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

ENVIRONMENTAL MANAGEMENT PROGRAMME

May 2022

Prepared for

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PROJECT DETAILS

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DEFINITIONS AND TERMINOLOGY

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

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 |

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CHAPTER 1: INTRODUCTION

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 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.

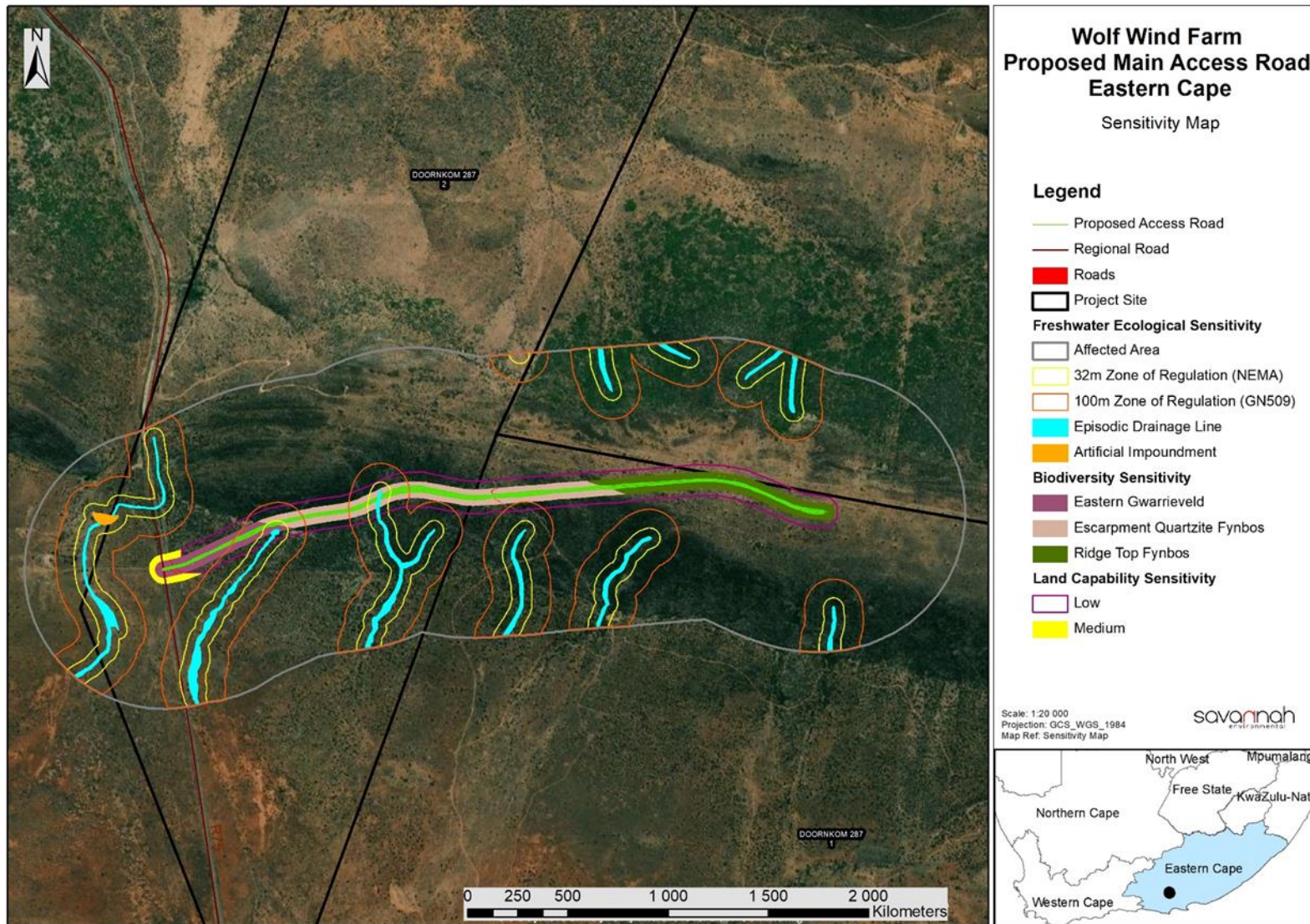


Figure 2.1: Layout and overall environmental sensitivity map

2.3. Life-cycle Phases of the Access Road

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

Activities to be undertaken

| | | |
|---------------------------------|---|---|
| Operation and Maintenance | » | Ad hoc road maintenance activities. |
| | » | On-going rehabilitation of those areas which were disturbed during the construction phase. |
| | » | During this operation phase vegetation surrounding the road will require management only if it impacts on the safety and operational objectives of the project. |

Decommissioning Phase

| | | |
|--------------|---|--|
| Requirements | » | Decommissioning of the access road for the Wolf Wind Farm will occur at the end of the economic life of the wind farm. |
| | » | Decommissioning activities to comply with the legislation relevant at the time. |
| | » | Requirement for rehabilitation of disturbed area |

CHAPTER 3 : PURPOSE AND OBJECTIVES OF THE EMPr

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

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

| Mitigation: Action/Control | Responsibility | Timeframe |
|---|-------------------------------------|---|
| 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 |

| | |
|------------------------------|--|
| Performance Indicator | Description of key indicator(s) that track progress/indicate the effectiveness of the management programme. |
| Monitoring | 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. | |
| (ii) Comply with any prescribed environmental management standards or practices. | |
| (iii) Comply with any applicable provisions of the Act regarding closure, where applicable. | Chapters 5 - 8 |

| 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.

| Specialist Area of Expertise | Specialist Company | Specialists Names |
|--|---|--|
| 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.

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

| Mitigation: Action/Control | Responsibility | Timeframe |
|---|-------------------------|------------------|
| 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 |

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

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

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

| 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 |

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

OBJECTIVE 4: Ensure appropriate planning is undertaken by contractors

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

| 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 |

| | |
|------------------------------|---|
| Performance Indicator | » Conditions of the EMPr form part of all contracts. » Local employment and procurement is encouraged. |
| Monitoring | » Monitor ongoing compliance with the EMP and method statements. |

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.

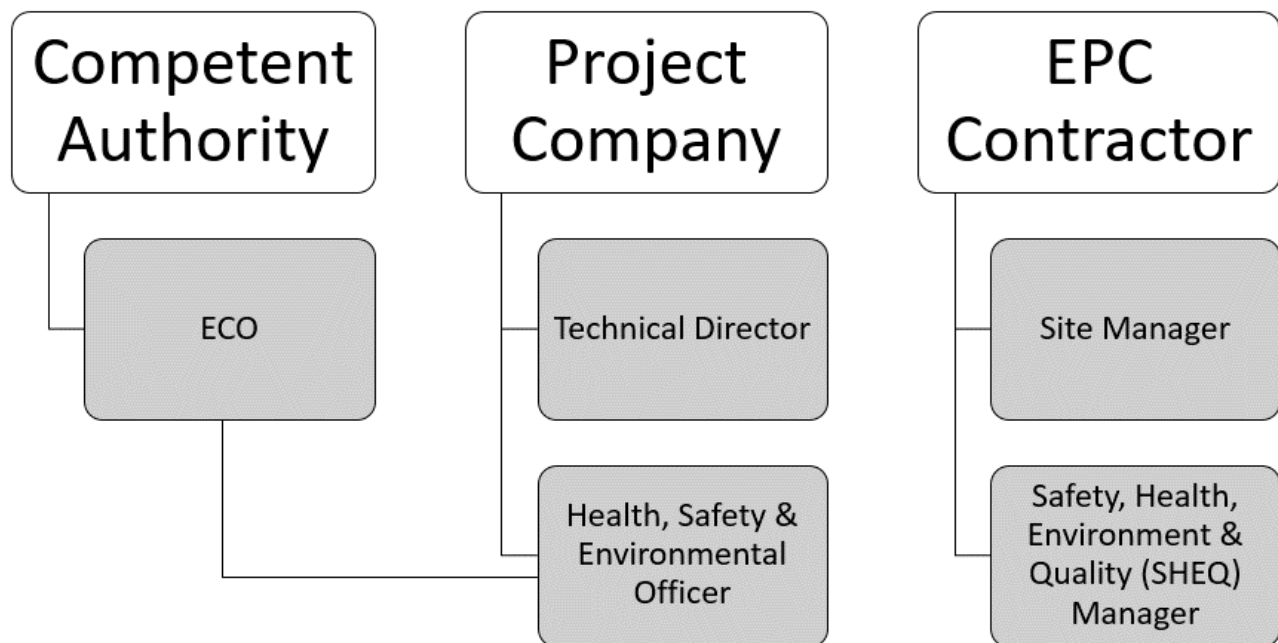


Figure 6.4: Organisational structure for the implementation of the EMPr

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

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

| Mitigation: Action/Control | Responsibility | Timeframe |
|--|-------------------------|--|
| 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 |
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| 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 |

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| Performance Indicator | <ul style="list-style-type: none"> » Site is secure and there is no unauthorised entry. » No members of the public/ landowners injured. » Appropriate and adequate waste management and sanitation facilities provided at construction site. » 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. |
| Monitoring | <ul style="list-style-type: none"> » An incident reporting system is used to record non-conformances to the EMPr. » 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. » Monitoring of vegetation clearing during construction (by contractor as part of construction contract). » Monitoring of rehabilitated areas quarterly for at least a year following the end of construction (by contractor as part of construction contract). |

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

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

| Mitigation: Action/Control | Responsibility | Timeframe |
|--|-----------------------|----------------------|
| 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 |

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| Performance Indicator | <ul style="list-style-type: none"> » No disturbance outside of designated work areas. » Minimised clearing of existing vegetation. » Vegetation and habitat loss restricted to infrastructure footprint. » No poaching etc of fauna by construction personnel during construction. » Removal to safety of fauna encountered during construction. » Low mortality of fauna due to construction machinery and activities » Topsoil appropriately stored, managed and rehabilitated. » Limited soil erosion around site. » No activity in restricted areas. |
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| | » Minimal level of soil degradation. |
| Monitoring | » 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.

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| Project Component/s | » Access road |
| Potential Impact | » 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. |
| Activities/Risk Sources | » 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. |
| Mitigation: Target/Objective | » 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. |

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

| 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 |

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| Performance Indicator | » Low abundance of alien plants. For each alien species: number of plants and aerial cover of plants within the site and immediate surroundings. |
| Monitoring | <ul style="list-style-type: none"> » On-going monitoring of area by EO during construction. » Annual audit of development footprint and immediate surroundings by qualified botanist. » 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. » The results should be interpreted in terms of the risk posed to sensitive habitats within and surrounding the site. » The environmental manager/site agent should be responsible for driving this process. » Reporting frequency depends on legal compliance framework. |

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

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| Project Component/s | » Access road |
| Potential Impact | <ul style="list-style-type: none"> » Operation of the proposed access road and throughflow structure » Disturbance to soil and ongoing erosion as a result of periodic maintenance activities » 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. » Higher flood peaks into the watercourses due to reduced surface roughness in the watercourses. » Altered water quality (if surface water is present) as a result of increased availability of pollutants. |
| Activities/Risk Sources | » Possible indiscriminate movement of maintenance vehicles within and in close proximity to watercourses. |
| Mitigation: Target/Objective | <ul style="list-style-type: none"> » 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. » Stormwater runoff from the road crossings should be monitored (by the Operation and Maintenance (O&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). » 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. » During periodic maintenance activities of the roads, monitoring for erosion should be undertaken; » 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. » 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. » 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. |
| Target / Objective | » 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 |

| Mitigation: Action/Control | Responsibility | Timeframe |
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| 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 |
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| 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 |

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| Performance Indicator | <ul style="list-style-type: none"> » No signs of erosion and sedimentation of the watercourses. » Alien invasive species removal/establishment should be monitored. |
| Monitoring | <ul style="list-style-type: none"> » 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. |

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.

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

| Mitigation: Action/control | Responsibility | Timeframe |
|--|---|---|
| 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. | | |

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

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.

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| Project component/s | » Access road |
| Potential Impact | <ul style="list-style-type: none"> » 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. » Release of minor amounts of air pollutants (for example NO₂, CO and SO₂) from vehicles and construction equipment. |
| Activity/risk source | <ul style="list-style-type: none"> » Clearing of vegetation and topsoil. » Excavation, grading, scraping, levelling, digging, drilling and associated construction activities. » Transport of materials, equipment, and components on internal access roads and the associated increased traffic. » Vehicle movement on gravel roads. » Re-entrainment of deposited dust by vehicle movements. » Wind erosion from topsoil and spoil stockpiles and unsealed roads and surfaces. » Fuel burning vehicle and construction engines. |
| Mitigation: Target/Objective | <ul style="list-style-type: none"> » To ensure emissions from all vehicles and construction engines are minimised, where possible, for the duration of the construction phase. » 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. » Suppression of dust, pollution control and minimise dust generation. |

| 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 |
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| 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 |

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

- » 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 SO₂, NO₂, 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).

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| Project Component/s | » Access road |
| Potential Impact | <ul style="list-style-type: none"> » Inefficient use of resources resulting in excessive waste generation. » Litter or contamination of the site or water through poor waste management practices. |
| Activity/Risk Source | <ul style="list-style-type: none"> » Packaging. » Other construction wastes. » Hydrocarbon use and storage. » Spoil material from excavation, earthworks and site preparation. |
| Mitigation: Target/Objective | <ul style="list-style-type: none"> » 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. |

| Mitigation: Action/Control | Responsibility | Timeframe |
|---|-----------------------|----------------------|
| 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 |
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| 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 |

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

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.

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

| Mitigation: Action/Control | Responsibility | Timeframe |
|--|-----------------------|------------------|
| 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 |
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| 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 |

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

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.

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| Project Component/s | » Access road |
| Potential Impact | <ul style="list-style-type: none"> » 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. |
| Activities/Risk Sources | » Use of access roads. |
| Mitigation: Target/Objective | <ul style="list-style-type: none"> » 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. |

| Mitigation: Action/Control | Responsibility | Timeframe |
|---|-----------------------|------------------|
| 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"> » Keep disturbance of indigenous vegetation to a minimum. » Rehabilitate disturbed areas as quickly as possible. » Do not import soil from areas with alien plants. | 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 |

| | |
|------------------------------|---|
| Performance Indicator | » Low abundance of alien plants. For each alien species: number of plants and aerial cover of plants within the site and immediate surroundings. |
| Monitoring | <ul style="list-style-type: none"> » On-going monitoring of area by EO during construction. » Annual audit of development footprint and immediate surroundings by qualified botanist. » 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. » The results should be interpreted in terms of the risk posed to sensitive habitats within and surrounding the site. » The environmental manager/site agent should be responsible for driving this process. » Reporting frequency depends on legal compliance framework. |

OBJECTIVE 4: Minimise dust

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

| | |
|-------------------------------------|---|
| Project Component/s | <ul style="list-style-type: none"> » Access road. » On-site vehicle movement. |
| Potential Impact | » Dust and particulates from vehicle movement to and on-site. |
| Activities/Risk Sources | » Wind erosion from unsealed roads and surfaces. |
| Mitigation: Target/Objective | » 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 |

| | |
|------------------------------|--|
| Performance Indicator | » No complaints from affected residents or community regarding dust. » Dust suppression measures implemented where required. |
| Monitoring | » Immediate reporting by personnel of any potential or actual issues with nuisance or dust to the Power Station Manager.. » An incident reporting system must be used to record non-conformances to the EMPr. |

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

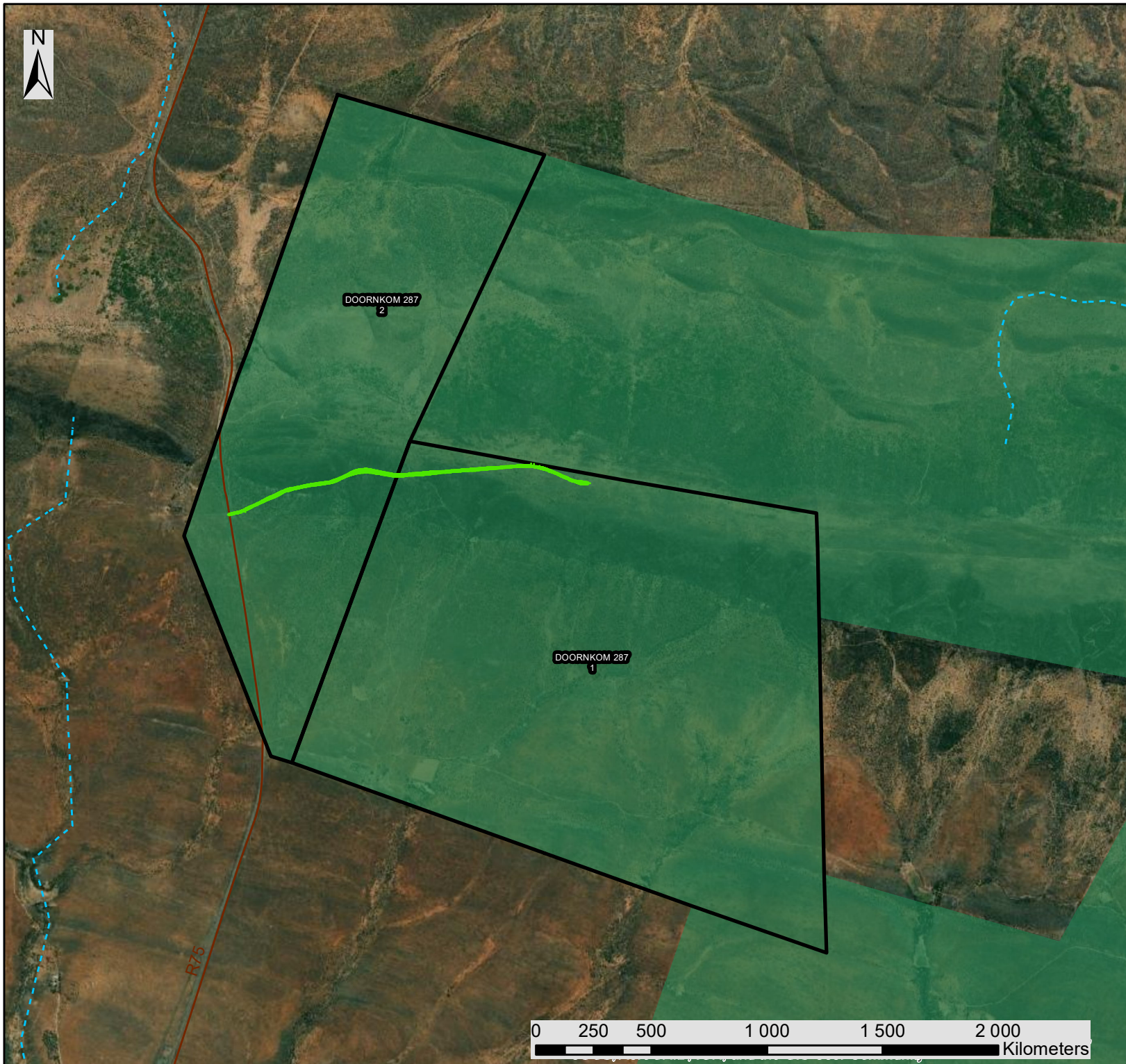
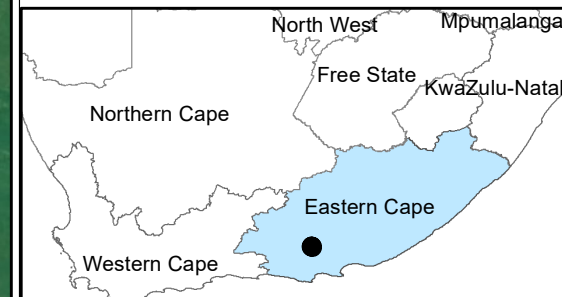
Layout Map

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





SALT PANS NECK 287
2

R75

SALT PANS NECK 287
1

Source: USGS
0 0,15 0,3 0,6 0,9 1,2 Kilometers

Wolf Wind Farm Proposed Main Access Road Eastern Cape

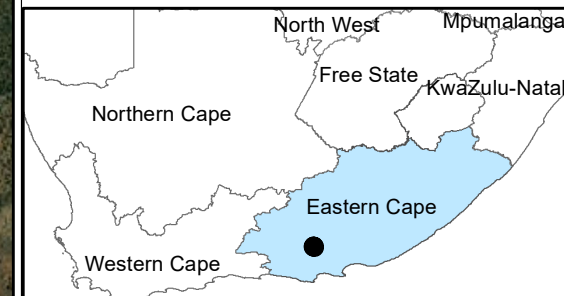
Sensitivity Map

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



APPENDIX B
CURRICULUM VITAE OF PROJECT TEAM

CURRICULUM VITAE OF JO-ANNE THOMAS

| | |
|-------------------------|---|
| Profession: | Environmental Management and Compliance Consultant; Environmental Assessment Practitioner |
| Specialisation: | Environmental Management; Strategic environmental advice; Environmental compliance advice & monitoring; Environmental Impact Assessments; Policy, strategy & guideline formulation; Project Management; General Ecology |
| Work experience: | 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 |

| Project Name & Location | Client Name | Role |
|---|--|-----------------------|
| 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

| Project Name & Location | Client Name | Role |
|--|----------------------------|-----------------------|
| 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

| Project Name & Location | Client Name | Role |
|--|------------------|-----------------|
| 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 | Sublunary 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 Konkoonies 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 |
| Konkoonies II SEF near Pofadder, Northern Cape | BioTherm Energy | Environmental Advisor |
| Konkoonies 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 | Sublunary 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

| Project Name & Location | Client Name | Role |
|--|--------------------------|-----------------------|
| 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 Lephalale 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 Konkoonises Solar Farm, Northern Cape | BioTherm Energy | Project Manager & EAP |
| Environmental Permitting for the Lephalale 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**

| Project Name & Location | Client Name | Role |
|--|--------------------|-----------------------|
| Ilanga CSP 2, 3, 4, 5, 7 & 9 Facilities near Upington, Northern Cape | Emvelo Holdings | Project Manager & EAP |
| Ilanga CSP near Upington, Northern Cape | Ilangehu 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

| Project Name & Location | Client Name | Role |
|--|--|-----------------------|
| 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 |
| Rheboksfontein 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

| Project Name & Location | Client Name | Role |
|--|--|-----------------------|
| 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

| Project Name & Location | Client Name | Role |
|--|---------------------|-----------------------|
| 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 | Exxaro 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

| Project Name & Location | Client Name | Role |
|---|----------------------------------|-----------------------|
| 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

| Project Name & Location | Client Name | Role |
|--|--|-----------------------|
| 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 Hopfield Community Wind Farm near Hopfield, 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

| Project Name & Location | Client Name | Role |
|--|-------------------|-----------------------|
| 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 Lephalale, 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 Lephalale, 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 Lephalale, 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 Lephalale, Limpopo | Axia | Project Manager & EAP |
| S53 & WULA for the Waterberg IPP Coal-Fired Power Station near Lephalale, Limpopo | Exxaro Resources | Project Manager & EAP |
| S53 Application for the Tshivasho Coal-fired Power Station near Lephalale, 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 |

| Project Name & Location | Client Name | Role |
|--|--|-----------------------|
| 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

| Project Name & Location | Client Name | Role |
|--|--|-----------------|
| 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

| Project Name & Location | Client Name | Role |
|--|----------------|-----------------------|
| 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

| Project Name & Location | Client Name | Role |
|---|---------------------------|-----------------------|
| 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 | Seskoko Resources | Project Manager & EAP |
| Aluminium Plant WML & AEL, Gauteng | GfE-MIR Alloys & Minerals | Project Manager & EAP |

Basic Assessments

| Project Name & Location | Client Name | Role |
|---|--------------------|-----------------------|
| 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

| Project Name & Location | Client Name | Role |
|---|----------------------------|-----------------|
| 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

| Project Name & Location | Client Name | Role |
|--|--------------------|-----------------------|
| 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

| Project Name & Location | Client Name | Role |
|--|--|-----------------------|
| 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 | Emalahleni 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

| Project Name & Location | Client Name | Role |
|--|-------------------------------|-----------------------|
| 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 | Emalahleni 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 Lodge, 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 Lodge, 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 | Sorror 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 |

| Project Name & Location | Client Name | Role |
|---|---|-----------------------|
| 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

| Project Name & Location | Client Name | Role |
|---|-----------------|-----------------------|
| 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 (ADB 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"> 1. Specific primary aspects of the including, inter alia: Environmental permitting, environmental authorisation applications, and associated public participation. 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. 3. Water use license applications, environmental compliance monitoring |

| Date | Company | Roles and Responsibilities |
|------|---------|--|
| | | <p>and any other related authorisation, permitting and licensing tasks.</p> <p>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,</p> <p>5. Project-related GIS mapping.</p> <p>6. Site visits and travel to project sites.</p> |

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:

- XXX

EMPLOYMENT

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

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

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

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 |
|-------------------------|-------------|------|
|-------------------------|-------------|------|

| | | |
|---|--------------------------------|-----|
| 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

| Project Name & Location | Client Name | Role |
|---|-------------------------|------------------------------|
| 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

| Project Name & Location | Client Name | Role |
|--|---|-------------|
| 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

| Project Name & Location | Client Name | Role |
|--|----------------------|-------------|
| 12 th 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

| Project Name & Location | Client Name | Role |
|------------------------------------|--------------------|-------------|
|------------------------------------|--------------------|-------------|

| | | |
|--|--|-------------------|
| <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> |