escaping or blowing around the site. This will also prevent leachate material from spilling out of the containers, which is hazardous.	Contractor	Duration of contract

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No complaints from affected residents or community regarding dust or vehicle emissions.</li> <li>» Visual presence of dust and air quality.</li> <li>» Dust does not cause health (inhaling, eye irritation) and safety risks (low visibility).</li> <li>» Dust suppression measures implemented for all heavy vehicles that require such measures during the construction phase.</li> <li>» Drivers made aware of the potential safety issues and enforcement of strict speed limits when they are employed.</li> <li>» All heavy vehicles equipped with speed monitors before they are used in the construction phase in accordance with South African vehicle legislation.</li> <li>» Road worthy certificates in place for all heavy vehicles at outset of construction phase and up-dated on a monthly basis.</li> <li>» A complaints register must be maintained, in which any complaints from neighbouring farmers will be logged, and thereafter complaints will be investigated and, where appropriate, acted upon.</li> <li>» Compliance with national ambient air quality standards based on passive sampling campaign.</li> </ul>
<b>Monitoring</b>	<p>Monitoring must be undertaken to ensure emissions are not exceeding the prescribed levels via the following methods:</p> <ul style="list-style-type: none"> <li>» Immediate reporting by personnel of any potential or actual issues with nuisance dust or emissions to the Site Manager.</li> <li>» A complaints register must be maintained, in which any complaints from residents/the community will be logged, and thereafter complaints will be investigated and, where appropriate, acted upon.</li> <li>» An incident register and non-conformance must be used to record incidents and non-conformances to the EMPr.</li> <li>» A complaints register must be used to record grievances by the public.</li> </ul>

- » Dustfall monitoring at the homesteads along the access road. Measured daily dustfall rates should not exceed the acceptable dustfall standards for residential areas.
- » Annual emissions monitoring campaign (as per conditions of the AEL), by independent contractor, on all engine stacks.
- » Annual emissions reporting (as per conditions of the AEL)
- » Once per year a 7-day ambient monitoring campaign at (minimum) 4 fence-line locations using passive sampling techniques. Monitoring of SO<sub>2</sub>, NO<sub>2</sub>, CO, and VOCsF

### **OBJECTIVE 12: Appropriate handling and management of waste**

The construction of the thermal plant and upgraded access road will involve the generation of various wastes. In order to manage the wastes effectively, guidelines for the assessment, classification, and management of wastes, along with industry principles for minimising construction wastes must be implemented. The main wastes expected to be generated by the construction activities include:

- » general solid waste;
- » hazardous waste;
- » inert waste (rock and soil); and
- » liquid waste (including grey water and sewage).

<b>Project Component/s</b>	» Access road
<b>Potential Impact</b>	» Inefficient use of resources resulting in excessive waste generation. » Litter or contamination of the site or water through poor waste management practices.
<b>Activity/Risk Source</b>	» Packaging. » Other construction wastes. » Hydrocarbon use and storage. » Spoil material from excavation, earthworks and site preparation.
<b>Mitigation: Target/Objective</b>	» To comply with waste management legislation. » To minimise production of waste. » To ensure appropriate waste storage and disposal. » To avoid environmental harm from waste disposal. » A waste manifests should be developed for the ablutions showing proof of disposal of sewage at appropriate water treatment works.

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Construction method and materials should be carefully considered in view of waste reduction, re-use, and recycling opportunities.	Contractor	Duration of contract
Construction contractors must provide specific detailed waste management plans to deal with all waste streams.	Contractor	Duration of contract
Ensure that no litter, refuse, wastes, rubbish, rubble, debris and builders wastes generated on the premises be placed, dumped or deposited on adjacent/surrounding properties, and that the waste is disposed of at dumping site as approved by the Council.	Contractor	Duration of contract
Waste disposal at the construction site must be avoided by separating and trucking out of waste.	Contractor	Construction
Specific areas must be designated on-site for the temporary management of various waste streams, i.e. general refuse,	Contractor	Duration of contract

Mitigation: Action/Control	Responsibility	Timeframe
construction waste (wood and metal scrap), and contaminated waste as required. Location of such areas must seek to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage, and vermin control.		
Where practically possible, construction and general wastes on-site must be reused or recycled. Bins and skips must be available on-site for collection, separation, and storage of waste streams (such as wood, metals, general refuse etc.).	Contractor	Duration of contract
Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors.	Contractor	Duration of contract
Uncontaminated waste must be removed at least weekly for disposal, if feasible; other wastes must be removed for recycling/ disposal at an appropriate frequency.	Contractor	Duration of contract
Hydrocarbon waste must be contained and stored in sealed containers within an appropriately bunded area and clearly labelled.	Contractor	Duration of contract
Waste must be kept to a minimum and must be transported by approved waste transporters to sites designated for their disposal.	Contractor	Duration of contract
No liquid waste, including grey water, may be discharged into any water body or drainage line. All sewage disposal to take place at a registered and operational wastewater treatment works. Slips of disposal to be retained as proof of responsible disposal.	Contractor	Maintenance: duration of contract within a particular area
All liquid wastes should be contained in appropriately sealed vessels/ponds within the footprint of the development, and be disposed of at a designated waste management facility after use.	Contractor	Duration of contract
Ensure compliance with all national, regional and local legislation with regard to the storage, handling and disposal of hydrocarbons, chemicals, solvents and any other harmful and hazardous substances and materials. The onus is on the Contractor to identify and interpret the applicable legislation. Hazardous waste to be disposed of at a registered landfill site.	Contractor	During and post construction.
Documentation (waste manifest) must be maintained detailing the quantity, nature, and fate of any regulated waste. Waste disposal records must be available for review at any time.	Contractor	Duration of contract
SABS approved spill kits to be available and easily accessible.	Contractor	Duration of contract
Regularly serviced chemical toilet facilities and/or septic tank must be used to ensure appropriate control of sewage.	Contractor	Duration of contract
Daily inspection of all chemical toilets and septic tanks must be performed by environmental representatives on site.	Contractor	Duration of contract
In the event where sewage is discharged into the environment, all contaminated vegetation/ rock and soil must be removed immediately and treated as hazardous waste.	Contractor	Duration of construction
Ensure that the below ground storage of the septic tank can withstand the external forces of the surrounding pressure. The area above the tank must be demarcated to prevent any vehicles or heavy machinery from driving around the tank.	Contractor	Duration of construction
Under no circumstances may waste be burnt on site.	Contractor	Duration of construction

Mitigation: Action/Control	Responsibility	Timeframe
Where a registered waste site is not available close to the construction site, provide a method statement with regard to waste management.	Contractor	Duration of construction
Waste manifests must be provided for all waste streams generated on site, and must be kept on site.	Contractor	Duration of construction
Implement an integrated waste management approach that is based on waste minimisation and incorporates reduction, recycling, re-use and disposal where appropriate. Where solid waste is disposed of, such disposal shall only occur at a landfill licensed in terms of section 20(b) of the National Environmental Management Waste Act, 2008 (Act 59 of 2008).	Contractor	Duration of construction
Upon the completion of construction, the area must be cleared of potentially polluting materials. Spoil stockpiles must also be removed and appropriately disposed of or the materials re-used for an appropriate purpose.	Contractor	Completion of construction
Upon the completion of construction, all sanitation facilities (including chemical toilets) must be removed, as well as the associated waste to be disposed of at a registered waste disposal site.	Contractor	Completion of construction
Litter generated by the construction crew must be collected in rubbish bins and disposed of weekly, or at an appropriate frequency, at registered waste disposal sites.	Contractor	Duration of construction
All building rubble, solid and liquid waste etc. generated during the construction activities must be disposed of as necessary at an appropriately licensed refuse facility.	Contractor	Duration of construction
Ensure that no refuse wastes are burnt on the premises or on surrounding premises. No fires will be allowed on site.	Contractor	Duration of construction
Ensure that no litter, refuse, wastes, rubbish, rubble, debris and builders wastes generated on the premises be placed, dumped or deposited on adjacent/surrounding properties during or after the construction period of the project and that the waste is disposed of at dumping site as approved by the Council.	Contractor	Duration of construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No complaints received regarding waste on site or indiscriminate dumping.</li> <li>» Internal site audits ensuring that waste segregation, recycling and reuse is occurring appropriately.</li> <li>» Provision of all appropriate waste manifests for all waste streams.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Observation and supervision of waste management practices throughout construction phase.</li> <li>» Waste collection will be monitored on a regular basis.</li> <li>» Waste documentation completed.</li> <li>» Proof of disposal of sewage at an appropriate wastewater treatment works.</li> <li>» A complaints register will be maintained, in which any complaints from the community will be logged. Complaints will be investigated and, if appropriate, acted upon.</li> <li>» An incident reporting system will be used to record non-conformances to the EMPr.</li> </ul>

### 6.3 Detailing Method Statements

**OBJECTIVE 15: Ensure all construction activities are undertaken with the appropriate level of environmental awareness to minimise environmental risk**

The environmental specifications are required to be underpinned by a series of Method Statements, within which the Contractors and Service Providers are required to outline how any identified environmental risks will practically be mitigated and managed for the duration of the contract, and how specifications within this EMPr will be met. That is, the Contractor will be required to describe how specified requirements will be achieved through the submission of written Method Statements to the Site Manager and ECO.

A Method Statement is defined as “a written submission by the Contractor in response to the environmental specification or a request by the Site Manager, setting out the plant, materials, labour and method the Contractor proposes using to conduct an activity, in such detail that the Site Manager is able to assess whether the Contractor’s proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications”. The Method Statement must cover applicable details with regard to:

- » Responsible person/s;
- » Construction procedures;
- » Materials and equipment to be used;
- » Getting the equipment to and from site;
- » How the equipment/material will be moved while on-site;
- » How and where material will be stored;
- » The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
- » Timing and location of activities;
- » Compliance/non-compliance with the Specifications; and
- » Any other information deemed necessary by the Site Manager.

Method Statements must be compiled for all activities which affect any aspect of the environment and should be applied consistently to all activities. Specific areas to be addressed in the method statement: pre, during and post construction include:

- » Site establishment (which explains all activities from induction training to offloading, construction sequence for site establishment and the different amenities and to be established etc. Including a site camp plan indicating all of these).
- » Preparation of the site (i.e. clearing vegetation, compacting soils and removing existing infrastructure and waste).
- » Soil management/stockpiling and erosion control.
- » Excavations and backfilling procedure.
- » Stipulate norms and standards for water supply and usage (i.e.: comply strictly to licence and legislation requirements and restrictions).
- » Storm water method statement.
- » Ablution facilities (placement, maintenance, management and servicing).

- » Solid Waste Management:
  - \* Description of the waste storage facilities (on site and accumulative).
  - \* Placement of waste stored (on site and accumulative).
  - \* Management and collection of waste process.
  - \* Recycle, re-use and removal process and procedure.
- » Liquid waste management.
- » Design, establish, maintain and operate suitable pollution control facilities necessary to prevent discharge of water containing polluting matter or visible suspended materials into the surrounding environment. Should grey water (i.e. water from basins, showers, baths, kitchen sinks etc.) need to be disposed of, link into an existing facility where possible. Where no facilities are available, grey water runoff must be controlled to ensure no seepage into the surrounding environment occurs.
- » Dust and noise pollution:
  - \* Describe the necessary measures to ensure that noise from construction activities is maintained within lawfully acceptable levels.
  - \* Procedure to control dust at all times on the site, access roads and spoil sites (dust control shall be sufficient so as not to have significant impacts in terms of the biophysical and social environments). These impacts include visual pollution, decreased safety due to reduced visibility, negative effects on human health and the ecology due to dust particle accumulation.
- » Hazardous substance storage (ensure compliance with all national, regional and local legislation with regard to the storage of oils, fuels, lubricants, solvents, wood treatments, bitumen, cement, pesticides and any other harmful and hazardous substances and materials. South African National Standards apply).
  - \* Lists of all potentially hazardous substances to be used.
  - \* Appropriate handling, storage and disposal procedures.
  - \* Prevention protocol of accidental contamination of soil at storage and handling areas.
  - \* All storage areas, (i.e. for harmful substances appropriately bunded with a suitable collection point for accidental spills must be implemented and drip trays underneath dispensing mechanisms including leaking engines/machinery).
- » Fire prevention and management measures on site.
- » Fauna and flora protection process on and off site (i.e. removal to reintroduction or replanting, if necessary).
  - \* Rehabilitation, re-vegetation process and bush clearing.
- » Incident and accident reporting protocol.
- » General administration.
- » Designate access road and the protocols while roads are in use.
- » Requirements on gate control protocols.

The Contractor may not commence the activity covered by the Method Statement until it has been approved by the Site Manager (with input from the ECO), except in the case of emergency activities and then only with the consent of the Site Manager. Approval of the Method Statement will not absolve the Contractor from their obligations or responsibilities in terms of their contract. Failure to submit a method statement may result in suspension of the activity concerned until such time as a method statement has been submitted and approved.

## 6.4 Awareness and Competence: Construction Phase

**OBJECTIVE 16: To ensure all construction personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm**

To achieve effective environmental management, it is important that all personnel involved in the project are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMPr. The ECO is responsible for monitoring compliance pre, during and post construction. The contractor is responsible for informing employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts.

The Contractors obligations in this regard include the following:

- » All Employees must have a basic understanding of the key environmental features of the construction site and the surrounding environment. This includes the discussion/explanation of site environmental matters during toolbox talks.
- » The content and requirements of Method Statements are to be clearly explained to all plant operators and general workers. All staff acting in a supervisory capacity are to have copies of the relevant Method Statements and be aware of the contents thereof.
- » Ensuring that a copy of the EMPr is readily available on-site, and that all senior site staff are aware of the location and have access to the document. Senior site staff will be familiar with the requirements of the EMPr and the environmental specifications as they apply to the construction of the access road.
- » Ensuring that, prior to commencing any site works, all employees and sub-contractors have attended an Environmental Awareness Training session. The training session must provide the site staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
  - \* Records must be kept of those that have completed the relevant training.
  - \* Training should be done either in a written or verbal format but must be appropriate for the receiving audience.
  - \* Refresher sessions must be held to ensure the contractor staff are aware of their environmental obligations as practically possible.
- » All sub-contractors must have a copy of the EMPr and sign a declaration/ acknowledgement that they are aware and familiar with the contents and requirements of the EMPr and that they will conduct work in such a manner as to ensure compliance with the requirements of the EMPr.
- » Contractors and main sub-contractors should have a basic training in the identification of archaeological sites/objects, and protected flora and fauna that may be encountered on the site.
- » Awareness of any other environmental matters, which are deemed to be necessary by the ECO.
- » Ensuring that employee information posters, outlining the environmental "do's" and "don'ts" (as per the environmental awareness training course) are erected at prominent locations throughout the site.

Therefore, prior to the commencement of construction activities on site and before any person commences with work on site thereafter, adequate environmental awareness and responsibility are to be appropriately presented to all staff present onsite, clearly describing their obligations towards environmental controls and methodologies in terms of this EMPr. This training and awareness will be achieved in the following ways:

### **6.4.1 Environmental Awareness and Induction Training**

The EO, in consultation with the contractor, shall ensure that all construction workers receive an induction presentation, as well as on-going environmental education and awareness, on the importance and implications of the EMPr and the environmental requirements it prescribes. The presentation shall be conducted, as far as is possible, in the employees' language of choice. The contractor should provide a translator from their staff for the purpose of translating should this be necessary.

As a minimum, induction training should include:

- » Explanation of the importance of complying with the EMPr;
- » Explanation of the importance of complying with the Environmental Authorisation;
- » Discussion of the potential environmental impacts of construction activities;
- » Awareness regarding sensitivities on the site, including sensitive plant species (including the use of visual aids and on-site identification);
- » The benefits of improved personal performance;
- » Employees' roles and responsibilities, including emergency preparedness (this should be combined with this induction, but presented by the contractor's Health and Safety Representative);
- » Explanation of the mitigation measures that must be implemented when carrying out their activities; and
- » Explanation of the specifics of this EMPr and its specification (no-go areas, etc.).

Environmental Awareness Training must take the form of an on-site talk and demonstration by the EO/ECO before the commencement of site establishment and construction on site. The education/awareness programme should be aimed at all levels of management and construction workers within the contractor team. A record of attendance of this training must be maintained by the EO/ECO on site. Proof of awareness training should be kept on record. Environmental induction training must be presented to all persons who are to work on the site – be it for short or long durations; Contractor's or Engineer's staff; administrative or site staff; sub-contractors or visitors to site.

This induction training should be undertaken by the Contractor's Environmental Officer and should include discussing Wolf Wind Power (RF) (Pty) Ltd's environmental policy and values, the function of the EMPr and Contract Specifications and the importance and reasons for compliance to these. The induction training must highlight overall do's and don'ts on site and clarify the repercussions of not complying with these. The non-conformance reporting system must be explained during the induction as well. Opportunity for questions and clarifications must form part of this training. A record of attendance of this training must be maintained by the EO/ECO on site.

### **6.4.2 Toolbox Talks**

Toolbox talks should be held on a scheduled and regular basis (at least twice a month) where foremen, environmental and safety representatives of different components of the works and sub-consultants hold talks relating to environmental practices and safety awareness on site. These talks should also include discussions on possible common incidents occurring on site and ones recommended by the on site EO and the prevention of reoccurrence thereof. Records of attendance and the awareness talk subject must be kept on file.

## 6.5 Monitoring Programme: Construction Phase

### **OBJECTIVE 17: To monitor the performance of the control strategies employed against environmental objectives and standards**

A monitoring programme must be in place not only to ensure conformance with the EMPr, but also to monitor any environmental issues and impacts which have not been accounted for in the EMPr that are, or could result in significant environmental impacts for which corrective action is required. The period and frequency of monitoring will be stipulated by the Environmental Authorisation (once issued). Where this is not clearly dictated, the Developer will determine and stipulate the period and frequency of monitoring required in consultation with relevant stakeholders and authorities. The Technical Director/ Project Manager will ensure that the monitoring is conducted and reported.

The aim of the monitoring and auditing process would be to monitor the implementation of the specified environmental specifications, in order to:

- » Monitor and audit compliance with the prescriptive and procedural terms of the environmental specifications;
- » Ensure adequate and appropriate interventions to address non-compliance;
- » Ensure adequate and appropriate interventions to address environmental degradation;
- » Provide a mechanism for the lodging and resolution of public complaints;
- » Ensure appropriate and adequate record keeping related to environmental compliance;
- » Determine the effectiveness of the environmental specifications and recommend the requisite changes and updates based on audit outcomes, in order to enhance the efficacy of environmental management on site; and
- » Aid in communication and feedback to authorities and stakeholders.

All documentation e.g. audit/monitoring/compliance reports and notifications, required to be submitted to the DFFE in terms of the Environmental Authorisation, must be submitted to the Director: Compliance Monitoring of the Department.

Records relating to monitoring and auditing must be kept on site and made available for inspection to any relevant and competent authority in respect of this development.

#### **6.5.1. Non-Conformance Reports**

All supervisory staff including Foremen, Engineers, and the ECO must be provided the means to be able to submit non-conformance reports to the Site Manager. Non-conformance reports will describe, in detail, the cause, nature and effects of any environmental non-conformance by the Contractor.

The non-conformance report will be updated on completion of the corrective measures indicated on the finding sheet. The report must indicate that the remediation measures have been implemented timeously and that the non-conformance can be closed-out to the satisfaction of the Site Manager and ECO.

### **6.5.2. Monitoring Reports**

A monitoring report will be compiled by the ECO on a monthly basis and must be submitted to the Director: Compliance Monitoring at DFFE for their records. This report should include details of the activities undertaken in the reporting period, any non-conformances or incidents recorded, corrective action required, and details of those non-conformances or incidents which have been closed out. The contractor must ensure that all waste manifests are provided to the ECO on a monthly basis in order to inform and update the DFFE regarding waste related activities.

### **6.5.3. Audit Reports**

The holder of the Environmental Authorisation must, for the period during which the Environmental Authorisation and EMPr remain valid, ensure that project compliance with the conditions of the Environmental Authorisation and the EMPr are audited, and that the audit reports are submitted to the Director: Compliance Monitoring of the DFFE.

An environmental internal audit must be conducted and submitted every 3 months and an external audit must be conducted once a year. An annual audit report must be compiled and submitted to DFFE until the completion of the construction and rehabilitation. This report must be compiled in accordance with Appendix 7 of the EIA Regulations, 2014, as amended, and indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the environmental authorisation conditions and the requirements of the EMPr.

### **6.5.4. Final Audit Report**

A final environmental audit report must be compiled by an independent auditor and be submitted to DFFE upon completion of the construction and rehabilitation activities. The report must be submitted within 30 days of completion of rehabilitation activities. This report must indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the environmental authorisation conditions and the requirements of the EMPr.

## CHAPTER 7: OPERATION MANAGEMENT PROGRAMME

**Overall Goal:** To ensure that the use of the access road does not have unforeseen impacts on the environment and to ensure that all impacts are monitored and the necessary corrective action taken in all cases. In order to address this goal, it is necessary to operate the access road in a way that:

- » Ensures that operation activities are properly managed in respect of environmental aspects and impacts.
- » Enables the operation activities to be undertaken without significant disruption to other land uses in the area, in particular with regard to farming practices, traffic and road use, and effects on local residents.

### OBJECTIVE 2: Limit the ecological footprint of the Access Road

Indirect impacts on vegetation and terrestrial fauna during operation could result from maintenance activities and the movement of people and vehicles on site. In order to ensure the long-term environmental integrity of the site following construction, maintenance of the areas rehabilitated post-construction must be undertaken until these areas have successfully re-established.

<b>Project Component/s</b>	<ul style="list-style-type: none"> <li>» Access road.</li> <li>» Rehabilitated areas.</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Disturbance to or loss of vegetation and/or habitat in surrounding areas.</li> <li>» Environmental integrity of the site undermined resulting in reduced visual aesthetics, erosion, compromised land capability and the requirement for on-going management intervention.</li> </ul>
<b>Activities/Risk Sources</b>	<ul style="list-style-type: none"> <li>» Human presence</li> <li>» Movement of vehicles to and from the site.</li> <li>» Presence of the thermal plant infrastructure and site fencing.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» Maintain minimised footprints of disturbance of vegetation/habitats on-site.</li> <li>» Ensure and encourage plant regrowth in non-operational areas of post-construction rehabilitation.</li> </ul>

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Rehabilitate disturbed areas should the previous attempt be unsuccessful.	Operations Manager	Operation
Access to adjacent areas to be strictly controlled.	Developer	Operation
Maintain and augment natural vegetation around the proposed project.	Developer	Operation
Vegetation control should be by manual clearing and herbicides should not be used except to control alien plants in the prescribed manner.	Developer	Operation
The use of herbicides and pesticides and other related horticultural chemicals should be carefully controlled and only applied by personnel adequately certified to apply pesticides and herbicides. It must be ensured that WHO Recommended	Developer	Operation

Mitigation: Action/Control	Responsibility	Timeframe
Classification of Pesticides by Hazard Class 1a (extremely hazardous) or 1b (highly hazardous) are not purchased, stored or used on site along with any other nationally or internationally similarly restricted/banned products.		
Soil surfaces where no revegetation seems possible will have to be covered with gravel or small rock fragments to increase porosity of the soil surface, slow down runoff and prevent wind and water erosion.	Developer	Operation
Any vegetation clearing that needs to take place as part of the maintenance activities must be done in an environmentally friendly manner, including avoiding the use of herbicides and using manual clearing methods wherever possible.	Developer	Operation
Vehicle movements must be restricted to the designated access road.	Developer	Operation
No harvesting of plants for firewood, medicinal or any other purposes are to be permitted	Developer	Operation
No killing and poaching of any wild animal to be allowed. This should be clearly communicated to all employees, including subcontractors.	Developer	Operation
Any potentially dangerous fauna such as snakes or fauna threatened by the maintenance and operational activities must be removed to a safe location.	Developer	Operation
An on-going alien plant monitoring and eradication programme must be implemented, where necessary.	Developer	Operation
Regular monitoring of SCC present and observation regarding their extent and abundance.		
Appropriate management plans to (if possible) relocated or avoid disturbing SCC species, especially those which are sensitive to disturbance.		
Ongoing monitoring of relocated SCC must take place until it is assured they will thrive.		
Annual site inspection for erosion or water flow regulation problems – with follow up remedial action where problems are identified.	Developer	Operation

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Limited soil erosion around site.</li> <li>» No further disturbance to vegetation or terrestrial faunal habitats.</li> <li>» Continued improvement of rehabilitation efforts.</li> <li>» Removal to safety of entrapped/injured avifauna encountered during routine maintenance.</li> <li>» Low impact on nocturnal and crepuscular species along roads</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Observation of vegetation on-site by environmental manager.</li> <li>» Regular inspections to monitor plant regrowth/performance of rehabilitation efforts and weed infestation compared to natural/undisturbed areas.</li> </ul>

**OBJECTIVE 3: Minimise the establishment and spread of alien invasive plants**

Major factors contributing to invasion by alien invader plants include high disturbance activities and negative grazing practices. Consequences of this may include:

- » Loss of indigenous vegetation;
- » Change in vegetation structure leading to change in various habitat characteristics;
- » Change in plant species composition;
- » Change in soil chemical properties;
- » Loss of sensitive habitats;
- » Loss or disturbance to individuals of rare, endangered, endemic, and/or protected species;
- » Fragmentation of sensitive habitats;
- » Change in flammability of vegetation, depending on alien species; and
- » Hydrological impacts due to increased transpiration and runoff.

<b>Project Component/s</b>	» Access road
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Invasion of natural vegetation surrounding the site by declared weeds or invasive alien species.</li> <li>» Impacts on soil.</li> <li>» Impact on faunal habitats.</li> <li>» Degradation and loss of agricultural potential.</li> </ul>
<b>Activities/Risk Sources</b>	» Use of access roads.
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To significantly reduce the presence of weeds and eradicate alien invasive species.</li> <li>» To avoid the introduction of additional alien invasive plants to the site.</li> <li>» To avoid distribution and thickening of existing alien plants in the site.</li> <li>» To complement existing alien plant eradication programs in gradually causing a significant reduction of alien plant species throughout the site.</li> </ul>

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Develop and implement an Alien Invasive Control and Eradication Programme.	Developer	Operation
Avoid creating conditions in which alien plants may become established: <ul style="list-style-type: none"> <li>» Keep disturbance of indigenous vegetation to a minimum.</li> <li>» Rehabilitate disturbed areas as quickly as possible.</li> <li>» Do not import soil from areas with alien plants.</li> </ul>	Developer	Operation
Annual monitoring for alien plant species - with follow up clearing as needed – or as per the frequency stated in the alien invasive management plan to be developed for the site. When alien plants are detected, these must be controlled and cleared using the recommended control measures for each species to ensure that the problem is not exacerbated or does not re-occur.	EO and Plant Manager	Operation
Eradicate all weeds and alien invasive plants as far as practically possible and ensure that material from invasive plants are adequately destroyed and not further distributed.	EO and Plant Manager	Operation
Any alien and invasive vegetation removed should be taken to a registered landfill site to prevent the proliferation of alien and invasive species	EO and Plant Manager	Operation

Mitigation: Action/Control	Responsibility	Timeframe
The use of herbicides and pesticides and other related horticultural chemicals should be carefully controlled and only applied by personnel adequately certified to apply pesticides and herbicides. It must be ensured that WHO Recommended Classification of Pesticides by Hazard Class 1a (extremely hazardous) or 1b (highly hazardous) are not purchased, stored or used on site along with any other nationally or internationally similarly restricted/banned products.	EO and Plant Manager	Operation

<b>Performance Indicator</b>	» Low abundance of alien plants. For each alien species: number of plants and aerial cover of plants within the site and immediate surroundings.
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» On-going monitoring of area by EO during construction.</li> <li>» Annual audit of development footprint and immediate surroundings by qualified botanist.</li> <li>» If any alien invasive species are detected then the distribution of these should be mapped (GPS co-ordinates of plants or concentrations of plants), number of individuals (whole site or per unit area), age and/or size classes of plants and aerial cover of plants.</li> <li>» The results should be interpreted in terms of the risk posed to sensitive habitats within and surrounding the site.</li> <li>» The environmental manager/site agent should be responsible for driving this process.</li> <li>» Reporting frequency depends on legal compliance framework.</li> </ul>

#### OBJECTIVE 4: Minimise dust

Windy conditions and the movement of vehicles on site may lead to dust creation from the access road.

<b>Project Component/s</b>	<ul style="list-style-type: none"> <li>» Access road.</li> <li>» On-site vehicle movement.</li> </ul>
<b>Potential Impact</b>	» Dust and particulates from vehicle movement to and on-site.
<b>Activities/Risk Sources</b>	» Wind erosion from unsealed roads and surfaces.
<b>Mitigation: Target/Objective</b>	» Ensure compliance with acceptable dust fall standards along access route

Mitigation: Action/Control	Responsibility	Timeframe
Implement appropriate dust suppression measures on a regular basis in any exposed surfaces.	Developer	Operation
Re-vegetation of cleared areas as soon as practically feasible.	Developer	Operation
Speed of vehicles must be restricted on site to 40km/hr.	Developer	Operation
Vehicles and equipment must be maintained in a road-worthy condition at all times.	Developer	Operation
Establish a complaints register and/or incident reporting system where personnel, communities and adjacent landowners can lodge complaints regarding construction activities. Ideal location would be security post at point of site access.	EO and Plant Manager	Prior to commissioning

<b>Performance Indicator</b>	<ul style="list-style-type: none"><li>» No complaints from affected residents or community regarding dust.</li><li>» Dust suppression measures implemented where required.</li></ul>
<b>Monitoring</b>	<ul style="list-style-type: none"><li>» Immediate reporting by personnel of any potential or actual issues with nuisance or dust to the Power Station Manager..</li><li>» An incident reporting system must be used to record non-conformances to the EMPr.</li></ul>

## CHAPTER 8: MANAGEMENT PROGRAMME: DECOMMISSIONING

**Overall Goal:** To ensure that the decommissioning of the access road does not have unforeseen impacts on the environment and to ensure that all impacts are monitored and the necessary corrective action is taken at all cost.

### 8.2.3. Soil rehabilitation

The steps that should be taken during the rehabilitation of soils are as follows:

- » The topsoil used in the rehabilitation phase should not be contaminated;
- » The deposited soils must be ripped to ensure reduced compaction;
- » An acceptable seed bed should be produced by surface tillage;
- » Restore soil fertility;
- » Incorporate the immobile fertilisers in to the plant rooting zone before ripping; and
- » Apply maintenance dressing of fertilisers on an annual basis until the soil fertility cycle has been restored.

### 9.2.4. Establishment of vegetation

The objective is to restore the project site to a self-sustaining cycle, i.e. to realise the re-establishment of the natural nutrient cycle with ecological succession initiated.

The objectives for the re-vegetation of reshaped and top-soiled land are to:

- » Prevent erosion;
- » Restore the land to the agreed land capability;
- » Re-establish eco-system processes to ensure that a sustainable land use can be established without requiring fertilizer additions; and
- » Restore the biodiversity of the area as far as possible



**APPENDIX A**  
**LAYOUT AND SENSITIVITY MAPS**

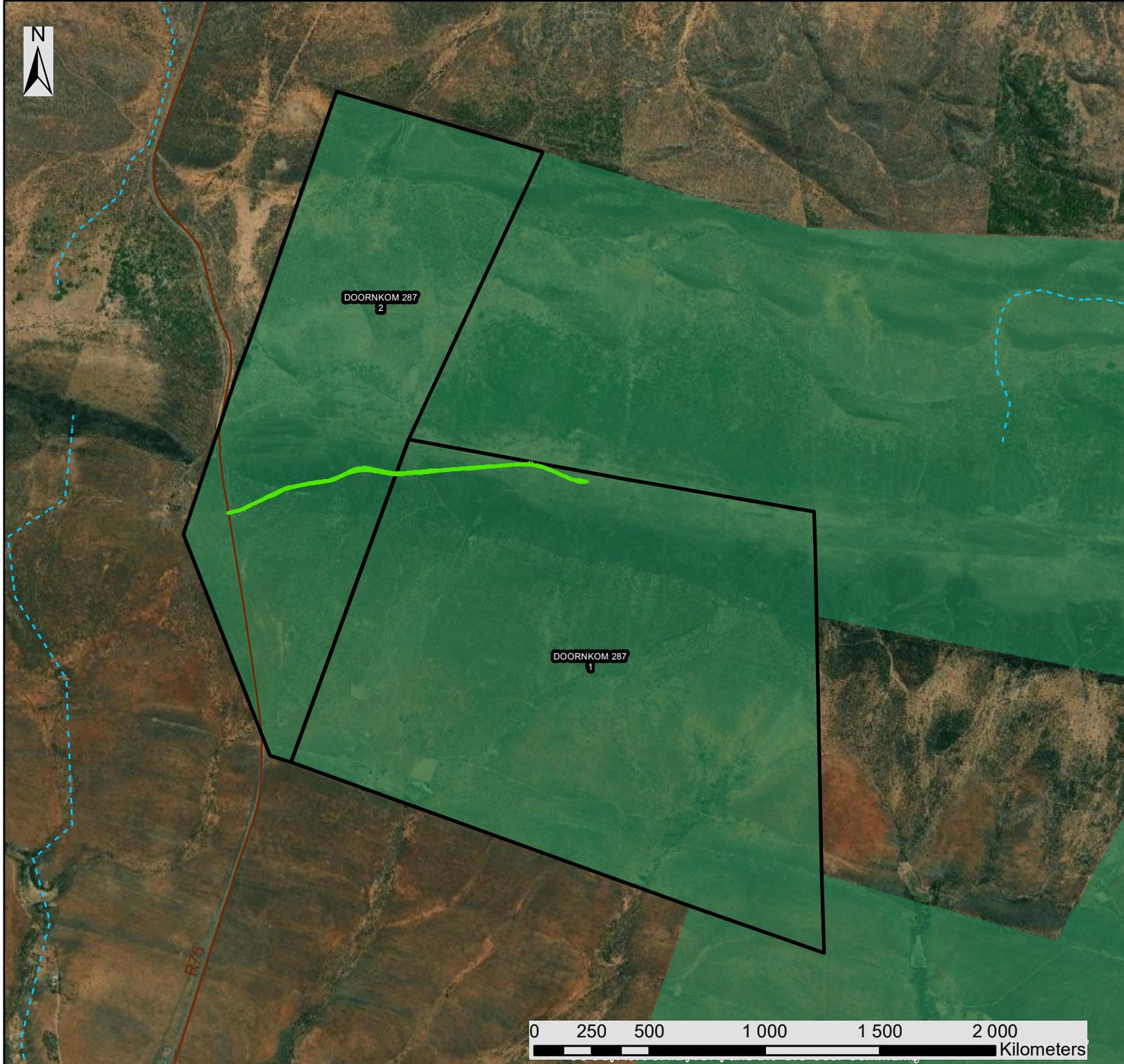


# Wolf Wind Farm Proposed Main Access Road Eastern Cape

Layout Map

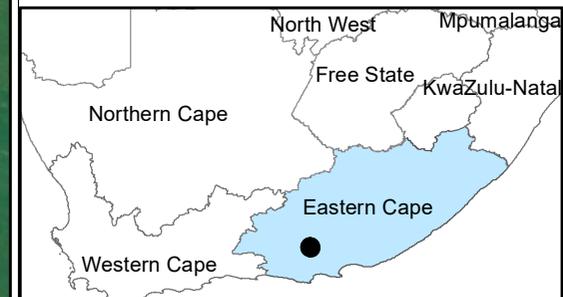
## Legend

-  Regional Road
-  Non Perennial River
-  Proposed Access Road
-  Project Site
- Renewable Energy Facility**
  -  Proposed Wolf Wind Energy Facility  
Near Wolwefontein Eastern Cape



Scale: 1:50 000  
Projection: GCS\_WGS\_1984  
Map Ref: Layout Map

savannah  
environmental





# Wolf Wind Farm Proposed Main Access Road Eastern Cape

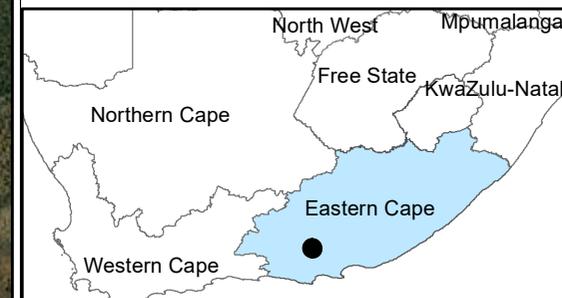
Sensitivity Map

## Legend

- Proposed Access Road
- Regional Road
- Internal Roads
- Project Site
- Freshwater Ecological Sensitivity**
  - Affected Area
  - 32m Zone of Regulation (NEMA)
  - 100m Zone of Regulation (GN509)
  - Episodic Drainage Line
  - Artificial Impoundment
- Biodiversity Sensitivity**
  - Eastern Gwarrieveld
  - Escarpment Quartzite Fynbos
  - Ridge Top Fynbos
- Land Capability Sensitivity**
  - Low
  - Medium

Scale: 1:20 000  
Projection: GCS\_WGS\_1984  
Map Ref: Sensitivity Map

savannah  
environmental



SALT PANS NECK 287  
2

SALT PANS NECK 287  
1

R715



**APPENDIX B**  
**CURRICULUM VITAE OF PROJECT TEAM**

## CURRICULUM VITAE OF JO-ANNE THOMAS

<b>Profession:</b>	Environmental Management and Compliance Consultant; Environmental Assessment Practitioner
<b>Specialisation:</b>	Environmental Management; Strategic environmental advice; Environmental compliance advice & monitoring; Environmental Impact Assessments; Policy, strategy & guideline formulation; Project Management; General Ecology
<b>Work experience:</b>	Twenty four (24) years in the environmental field

### VOCATIONAL EXPERIENCE

Provide technical input for projects in the environmental management field, specialising in Strategic Environmental Advice, Environmental Impact Assessment studies, environmental auditing and monitoring, environmental permitting, public participation, Environmental Management Plans and Programmes, environmental policy, strategy and guideline formulation, and integrated environmental management. Key focus on integration of the specialist environmental studies and findings into larger engineering-based projects, strategic assessment, and providing practical and achievable environmental management solutions and mitigation measures. Responsibilities for environmental studies include project management (including client and authority liaison and management of specialist teams); review and manipulation of data; identification and assessment of potential negative environmental impacts and benefits; review of specialist studies; and the identification of mitigation measures. Compilation of the reports for environmental studies is in accordance with all relevant environmental legislation.

Undertaking of numerous environmental management studies has resulted in a good working knowledge of environmental legislation and policy requirements. Recent projects have been undertaken for both the public- and private-sector, including compliance advice and monitoring, electricity generation and transmission projects, various types of linear developments (such as National Road, local roads and power lines), waste management projects (landfills), mining rights and permits, policy, strategy and guideline development, as well as general environmental planning, development and management.

### SKILLS BASE AND CORE COMPETENCIES

- Project management for a range of projects
- Identification and assessment of potential negative environmental impacts and benefits through the review and manipulation of data and specialist studies
- Identification of practical and achievable mitigation and management measures and the development of appropriate management plans
- Compilation of environmental reports in accordance with relevant environmental legislative requirements
- External and peer review of environmental reports & compliance advice and monitoring
- Formulation of environmental policies, strategies and guidelines
- Strategic and regional assessments; pre-feasibility & site selection
- Public participation processes for a variety of projects
- Strategic environmental advice to a wide variety of clients both in the public and private sectors
- Working knowledge of environmental planning processes, policies, regulatory frameworks and legislation

## EDUCATION AND PROFESSIONAL STATUS

### Degrees:

- B.Sc Earth Sciences, University of the Witwatersrand, Johannesburg (1993)
- B.Sc Honours in Botany, University of the Witwatersrand, Johannesburg (1994)
- M.Sc in Botany, University of the Witwatersrand, Johannesburg (1996)

### Short Courses:

- Environmental Impact Assessment, Potchefstroom University (1998)
- Environmental Law, Morgan University (2001)
- Environmental Legislation, IMBEWU (2017)
- Mining Legislation, Cameron Cross & Associates (2013)
- Environmental and Social Risk Management (ESRM), International Finance Corporation (2018)

### Professional Society Affiliations:

- Registered EAP with the Environmental Assessment Practitioners Association of South Africa (EAPASA) (2019/726)
- Registered with the South African Council for Natural Scientific Professions as a Professional Natural Scientist: Environmental Scientist (400024/00)
- Registered with the International Association for Impact Assessment South Africa (IAIASa): 5601
- Member of the South African Wind Energy Association (SAWEA)

## EMPLOYMENT

Date	Company	Roles and Responsibilities
January 2006 - Current:	Savannah Environmental (Pty) Ltd	Director Project manager Independent specialist environmental consultant, Environmental Assessment Practitioner (EAP) and advisor.
1997 – 2005:	Bohlweki Environmental (Pty) Ltd	Senior Environmental Scientist at. Environmental Management and Project Management
January – July 1997:	Sutherland High School, Pretoria	Junior Science Teacher

## PROJECT EXPERIENCE

Project experience includes large infrastructure projects, including electricity generation and transmission, wastewater treatment facilities, mining and prospecting activities, property development, and national roads, as well as strategy and guidelines development.

## RENEWABLE POWER GENERATION PROJECTS: PHOTOVOLTAIC SOLAR ENERGY FACILITIES

### Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Christiana PV 2 SEF, North West	Solar Reserve South Africa	Project Manager & EAP
De Aar PV facility, Northern Cape	iNca Energy	Project Manager & EAP
Everest SEF near Hennenman, Free State	FRV Energy South Africa	Project Manager & EAP
Graafwater PV SEF, Western Cape	iNca Energy	Project Manager & EAP
Grootkop SEF near Allanridge, Free State	FRV Energy South Africa	Project Manager & EAP
Hertzogville PV 2 SEF with 2 phases, Free State	SunCorp / Solar Reserve	Project Manager & EAP

Project Name & Location	Client Name	Role
Karoshhoek CPV facility on site 2 as part of the larger Karoshhoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP
Kgabalatsane SEF North-East for Brits, North West	Built Environment African Energy Services	Project Manager & EAP
Kleinbegin PV SEF West of Groblershoop, Northern Cape	MedEnergy Global	Project Manager & EAP
Lethabo Power Station PV Installation, Free State	Eskom Holdings SoC Limited	Project Manager & EAP
Majuba Power Station PV Installation, Mpumalanga	Eskom Holdings SoC Limited	Project Manager & EAP
Merapi PV SEF Phase 1 – 4 South-East of Excelsior, Free State	SolaireDirect Southern Africa	Project Manager & EAP
Sannaspos Solar Park, Free State	SolaireDirect Southern Africa	Project Manager & EAP
Ofir-Zx PV Plant near Keimoes, Northern Cape	S28 Degrees Energy	Project Manager & EAP
Oryx SEF near Virginia, Free State	FRV Energy South Africa	Project Manager & EAP
Project Blue SEF North of Kleinsee, Northern Cape	WWK Development	Project Manager & EAP
S-Kol PV Plant near Keimoes, Northern Cape	S28 Degrees Energy	Project Manager & EAP
Sonnenberg PV Plant near Keimoes, Northern Cape	S28 Degrees Energy	Project Manager & EAP
Tutuka Power Station PV Installation, Mpumalanga	Eskom Transmission	Project Manager & EAP
Two PV sites within the Northern Cape	MedEnergy Global	Project Manager & EAP
Two PV sites within the Western & Northern Cape	iNca Energy	Project Manager & EAP
Upington PV SEF, Northern Cape	MedEnergy Global	Project Manager & EAP
Vredendal PV facility, Western Cape	iNca Energy	Project Manager & EAP
Waterberg PV plant, Limpopo	Thupela Energy	Project Manager & EAP
Watershed Phase I & II SEF near Litchtenburg, North West	FRV Energy South Africa	Project Manager & EAP
Alldays PV & CPV SEF Phase 1, Limpopo	BioTherm Energy	Project Manager & EAP
Hyperion PV Solar Development 1, 2, 3, 4, 5 & 6, Northern Cape	Building Energy	Project Manager & EAP
Vrede & Rondavel PV, Free State	Mainstream Renewable Energy Developments	Project Manager & EAP

#### Basic Assessments

Project Name & Location	Client Name	Role
Aberdeen PV SEF, Eastern Cape	BioTherm Energy	Project Manager & EAP
Christiana PV 1 SEF on Hartebeestpan Farm, North-West	Solar Reserve South Africa	Project Manager & EAP
Heuningspruit PV1 & PV 2 facilities near Koppies, Free State	Sun Mechanics	Project Manager & EAP
Kakamas PV Facility, Northern Cape	iNca Energy	Project Manager & EAP
Kakamas II PV Facility, Northern Cape	iNca Energy	Project Manager & EAP
Machadodorp 1 PV SEF, Mpumalanga	Solar To Benefit Africa	Project Manager & EAP
PV site within the Northern Cape	iNca Energy	Project Manager & EAP
PV sites within 4 ACSA airports within South Africa, National	Airports Company South Africa (ACSA)	Project Manager & EAP
RustMo1 PV Plant near Buffelspoort, North West	Momentous Energy	Project Manager & EAP
RustMo2 PV Plant near Buffelspoort, North West	Momentous Energy	Project Manager & EAP
RustMo3 PV Plant near Buffelspoort, North West	Momentous Energy	Project Manager & EAP
RustMo4 PV Plant near Buffelspoort, North West	Momentous Energy	Project Manager & EAP

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Sannaspos PV SEF Phase 2 near Bloemfontein, Free State	SolaireDirect Southern Africa	Project Manager & EAP
Solar Park Expansion within the Rooiwal Power Station, Gauteng	AFRKO Energy	Project Manager & EAP
Steynsrus SEF, Free State	SunCorp	Project Manager & EAP
Sirius Solar PV Project Three and Sirius Solar PV Project Four (BA in terms of REDZ regulations), Northern Cape	SOLA Future Energy	Project Manager & EAP
Northam PV, Limpopo Province	Northam Platinum	Project Manager & EAP
Kolkies PV Suite (x 6 projects) and Sadawa PV Suite (x 4 projects), Western Cape	Mainstream Renewable Energy Developments	Project Manager & EAP

### Screening Studies

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Allemans Fontein SEF near Noupoot, Northern Cape	Fusion Energy	Project Manager & EAP
Amandel SEF near Thabazimbi, Limpopo	iNca Energy	Project Manager & EAP
Arola/Doomplaat SEF near Ventersdorp, North West	FRV & iNca Energy	Project Manager & EAP
Bloemfontein Airport PV Installation, Free State	The Power Company	Project Manager & EAP
Brakspuit SEF near Klerksorp, North West	FRV & iNca Energy	Project Manager & EAP
Carolus Poort SEF near Noupoot, Northern Cape	Fusion Energy	Project Manager & EAP
Damfontein SEF near Noupoot, Northern Cape	Fusion Energy	Project Manager & EAP
Everest SEF near Welkom, Free State	FRV & iNca Energy	Project Manager & EAP
Gillmer SEF near Noupoot, Northern Cape	Fusion Energy	Project Manager & EAP
Grootkop SEF near Allansridge, Free State	FRV & iNca Energy	Project Manager & EAP
Heuningspruit PV1 & PV 2 near Koppies, Free State	Cronimat	Project Manager & EAP
Kimberley Airport PV Installation, Northern Cape	The Power Company	Project Manager & EAP
Kolonnade Mall Rooftop PV Installation in Tshwane, Gauteng	Momentous Energy	Project Manager & EAP
Loskop SEF near Groblersdal, Limpopo	S&P Power Unit	Project Manager & EAP
Marble SEF near Marble Hall, Limpopo	S&P Power Unit	Project Manager & EAP
Morgenson PV1 SEF South-West of Windsorton, Northern Cape	Solar Reserve South Africa	Project Manager & EAP
OR Tambo Airport PV Installation, Gauteng	The Power Company	Project Manager & EAP
Oryx SEF near Virginia, Free State	FRV & iNca Energy	Project Manager & EAP
Rhino SEF near Vaalwater, Limpopo	S&P Power Unit	Project Manager & EAP
Rustmo2 PV Plant near Buffelspoort, North West	Momentous Energy	Project Manager & EAP
Spitskop SEF near Northam, Limpopo	FRV & iNca Energy	Project Manager & EAP
Steynsrus PV, Free State	Suncorp	Project Manager & EAP
Tabor SEF near Polokwane, Limpopo	FRV & iNca Energy	Project Manager & EAP
Upington Airport PV Installation, Northern Cape	The Power Company	Project Manager & EAP
Valeria SEF near Hartebeestpoort Dam, North West	Solar to Benefit Africa	Project Manager & EAP
Watershed SEF near Lichtenburg, North West	FRV & iNca Energy	Project Manager & EAP
Witkop SEF near Polokwane, Limpopo	FRV & iNca Energy	Project Manager & EAP
Woodmead Retail Park Rooftop PV Installation, Gauteng	Momentous Energy	Project Manager & EAP

### Environmental Compliance, Auditing and ECO

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
ECO and bi-monthly auditing for the construction of the Adams Solar PV Project Two South of Hotazel,	Enel Green Power	Project Manager

Project Name & Location	Client Name	Role
Northern Cape		
ECO for the construction of the Kathu PV Facility, Northern Cape	REISA	Project Manager
ECO and bi-monthly auditing for the construction of the Pulida PV Facility, Free State	Enel Green Power	Project Manager
ECO for the construction of the RustMo1 SEF, North West	Momentous Energy	Project Manager
ECO for the construction of the Sishen SEF, Northern Cape	Windfall 59 Properties	Project Manager
ECO for the construction of the Upington Airport PV Facility, Northern Cape	Sublanary Trading	Project Manager
Quarterly compliance monitoring of compliance with all environmental licenses for the operation activities at the Kathu PV facility, Northern Cape	REISA	Project Manager
ECO for the construction of the Konkoonsies II PV SEF and associated infrastructure, Northern Cape	BioTherm Energy	Project Manager
ECO for the construction of the Aggeneys PV SEF and associated infrastructure, Northern Cape	BioTherm Energy	Project Manager

#### Compliance Advice and ESAP Reporting

Project Name & Location	Client Name	Role
Aggeneys Solar Farm, Northern Cape	BioTherm Energy	Environmental Advisor
Airies II PV Facility SW of Kenhardt, Northern Cape	BioTherm Energy	Environmental Advisor
Kalahari SEF Phase II in Kathu, Northern Cape	Engle	Environmental Advisor
Kathu PV Facility, Northern Cape	Building Energy	Environmental Advisor
Kenhardt PV Facility, Northern Cape	BioTherm Energy	Environmental Advisor
Kleinbegin PV SEF West of Groblershoop, Northern Cape	MedEnergy	Environmental Advisor
Konkoonises II SEF near Pofadder, Northern Cape	BioTherm Energy	Environmental Advisor
Konkoonsies Solar Farm, Northern Cape	BioTherm Energy	Environmental Advisor
Lephalale SEF, Limpopo	Exxaro	Environmental Advisor
Pixley ka Seme PV Park, South-East of De Aar, Northern Cape	African Clean Energy Developments (ACED)	Environmental Advisor
RustMo1 PV Plant near Buffelspoort, North West	Momentous Energy	Environmental Advisor
Scuitdrift 1 SEF & Scuitdrift 2 SEF, Limpopo	Building Energy	Environmental Advisor
Sirius PV Plants, Northern Cape	Aurora Power Solutions	Environmental Advisor
Upington Airport PV Power Project, Northern Cape	Sublanary Trading	Environmental Advisor
Upington SEF, Northern Cape	Abengoa Solar	Environmental Advisor
Ofir-ZX PV SEF near Keimoes, Northern Cape	Network S28 Energy	Environmental Advisor
Environmental Permitting for the Steynsrus PV1 & PV2 SEF's, Northern Cape	Cronimet Power Solutions	Environmental Advisor
Environmental Permitting for the Heuningspruit PV SEF, Northern Cape	Cronimet Power Solutions	Environmental Advisor

#### Due Diligence Reporting

Project Name & Location	Client Name	Role
5 PV SEF projects in Lephalale, Limpopo	iNca Energy	Environmental Advisor
Prieska PV Plant, Northern Cape	SunEdison Energy India	Environmental Advisor
Sirius Phase One PV Facility near Upington, Northern Cape	Aurora Power Solutions	Environmental Advisor

**Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Biodiversity Permit & WULA for the Aggeneys SEF near Aggeneys, Northern Cape	BioTherm Energy	Project Manager & EAP
Biodiversity Permit for the Konkoonises II SEF near Pofadder, Northern Cape	BioTherm Energy	Project Manager & EAP
Biodiversity Permitting for the Lephallale SEF, Limpopo	Exxaro Resources	Project Manager & EAP
Environmental Permitting for the Kleinbegin PV SEF West of Groblershoop, Northern Cape	MedEnergy	Project Manager & EAP
Environmental Permitting for the Upington SEF, Northern Cape	Abengoa Solar	Project Manager & EAP
Environmental Permitting for the Kathu PV Facility, Northern Cape	Building Energy	Project Manager & EAP
Environmental Permitting for the Konkoonsies Solar Farm, Northern Cape	BioTherm Energy	Project Manager & EAP
Environmental Permitting for the Lephallale SEF, Limpopo	Exxaro Resources	Project Manager & EAP
Environmental Permitting for the Scuitdrift 1 SEF & Scuitdrift 2 SEF, Limpopo	Building Energy	Project Manager & EAP
Environmental Permitting for the Sirius PV Plant, Northern Cape	Aurora Power Solutions	Project Manager & EAP
Environmental Permitting for the Steynsrus PV1 & PV2 SEF's, Northern Cape	Cronimet Power Solutions	Project Manager & EAP
Environmental Permitting for the Heuningspruit PV SEF, Northern Cape	Cronimet Power Solutions	Project Manager & EAP
Permits for the Kleinbegin and UAP PV Plants, Northern Cape	MedEnergy Global	Project Manager & EAP
S53 Application for Arriesfontein Solar Park Phase 1 – 3 near Danielskuil, Northern Cape	Solar Reserve / SunCorp	Project Manager & EAP
S53 Application for Hertzogville PV1 & PV 2 SEFs, Free State	Solar Reserve / SunCorp	Project Manager & EAP
S53 Application for the Bloemfontein Airport PV Facility, Free State	Sublunary Trading	Project Manager & EAP
S53 Application for the Kimberley Airport PV Facility, Northern Cape	Sublunary Trading	Project Manager & EAP
S53 Application for the Project Blue SEF, Northern Cape	WWK Developments	Project Manager & EAP
S53 Application for the Upington Airport PV Facility, Free State	Sublunary Trading	Project Manager & EAP
WULA for the Kalahari SEF Phase II in Kathu, Northern Cape	Engie	Project Manager & EAP

**RENEWABLE POWER GENERATION PROJECTS: CONCENTRATED SOLAR FACILITIES (CSP)**

**Environmental Impact Assessments and Environmental Management Programmes**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Ilanga CSP 2, 3, 4, 5, 7 & 9 Facilities near Upington, Northern Cape	Emvelo Holdings	Project Manager & EAP
Ilanga CSP near Upington, Northern Cape	Ilangethu Energy	Project Manager & EAP

Project Name & Location	Client Name	Role
Ilanga Tower 1 Facility near Upington, Northern Cape	Emvelo Holdings	Project Manager & EAP
Karoshhoek CPVPD 1-4 facilities on site 2 as part of the larger Karoshhoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP
Karoshhoek CSP facilities on sites 1.4; 4 & 5 as part of the larger Karoshhoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP
Karoshhoek Linear Fresnel 1 Facility on site 1.1 as part of the larger Karoshhoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP

#### Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO for the construction of the !Khi CSP Facility, Northern Cape	Abengoa Solar	Project Manager
ECO for the construction of the Ilanga CSP 1 Facility near Upington, Northern Cape	Karoshhoek Solar One	Project Manager
ECO for the construction of the folar Park, Northern Cape	Kathu Solar	Project Manager
ECO for the construction of the KaXu! CSP Facility, Northern Cape	Abengoa Solar	Project Manager
Internal audit of compliance with the conditions of the IWUL issued to the Karoshhoek Solar One CSP Facility, Northern Cape	Karoshhoek Solar One	Project Manager

#### Screening Studies

Project Name & Location	Client Name	Role
Upington CSP (Tower) Plant near Kanoneiland, Northern Cape	iNca Energy and FRV	Project Manager & EAP

#### Compliance Advice and ESAP reporting

Project Name & Location	Client Name	Role
Ilanga CSP Facility near Upington, Northern Cape	Ilangethu Energy	Environmental Advisor
Ilangalethu CSP 2, Northern Cape	FG Emvelo	Environmental Advisor
Kathu CSP Facility, Northern Cape	GDF Suez	Environmental Advisor
Lephalale SEF, Limpopo	Cennergi	Environmental Advisor
Solis I CSP Facility, Northern Cape	Brightsource	Environmental Advisor

#### Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Environmental Permitting for the Ilanga CSP Facility near Upington, Northern Cape	Ilangethu Energy	Project Manager & EAP
Environmental Permitting for the Kathu CSP, Northern Cape	GDF Suez	Project Manager & EAP
WULA for the Solis I CSP Facility, Northern Cape	Brightsource	Project Manager & EAP

## **RENEWABLE POWER GENERATION PROJECTS: WIND ENERGY FACILITIES**

### **Environmental Impact Assessments and Environmental Management Programmes**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Sere WEF, Western Cape	Eskom Holdings SoC Limited	EAP
Aberdeen WEF, Eastern Cape	Eskom Holdings SoC Limited	Project Manager & EAP
Amakhala Emoyeni WEF, Eastern Cape	Windlab Developments	Project Manager & EAP
EXXARO West Coast WEF, Western Cape	EXXARO Resources	Project Manager & EAP
Goereesoe Wind Farm near Swellendam, Western Cape	iNca Energy	Project Manager & EAP
Hartneest WEF, Western Cape	Juwi Renewable Energies	Project Manager & EAP
Hopefield WEF, Western Cape	Umoya Energy	EAP
Kleinsee WEF, Northern Cape	Eskom Holdings SoC Limited	Project Manager & EAP
Klipheuwel/Dassiesfontein WEF within the Overberg area, Western Cape	BioTherm Energy	Project Manager & EAP
Moorreesburg WEF, Western Cape	iNca Energy	Project Manager & EAP
Oyster Bay WEF, Eastern Cape	Renewable Energy Resources Southern Africa	Project Manager & EAP
Project Blue WEF, Northern Cape	Windy World	Project Manager & EAP
Rhebokfontein WEF, Western Cape	Moyeng Energy	Project Manager & EAP
Spitskop East WEF near Riebeeck East, Eastern Cape	Renewable Energy Resources Southern Africa	Project Manager & EAP
Suurplaat WEF, Western Cape	Moyeng Energy	Project Manager & EAP
Swellendam WEF, Western Cape	IE Swellendam	Project Manager & EAP
Tsitsikamma WEF, Eastern Cape	Exxarro	Project Manager & EAP
West Coast One WEF, Western Cape	Moyeng Energy	Project Manager & EAP

### **Basic Assessments**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Amakhala Emoyeni Wind Monitoring Masts, Eastern Cape	Windlab Developments	Project Manager & EAP
Beaufort West Wind Monitoring Masts, Western Cape	Umoya Energy	Project Manager & EAP
Hopefield Community Wind Farm near Hopefield, Western Cape	Umoya Energy	Project Manager & EAP
Koekenaap Wind Monitoring Masts, Western Cape	EXXARO Resources	Project Manager & EAP
Koingnaas WEF, Northern Cape	Just Palm Tree Power	Project Manager & EAP
Laingsburg Area Wind Monitoring Masts, Western Cape	Umoya Energy	Project Manager & EAP
Overberg Area Wind Monitoring Masts, Western Cape	BioTherm Energy	Project Manager & EAP
Oyster Bay Wind Monitoring Masts, Eastern Cape	Renewable Energy Systems Southern Africa (RES)	Project Manager & EAP
Wind Garden & Fronteer WEFs, Eastern Cape	Wind Relc	Project Manager & EAP

### **Screening Studies**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Albertinia WEF, Western Cape	BioTherm Energy	Project Manager & EAP
Koingnaas WEF, Northern Cape	Just Pal Tree Power	Project Manager & EAP
Napier Region WEF Developments, Western Cape	BioTherm Energy	Project Manager & EAP
Tsitsikamma WEF, Eastern Cape	Exxarro Resources	Project Manager & EAP

Project Name & Location	Client Name	Role
Various WEFs within an identified area in the Overberg area, Western Cape	BioTherm Energy	Project Manager & EAP
Various WEFs within an identified area on the West Coast, Western Cape	Investec Bank Limited	Project Manager & EAP
Various WEFs within an identified area on the West Coast, Western Cape	Eskom Holdings Limited	Project Manager & EAP
Various WEFs within the Western Cape	Western Cape Department of Environmental Affairs and Development Planning	Project Manager & EAP
Velddrift WEF, Western Cape	VentuSA Energy	Project Manager & EAP
Wind 1000 Project	Thabo Consulting on behalf of Eskom Holdings	Project Manager & EAP
Wittekleibosch, Snylip & Doriskraal WEFs, Eastern Cape	Exxarro Resources	Project Manager & EAP

#### Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO for the construction of the West Coast One WEF, Western Cape	Aurora Wind Power	Project Manager
ECO for the construction of the Gouda WEF, Western Cape	Blue Falcon	Project Manager
EO for the Dassiesklip Wind Energy Facility, Western Cape	Group 5	Project Manager
Quarterly compliance monitoring of compliance with all environmental licenses for the operation activities at the Gouda Wind Energy facility near Gouda, Western Cape	Blue Falcon	Project Manager
Annual auditing of compliance with all environmental licenses for the operation activities at the West Coast One Wind Energy facility near Vredenburg, Western Cape	Aurora Wind Power	Project Manager
External environmental and social audit for the Amakhala Wind Farm, Eastern Cape	Cennergi	Project Manager
External environmental and social audit for the Tsitsikamma Wind Farm, Eastern Cape	Cennergi	Project Manager
ECO for the construction of the Excelsior Wind Farm and associated infrastructure, Northern Cape	BioTherm Energy	Project Manager
External compliance audit of the Dassiesklip Wind Energy Facility, Western Cape	BioTherm Energy	Project Manager

#### Compliance Advice

Project Name & Location	Client Name	Role
Amakhala Phase 1 WEF, Eastern Cape	Cennergi	Environmental Advisor
Dassiesfontein WEF within the Overberg area, Western Cape	BioTherm Energy	Environmental Advisor
Excelsior Wind Farm, Western Cape	BioTherm Energy	Environmental Advisor
Great Karoo Wind Farm, Northern Cape	African Clean Energy Developments (ACED)	Environmental Advisor
Hopefield Community WEF, Western Cape	African Clean Energy Developments (ACED)	Environmental Advisor

Rheboksfontein WEF, Western Cape	Moyeng Energy	Environmental Advisor
Tiqua WEF, Western Cape	Cennergi	Environmental Advisor
Tsitsikamma WEF, Eastern Cape	Cennergi	Environmental Advisor
West Coast One WEF, Western Cape	Moyeng Energy	Environmental Advisor

#### **Due Diligence Reporting**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Witteberg WEF, Western Cape	EDPR Renewables	Environmental Advisor
IPD Vredenburg WEF within the Saldanha Bay area, Western Cape	IL&FS Energy Development Company	Environmental Advisor

#### **Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Biodiversity Permitting for the Power Line between the Tsitsikamma Community WEF & the Diep River Substation, Eastern Cape	Cennergi	Project Manager & EAP
Biodiversity Permitting for the West Coast One WEF, Western Cape	Aurora Wind Power	Project Manager & EAP
Environmental Permitting for the Excelsior WEF, Western Cape	BioTherm Energy	Project Manager & EAP
Plant Permits & WULA for the Tsitsikamma Community WEF, Eastern Cape	Cennergi	Project Manager & EAP
S24G and WULA for the Rectification for the commencement of unlawful activities on Ruimsig AH in Honeydew, Gauteng	Hossam Soror	Project Manager & EAP
S24G Application for the Rheboksfontein WEF, Western Cape	Ormonde - Theo Basson	Project Manager & EAP
S53 Application & WULA for Suurplaat and Gemini WEFs, Northern Cape	Engie	Project Manager & EAP
S53 Application for the Hopefield Community Wind Farm near Hopefield, Western Cape	Umoya Energy	Project Manager & EAP
S53 Application for the Project Blue WEF, Northern Cape	WWK Developments	Project Manager & EAP
S53 for the Oyster Bay WEF, Eastern Cape	RES	Project Manager & EAP
WULA for the Great Karoo Wind Farm, Northern Cape	African Clean Energy Developments (ACED)	Project Manager & EAP

#### **CONVENTIONAL POWER GENERATION PROJECTS (COAL)**

##### **Environmental Impact Assessments and Environmental Management Programmes**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Mutsho Power Station near Makhado, Limpopo	Mutsho Consortium	Project Manager & EAP
Coal-fired Power Station near Ogies, Mpumalanga	Ruukki SA	Project Manager & EAP
Thabametsi IPP Coal-fired Power Station, near Lephalale, Limpopo	Axia	Project Manager & EAP
Transalloys Coal-fired Power Station, Mpumalanga	Transalloys	Project Manager & EAP
Tshivasho IPP Coal-fired Power Station (with WML), near Lephalale, Limpopo	Cennergi	Project Manager & EAP
Umbani Coal-fired Power Station, near Kriel, Mpumalanga	ISS Global Mining	Project Manager & EAP

Project Name & Location	Client Name	Role
Waterberg IPP Coal-Fired Power Station near Lephallale, Limpopo	Exxaro Resources	Project Manager & EAP

#### Basic Assessments

Project Name & Location	Client Name	Role
Coal Stockyard on Medupi Ash Dump Site, Limpopo	Eskom Holdings	Project Manager & EAP
Biomass Co-Firing Demonstration Facility at Arnot Power Station East of Middleburg, Mpumlanaga	Eskom Holdings	Project Manager & EAP

#### Screening Studies

Project Name & Location	Client Name	Role
Baseload Power Station near Lephallale, Limpopo	Cennergi	Project Manager & EAP
Coal-Fired Power Plant near Delmas, Mpumalanga	Exxaro Resources	Project Manager & EAP
Makhado Power Station, Limpopo	Mutsho Consortium, Limpopo	Project Manager & EAP

#### Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO for the Camden Power Station, Mpumalanga	Eskom Holdings	Project Manager

#### Compliance Advice

Project Name & Location	Client Name	Role
Thabametsi IPP Coal-fired Power Station, near Lephallale, Limpopo	Axia	Environmental Advisor

#### Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Permit application for the Thabametsi Bulk Water Pipeline, near Lephallale, Limpopo	Axia	Project Manager & EAP
S53 & WULA for the Waterberg IPP Coal-Fired Power Station near Lephallale, Limpopo	Exxaro Resources	Project Manager & EAP
S53 Application for the Tshivasho Coal-fired Power Station near Lephallale, Limpopo	Cennergi	Project Manager & EAP

#### CONVENTIONAL POWER GENERATION PROJECTS (GAS)

##### Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Ankerlig OCGT to CCGT Conversion project & 400 kV transmission power line between Ankerlig and the Omega Substation, Western Cape	Eskom Holdings SoC Limited	Project Manager & EAP
Gourikwa OCGT to CCGT Conversion project & 400kV transmission power line between Gourikwa & Proteus Substation, Western Cape	Eskom Holdings SoC Limited	Project Manager & EAP
Richards Bay Gas to Power Combined Cycle Power Station, KwaZulu-Natal	Eskom Holdings SoC Limited	Project Manager & EAP
Richards Bay Gas to Power Plant, KwaZulu-Natal	Richards Bay Gas Power 2	Project Manager & EAP
Decommissioning & Recommissioning of 3 Gas Turbine Units at Acacia Power Station & 1 Gas Turbine Unit at Port Rex Power Station to the existing	Eskom Holdings	Project Manager & EAP

Project Name & Location	Client Name	Role
Ankerlig Power Station in Atlantis Industria, Western Cape		
320MW gas-to-power station in Richards Bay, KwaZulu-Natal	Phinda Power Projects	Project Manager & EAP

#### Screening Studies

Project Name & Location	Client Name	Role
Fatal Flaw Analysis for 3 area identified for the establishment of a 500MW CCGT Power Station	Globeleq Advisors Limited	Project Manager & EAP
Richards Bay Gas to Power Combined Cycle Power Station, KwaZulu-Natal	Eskom Holdings SoC Limited	Project Manager & EAP

#### GRID INFRASTRUCTURE PROJECTS

##### Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Aggeneis-Oranjemond Transmission Line & Substation Upgrade, Northern Cape	Eskom Transmission	Project Manager & EAP
Ankerlig-Omega Transmission Power Lines, Western Cape	Eskom Transmission	Project Manager & EAP
Karoshhoek Grid Integration project as part of the Karoshhoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP
Koeberg-Omega Transmission Power Lines,, Western Cape	Eskom Transmission	Project Manager & EAP
Koeberg-Stikland Transmission Power Lines, Western Cape	Eskom Transmission	Project Manager & EAP
Kyalami Strengthening Project, Gauteng	Eskom Transmission	Project Manager & EAP
Mokopane Integration Project, Limpopo	Eskom Transmission	Project Manager & EAP
Saldanha Bay Strengthening Project, Western Cape	Eskom Transmission	Project Manager & EAP
Steelpoort Integration Project, Limpopo	Eskom Transmission	Project Manager & EAP
Transmission Lines from the Koeberg-2 Nuclear Power Station site, Western Cape	Eskom Transmission	Project Manager & EAP
Tshwane Strengthening Project, Phase 1, Gauteng	Eskom Transmission	Project Manager & EAP
Main Transmission Substation (MTS) associated with the Choje Wind Farm cluster, Eastern Cape	Wind Relic	Project Manager & EAP

#### Basic Assessments

Project Name & Location	Client Name	Role
Dassenberg-Koeberg Power Line Deviation from the Koeberg to the Ankerlig Power Station, Western Cape	Eskom Holdings	Project Manager & EAP
Golden Valley II WEF Power Line & Substation near Cookhouse, Eastern Cape	BioTherm Energy	Project Manager & EAP
Golden Valley WEF Power Line near Cookhouse, Eastern Cape	BioTherm Energy	Project Manager & EAP
Karoshhoek Grid Integration project as part of the Karoshhoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Konkoonsies II PV SEF Power Line to the Paulputs Substation near Pofadder, Northern Cape	BioTherm Energy	Project Manager & EAP
Perdekraal West WEF Powerline to the Eskom Kappa Substation, Western Cape	BioTherm Energy	Project Manager & EAP
Rheboksfontein WEF Powerline to the Aurora Substation, Western Cape	Moyeng Energy	Project Manager & EAP
Soetwater Switching Station near Sutherland, Northern Cape	African Clean Energy Developments (ACED)	Project Manager & EAP
Solis Power I Power Line & Switchyard Station near Upington, Northern Cape	Brightsource	Project Manager & EAP
Stormwater Canal System for the Ilanga CSP near Upington, Northern Cape	Karoshhoek Solar One	Project Manager & EAP
Tsitsikamma Community WEF Powerline to the Diep River Substation, Eastern Cape	Eskom Holdings	Project Manager & EAP
Two 132kV Chickadee Lines to the new Zonnebloem Switching Station, Mpumalanga	Eskom Holdings	Project Manager & EAP
Electrical Grid Infrastructure for the Kolkies and Sadawa PV clusters, Western Cape	Mainstream Renewable Energy Developments	Project Manager & EAP
Sadawa Collector substation, Western Cape	Mainstream Renewable Energy Developments	Project Manager & EAP
Electrical Grid Infrastructure for the Vrede and Rondavel PV facilities, Free State	Mainstream Renewable Energy Developments	Project Manager & EAP

#### **Environmental Compliance, Auditing and ECO**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
ECO for the construction of the Ferrum-Mookodi Transmission Line, Northern Cape and North West	Trans-Africa Projects on behalf of Eskom	Project Manager
EO for the construction of the Gamma-Kappa Section A Transmission Line, Western Cape	Trans-Africa Projects on behalf of Eskom	Project Manager
EO for the construction of the Gamma-Kappa Section B Transmission Line, Western Cape	Trans-Africa Projects on behalf of Eskom	Project Manager
EO for the construction of the Hydra IPP Integration project, Northern Cape	Trans-Africa Projects on behalf of Eskom	Project Manager
EO for the construction of the Kappa-Sterrekus Section C Transmission Line, Western Cape	Trans-Africa Projects on behalf of Eskom	Project Manager
EO for the construction of the Namaqualand Strengthening project in Port Nolloth, Western Cape	Trans-Africa Projects on behalf of Eskom	Project Manager
ECO for the construction of the Neptune Substation Soil Erosion Mitigation Project, Eastern Cape	Eskom	Project Manager
ECO for the construction of the Ilanga-Gordonia 132kV power line, Northern Cape	Karoshhoek Solar One	Project Manager

#### **Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Environmental Permitting and WULA for the Rockdale B Substation & Loop in Power Lines,	Eskom Holdings	Project Manager & EAP
Environmental Permitting and WULA for the Steelpoort Integration project, Limpopo	Eskom Holdings	Project Manager & EAP
Environmental Permitting for Solis CSP near Upington, Northern Cape	Brightsource	Project Manager & EAP

## **MINING SECTOR PROJECTS**

### **Environmental Impact Assessments and Environmental Management Programmes**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Elitheni Coal Mine near Indwe, Eastern Cape	Elitheni Coal	Project Manager & EAP
Groot Letaba River Development Project Borrow Pits	Iiso	Project Manager & EAP
Grootegeluk Coal Mine for coal transportation infrastructure between the mine and Medupi Power Station (EMPr amendment), Limpopo	Eskom Holdings	Project Manager & EAP
Waterberg Coal Mine (EMPr amendment), Limpopo	Sesoko Resources	Project Manager & EAP
Aluminium Plant WML & AEL, Gauteng	GfE-MIR Alloys & Minerals	Project Manager & EAP

### **Basic Assessments**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Rare Earth Separation Plant in Vredendal, Western Cape	Rareco	Project Manager & EAP
Decommissioning and Demolition of Kilns 5 & 6 at the Slurry Plant, Kwa-Zulu Natal	PPC	Project Manager & EAP

### **Environmental Compliance, Auditing and ECO**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
ECO for the construction of the Duhva Mine Water Recovery Project, Mpumalanga	Eskom Holdings SoC Limited	Project Manager
External compliance audit of Palesa Coal Mine's Integrated Water Use License (IWUL), near KwaMhlanga, Mpumalanga	HCI Coal	Project Manager
External compliance audit of Palesa Coal Mine's Waste Management License (WML) and EMP, near KwaMhlanga, Mpumalanga	HCI Coal	Project Manager
External compliance audit of Mbali Coal Mine's Integrated Water Use License (IWUL), near Ogies, Mpumalanga	HCI Coal	Project Manager
Independent External Compliance Audit of Water Use License (WUL) for the Tronox Namakwa Sands (TNS) Mining Operations (Brand se Baai), Western Cape	Tronox Namakwa Sands	Project Manager
Independent External Compliance Audit of Water Use License (WUL) for the Tronox Namakwa Sands (TNS) Mineral Separation Plant (MSP), Western Cape	Tronox Namakwa Sands	Project Manager
Independent External Compliance Audit of Water Use License (WUL) for the Tronox Namakwa Sands (TNS) Smelter Operations (Saldanha), Western Cape	Tronox Namakwa Sands	Project Manager
Compliance Auditing of the Waste Management Licence for the PetroSA Landfill Site at the GTL Refinery, Western Cape	PetroSA	Project Manager

### **Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Waste Licence Application for the Rare Earth Separation Plant in Vredendal, Western Cape	Rareco	Project Manager & EAP

WULA for the Expansion of the Landfill site at Exxaro's Namakwa Sands Mineral Separation Plant, Western Cape	Exxaro Resources	Project Manager & EAP
S24G & WML for an Aluminium Plant, Gauteng	GfE-MIR Alloys & Minerals	Project Manager & EAP

### **INFRASTRUCTURE DEVELOPMENT PROJECTS (BRIDGES, PIPELINES, ROADS, WATER RESOURCES, STORAGE, ETC)**

#### **Environmental Impact Assessments and Environmental Management Programmes**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Bridge across the Ngotwane River, on the border of South Africa and Botswana	Eskom Holdings	Project Manager & EAP
Chemical Storage Tanks, Metallurgical Plant Upgrade & Backfill Plant upgrade at South Deep Gold Mine, near Westonia, Gauteng	Goldfields	Project Manager & EAP
Expansion of the existing Welgedacht Water Care Works, Gauteng	ERWAT	Project Manager & EAP
Golden Valley WEF Access Road near Cookhouse, Eastern Cape	BioTherm Energy	Project Manager & EAP
Great Fish River Wind Farm Access Roads and Watercourse Crossings near Cookhouse, Eastern Cape	African Clean Energy Developments (ACED)	Project Manager & EAP
Ilanga CSP Facility Watercourse Crossings near Upington, Northern Cape	Karoshhoek Solar one	Project Manager & EAP
Modification of the existing Hartebeestfontein Water Care Works, Gauteng	ERWAT	Project Manager & EAP
N10 Road Realignment for the Ilanga CSP Facility, East of Upington, Northern Cape	SANRAL	Project Manager & EAP
Nxuba (Bedford) Wind Farm Watercourse Crossings near Cookhouse, Eastern Cape	African Clean Energy Developments (ACED)	Project Manager & EAP
Pollution Control Dams at the Medupi Power Station Ash Dump & Coal Stockyard, Limpopo	Eskom	Project Manager & EAP
Qoboshane borrow pits (EMPr only), Eastern Cape	Emalaheni Local Municipality	Project Manager & EAP
Tsitsikamma Community WEF Watercourse Crossings, Eastern Cape	Cennergi	Project Manager & EAP
Clayville Central Steam Plant, Gauteng	Bellmall Energy	Project Manager & EAP
Msenge Emoyeni Wind Farm Watercourse Crossings and Roads, Eastern Cape	Windlab	Project Manager & EAP

#### **Basic Assessments**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Harmony Gold WWTW at Doornkop Mine, Gauteng	Harmony Doornkop Plant	Project Manager & EAP
Ofir-ZX Watercourse Crossing for the Solar PV Facility, near Keimoes, Northern Cape	Networx S28 Energy	Project Manager & EAP
Qoboshane bridge & access roads, Eastern Cape	Emalaheni Local Municipality	Project Manager & EAP
Relocation of the Assay Laboratory near Carletonville, Gauteng	Sibanye Gold	Project Manager & EAP
Richards Bay Harbour Staging Area, KwaZulu-Natal	Eskom Holdings	Project Manager & EAP
S-Kol Watercourse Crossing for the Solar PV Facility, East of Keimoes, Northern Cape	Networx S28 Energy	Project Manager & EAP
Sonnenberg Watercourse Crossing for the Solar PV Facility, West Keimoes, Northern Cape	Networx S28 Energy	Project Manager & EAP

Project Name & Location	Client Name	Role
Kruisvallei Hydroelectric Power Generation Scheme, Free State	Building Energy	Project Manager & EAP
Masetjaba Water Reservoir, Pump Station and Bulk Supply Pipeline near Nigel, Gauteng	Naidu Consulting Engineers	Project Manager & EAP
Access Road for the Dwarsug Wind Farm, Northern Cape Province	South Africa Mainsteam Renewable Power	Project Manager & EAP

#### Screening Studies

Project Name & Location	Client Name	Role
Roodepoort Open Space Optimisation Programme (OSOP) Precinct, Gauteng	TIMAC Engineering Projects	Project Manager & EAP
Vegetable Oil Plant and Associated Pipeline, Kwa-Zulu Natal	Wilmar Oils and Fats Africa	Project Manager & EAP

#### Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO and bi-monthly auditing for the construction of the Olifants River Water Resources Development Project (ORWRDP) Phase 2A: De Hoop Dam, R555 realignment and housing infrastructure	Department of Water and Sanitation	Project Manager Auditor
ECO for the Rehabilitation of the Blaaupan & Storm Water Channel, Gauteng	Airports Company of South Africa (ACSA)	Project Manager
Due Diligence reporting for the Better Fuel Pyrolysis Facility, Gauteng	Better Fuels	Project Manager
ECO for the Construction of the Water Pipeline from Kendal Power Station to Kendal Pump Station, Mpumalanga	Transnet	Project Manager
ECO for the Replacement of Low-Level Bridge, Demolition and Removal of Artificial Pong, and Reinforcement the Banks of the Crocodile River at the Construction at Walter Sisulu National Botanical Gardens, Gauteng Province	South African National Biodiversity Institute (SANBI)	Project Manager
External Compliance Audit of the Air Emission Licence (AEL) for a depot in Bloemfontein, Free State Province and in Tzaneen, Mpumalanga Province	PetroSA	Project Manager

#### Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
WULA for the Izubulo Private Nature Reserve, Limpopo	Kjell Bismeyer, Jann Bader, Laurence Saad	Project Manager & EAP
WULA for the Masodini Private Game Lode, Limpopo	Masodini Private Game Lodge	Environmental Advisor
WULA for the Ezulwini Private Nature Reserve, Limpopo	Ezulwini Investments	Project Manager & EAP
WULA for the Masodini Private Game Lode, Limpopo	Masodini Private Game Lodge	Project Manager & EAP
WULA for the N10 Realignment at the Ilanga SEF, Northern Cape	Karoshhoek Solar One	Project Manager & EAP
WULA for the Kruisvallei Hydroelectric Power Generation Scheme, Free State	Building Energy	Project Manager & EAP

Project Name & Location	Client Name	Role
S24G and WULA for the illegal construction of structures within a watercourse on EFF 24 Ruimsig Agricultural Holdings, Gauteng	Sorrer Language Services	Project Manager & EAP

## **HOUSING AND URBAN PROJECTS**

### **Basic Assessments**

Project Name & Location	Client Name	Role
Postmasburg Housing Development, Northern Cape	Transnet	Project Manager & EAP

### **Compliance Advice and reporting**

Project Name & Location	Client Name	Role
Kampi ya Thude at the Olifants West Game Reserve, Limpopo	Nick Elliot	Environmental Advisor
External Compliance Audit of WUL for the Johannesburg Country Club, Gauteng	Johannesburg Country Club	Project Manager

### **Environmental Compliance, Auditing and ECO**

Project Name & Location	Client Name	Role
Due Diligence Audit for the Due Diligence Audit Report, Gauteng	Delta BEC (on behalf of Johannesburg Development Agency (JDA))	Project Manager

## **ENVIRONMENTAL MANAGEMENT TOOLS**

Project Name & Location	Client Name	Role
Development of the 3rd Edition Environmental Implementation Plan (EIP)	Gauteng Department of Agriculture and Rural Development (GDARD)	Project Manager & EAP
Development of Provincial Guidelines on 4x4 routes, Western Cape	Western Cape Department of Environmental Affairs and Development Planning	EAP
Compilation of Construction and Operation EMP for the Braamhoek Transmission Integration Project, Kwazulu-Natal	Eskom Holdings	Project Manager & EAP
Compilation of EMP for the Wholesale Trade of Petroleum Products, Gauteng	Munaca Technologies	Project Manager & EAP
Operational Environmental Management Programme (OEMP) for Medupi Power Station, Limpopo	Eskom Holdings	Project Manager & EAP
Operational Environmental Management Programme (OEMP) for the Dube TradePort Site Wide Precinct	Dube TradePort Corporation	Project Manager & EAP
Operational Environmental Management Programme (OEMP) for the Kusile Power Station, Mpumalanga	Eskom Holdings	Project Manager & EAP
Review of Basic Assessment Process for the Wittekleibosch Wind Monitoring Mast, Eastern Cape	Exxaro Resources	Project Manager & EAP
Revision of the EMP for the Sirius Solar PV	Aurora Power Solutions	Project Manager & EAP

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
State of the Environment (SoE) for Emalahleni Local Municipality, Mpumalanga	Simo Consulting on behalf of Emalahleni Local Municipality	Project Manager & EAP
Aspects and Impacts Register for Salberg Concrete Products operations	Salberg Concrete Products	EAP
First State of Waste Report for South Africa	Golder on behalf of the Department of Environmental Affairs	Project Manager & EAP
Responsibilities Matrix and Gap Analysis for the Kruisvallei Hydroelectric Power Generation Scheme, Free State Province	Building Energy	Project Manager
Responsibilities Matrix and Gap Analysis for the Roggeveld Wind Farm, Northern & Western Cape Provinces	Building Energy	Project Manager

### **PROJECTS OUTSIDE OF SOUTH AFRICA**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Advisory Services for the Zizabona Transmission Project, Zambia, Zimbabwe, Botswana & Namibia	PHD Capital	Advisor
EIA for the Semonkong WEF, Lesotho	MOSCET	Project Manager & EAP
EMP for the Kuvaninga Energia Gas Fired Power Project, Mozambique	ADC (Pty) Ltd	Project Manager & EAP
Environmental Screening Report for the SEF near Thabana Morena, Lesotho	Building Energy	EAP
EPBs for the Kawambwa, Mansa, Mwense and Nchelenge SEFs in Luapula Province, Zambia	Building Energy	Project Manager & EAP
ESG Due Diligence for the Hilton Garden Inn Development in Windhoek, Namibia	Vatange Capital	Project Manager
Mandahill Mall Rooftop PV SEF EPB, Lusaka, Zambia	Building Energy	Project Manager & EAP
Monthly ECO for the PV Power Plant for the Mocuba Power Station	Scatec	Project Manager

## CURRICULUM VITAE OF RAQUEL PETERS

**Profession :** Junior Environmental Consultant

**Profile :**

A Bachelor of Arts (BA) (Hons) Environmental Management graduate with an immense passion for the environment, sustainability, and the transition to a low-carbon economy. Raquel has completed short courses in green investments and climate change. She possesses a high level of integrity and professionalism. Her greatest strengths include time management and dedication.

### VOCATIONAL EXPERIENCE

Raquel has a Bachelor of Arts (Hons) degree in Environmental Management (with distinction). She is currently employed as a Junior Environmental consultant at Savannah Environmental. She was chosen by the South African Wind Energy Association (SAWEA) to attend the Wind Ac Africa 2021 Conference and she has maintained a 78% average for her Honours degree. Throughout her studies she has gained experience in the following:

#### Renewable energy sector

Raquel was among 20 South African students selected to attend the Wind Ac Africa and Windaba 2021 Conference.

This conference has granted her exposure to:

- The latest renewable energy technologies currently available on the market.
- Research papers on renewable energy development zones (REDz) that were in the peer review process.
- The available market for renewable energy and the barriers that the sector experience.

#### Waste Management

Raquel has participated in waste management operations as well as recycling initiatives as part of the requirements for her Honours degree. This comprised of her heading a team to assess one of Durban's most polluted beaches and compile a report thereof. Recycling initiatives involved researching companies that are solely involved in waste management, assessing their procedures and practices, compiling a report thereof and presenting it.

Raquel has undertaken an audit for a park as a requirement for one of her Honours subjects. This comprised of assessing the condition of the park and determining whether environmental regulations were complied with. This process also involved stakeholder engagement where the perceptions of park users were recorded via face-to-face interviews.

## SKILLS BASE AND CORE COMPETENCIES

- Strong communication skills
- Planning and organisational resilience
- Proficient in English and Afrikaans
- Report writing
- Leadership potential (Team leader of a waste management project 2019, and leader of a University team debate 2022).

## EDUCATION AND PROFESSIONAL STATUS

### Degrees:

- BA Environmental Management (2019)
- BA (Hons) Environmental Management (2022) (Cum Laude)

### Short Courses:

- Green investments in renewable energy (ADBI Institute | 2021)
- Climate change and human rights (UNCC | 2021)

## EMPLOYMENT

Date	Company	Roles and Responsibilities
January 2022 – current	Savannah Environmental (Pty) Ltd	<p><u>Tasks include:</u></p> <p>Environmental Impact Assessments (EIAs) in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), read with the EIA Regulations (2014), as amended.</p> <ol style="list-style-type: none"> <li>1. Specific primary aspects of the including, inter alia: Environmental permitting, environmental authorisation applications, and associated public participation.</li> <li>2. Understanding and applying applicable legislation, efficient and quality report writing, liaison with relevant environmental authorities, site visits, compilation of environmental management programmes (EMPrs), amendment applications, and public participation tasks.</li> <li>3. Water use license applications, environmental compliance monitoring</li> </ol>

Date	Company	Roles and Responsibilities
		<p>and any other related authorisation, permitting and licensing tasks.</p> <ol style="list-style-type: none"> <li>4. Implementation of appropriate procedures and mechanisms to consolidate and complete a compliance check on project-related files with a view to enhance overall management of project documentation for all closed, live and future projects executed by the company,</li> <li>5. Project-related GIS mapping.</li> <li>6. Site visits and travel to project sites.</li> </ol>

## CURRICULUM VITAE OF LEHLOGONOLO MASHEGO

**Profession:** Public Participation and Environmental Consultant  
**Specialisation:** Environmental Assessment Practitioner  
**Work Experience:** Four (4) years and ten (10) months

### VOCATIONAL EXPERIENCE

Professional experience lies mainly in the environmental consulting field specialising in environmental impact assessments, public participation processes and facilitation, environmental planning, environmental research, environmental training, rehabilitation, . Having served the mining, construction and infrastructure industries.

### SKILLS BASE AND CORE COMPETENCIES

- Project management,
  - Microsoft Office,
  - Interpersonal and communication skills,
  - Presenting,
  - Report writing and formatting,
  - Environmental legislative interpretation,
  - Planning and organising, • Leading, coaching and mentoring,
  - Research,
  - Networking and marketing,
  - Data analysis, interpretation and management, and
- Quality management systems and document control.

**EDUCATION AND PROFESSIONAL STATUS**

**Degrees:**

- Masters in Environmental Science, University of Witwatersrand, 2021
- BSocSci Hons in Geographical and Environmental Science, University of Pretoria, 2016
- BA Geography, University of Johannesburg, 2015

**Short Courses:**

- Rethinking Integrated Environmental Management in Pursuit of the Sustainable Development Goals, IAIAsa National Conference, 2021
- Proposed Amendments to the Financial Provisioning Regulations 2015, IAIAsa, 2021
- Towards Sustainable and Responsible Mine Closure, IAIAsa, 2021
- Comprehensive Safety File Compilation Training Course, MAB Consultancy, 2019
- Monitor the Application of Health, Safety and Environmental Protection Procedures OHS Act 85 of 1993, Shesha Management Services, 2019
- Project Management, Africa International Advisors, 2017

**Professional Society Affiliations:**

- International Association of Impact Assessment – South Africa (IAIAsa); 5579

**Other Relevant Skills:**

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**EMPLOYMENT**

<b>Date</b>	<b>Company</b>	<b>Roles and Responsibilities</b>
<b>Jan 2022 - Current:</b>	Savannah Environmental (Pty) Ltd	<i>Public Participation and Environmental Consultant</i> <u>Tasks include:</u> <ul style="list-style-type: none"> <li>• <i>Public participation</i></li> <li>• <i>Technical writing</i></li> <li>• <i>Research</i></li> </ul>
<b>Apr 2019 – Current</b>	International Association of Impact Assessment – South Africa	<i>Branch Committee Member – Students and Young Professionals</i> <u>Tasks include:</u> <ul style="list-style-type: none"> <li>• <i>Marketing</i></li> <li>• <i>Strategic development</i></li> <li>• <i>Events management</i></li> <li>• <i>Stakeholder engagement</i></li> <li>• <i>Student empowerment</i></li> <li>• <i>Risk Assessment</i></li> </ul>
<b>Jan 2020 – Dec 2021</b>	GCS Water and Environmental Consultants	<i>Environmental Liaison Officer</i> <u>Tasks included:</u> <ul style="list-style-type: none"> <li>• <i>Public participation and facilitation</i></li> <li>• <i>Authority and client liaison</i></li> <li>• <i>Report writing</i></li> <li>• <i>Environmental authorisation applications</i></li> <li>• <i>Marketing</i></li> <li>• <i>Tendering and proposal compilation</i></li> <li>• <i>Project administration</i></li> <li>• <i>Project management</i></li> </ul>

Date	Company	Roles and Responsibilities
		<ul style="list-style-type: none"> <li>• Application of environmental management systems</li> <li>• Maintenance of ISO systems</li> <li>• Environmental control officer, auditing and compliance monitoring</li> <li>• Internal and external training</li> <li>• Health and safety, risk identification and risk management</li> <li>• Project management</li> <li>• Project organisation and planning</li> <li>• Human Resources Management and marketing</li> <li>• Mentoring and coaching</li> <li>• Team continual development representative with the duty of assigning fundamental tasks for continuous growth and development</li> </ul>
<b>April 2018 – Dec 2019</b>	Myezo Environmental Management Services	<p>Junior Environmental Consultant</p> <p><u>Tasks included:</u></p> <ul style="list-style-type: none"> <li>• Project assistance</li> <li>• Project administration</li> <li>• Project support</li> <li>• Report writing</li> <li>• Research</li> <li>• Document control</li> <li>• Quality management system management</li> </ul>
<b>April 2017 – Mar 2018</b>	Myezo Environmental Management Services	<p>Environmental Intern and Project Assistant</p> <p><u>Tasks included:</u></p> <ul style="list-style-type: none"> <li>• Project assistance</li> <li>• Project administration</li> <li>• Project support</li> <li>• Report writing</li> <li>• Research</li> <li>• Document control</li> <li>• Quality management system management</li> </ul>
<b>2016</b>	University of Pretoria – Department of Geography and Environmental Sciences	<p>Student mentor</p> <p><u>Tasks included:</u></p> <ul style="list-style-type: none"> <li>• Academic mentoring and coaching</li> <li>• Academic support and guidance</li> <li>• Academic recommendations</li> <li>• Research assistance</li> <li>• Personal guidance</li> </ul>
<b>Oct 2013 – Sep 2014</b>	University of Johannesburg – Annirand Dayhouse	<p>Hawker/Leader</p> <p><u>Tasks included:</u></p> <ul style="list-style-type: none"> <li>• Head of Communication</li> <li>• Secretary</li> <li>• Head of Community Service</li> <li>• Mentoring and academic guidance</li> <li>• Overseeing all administration tasks</li> </ul>

Date	Company	Roles and Responsibilities
		<ul style="list-style-type: none"> <li>In-charge of social media platforms</li> </ul>

## PROJECT EXPERIENCE

Project experience primarily lies in the mining industry having worked extensively in Mpumalanga, North West and Gauteng Province with an averaged four (4) and a half work experience acquired. Construction and housing development projects in and around the Gauteng Province with an averaged three (3) years work experience acquired.

## RENEWABLE POWER GENERATION PROJECTS: SOLAR ENERGY FACILITIES

### *Environmental Impact Assessments and Environmental Management Programmes*

Project Name & Location	Client Name	Role
Lephalale Solar Project – Limpopo Province	Grootgeluk Mine – Exxaro Coal	Public Participation Lead

## CONVENTIONAL POWER GENERATION PROJECTS (COAL)

### *Environmental Impact Assessments and Environmental Management Programmes*

Project Name & Location	Client Name	Role
EMPr Amendment Application for Voorspoed Coal Mine, Free State	De Beers Consolidated Mines	Public Participation Lead

## GRID INFRASTRUCTURE PROJECTS

### *Environmental Impact Assessments and Environmental Management Programmes*

Project Name & Location	Client Name	Role
Proposed Donatello Substation, Gauteng Province	MDT Environmental	Junior PPP

## MINING SECTOR PROJECTS

### *Screening Studies*

Project Name & Location	Client Name	Role
Feasibility Study of Pitlakes as a Mine Closure Option.	Coaltech Research Association	Public participation lead

### *Environmental Compliance, Auditing and ECO*

Project Name & Location	Client Name	Role
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Annual Environment Performance Assessment for Tharisa Mine, North West Province	Tharisa Minerals	ECO
Monthly Audit for Arbor Railway Siding, Mpumalanga Province	Gijima Supply Chain Management	ECO
Monthly Audit for Forfar Railway Siding	Aplorox (Pty) Ltd	ECO
Annual EMPr and IWUL Audit for Hawerklip Railway Siding	Brazen Alger	ECO

#### **Due Diligence Reporting**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Annual Rehabilitation Strategy and Implementation Programme (RSIP) for Mafube Mine, Mpumalanga Province	Exxaro Coal, Mpumalanga	Junior EAP and report writer
Annual Rehabilitation Strategy and Implementation Programme (RSIP) for Belfast Mine, Mpumalanga Province	Exxaro Coal, Mpumalanga	Junior EAP and report writer
Annual Rehabilitation Strategy and Implementation Programme (RSIP) for Rietkuil Siding, Mpumalanga Province	Exxaro Coal, Mpumalanga	Junior EAP and report writer
Annual Rehabilitation Strategy and Implementation Programme (RSIP) for Tharisa Mine, North West Province	Tharisa Minerals	Junior EAP and report writer

#### **INFRASTRUCTURE DEVELOPMENT PROJECTS (BRIDGES, PIPELINES, ROADS, WATER RESOURCES, STORAGE, ETC)**

##### **Environmental Impact Assessments and Environmental Management Programmes**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
Basic Assessment Report for the proposed development of the K11 Road, Gauteng Province	Vuka-Afrika Consulting Engineers and Project Managers	Junior EAP
Decommissioning of a Transnet pipeline running from Durban to Johannesburg	Hydro Science	Junior EAP

##### **Environmental Compliance, Auditing and ECO**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
12 <sup>th</sup> Avenue Bridge Rehabilitation, Gauteng Province	E-Square Engineering	ECO
Oxford Road Road Rehabilitation, Gauteng Province	E-Square Engineering	ECO
Chaplin Stormwater Infrastructure Rehabilitation, Gauteng Province	E-Square Engineering	ECO

#### **HOUSING AND URBAN PROJECTS**

##### **Environmental Impact Assessments and Environmental Management Programmes**

<b>Project Name &amp; Location</b>	<b>Client Name</b>	<b>Role</b>
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<i>Gauteng Rapid Land Release Programme, Unitas Park and Evaton West, Gauteng Province</i>	<i>Department of Human Settlements</i>	<i>Junior EAP</i>
<i>Matsulu Waste Transfer Station, Mpumalanga Province</i>	<i>Zethu Consulting Services</i>	<i>Junior EAP</i>

