# ABERDEEN WIND FACILITY 1, EASTERN CAPE PROVINCE

## ENVIRONMENTAL MANAGEMENT PROGRAMME

## APRIL 2023

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# EMPR DETAILS

| | | |
|---|---|---|
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# DEFINITIONS AND TERMINOLOGY

**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.

**Ambient sound level**: The reading on an integrating impulse sound level meter taken at a measuring point in the absence of any alleged disturbing noise at the end of a total period of at least 10 minutes after such meter was put into operation.

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

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

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

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

**Development area:** The development area is that identified area (located within the project site ~9180ha) which has been assessed by specialists with the aim of identifying areas of sensitivity which should be avoided by the development footprint or facility layout.

**Development footprint:** The development footprint is the defined area (located within the development area) where the wind farm and other associated infrastructure for the Project is planned to be constructed. This is the actual footprint of the facility, and the area which would be disturbed.

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

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

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

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

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

**Environmental 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 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:** A plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its on-going maintenance after implementation.

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

**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.

**Incident:** Section 30 of NEMA defines an 'incident' as "an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed."[1]

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

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

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

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

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

**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.

[1]http://ipwis.pgwc.gov.za/ipwisdoc/Public/Publications/ChemicalsMgt/A%20Procedure%20for%20Section%2030%20of%20NEMA.pdf

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

**Project developer:** The project developer, Aberdeen Wind Facility 1 (Pty) Ltd, will be the party responsible for the construction and day-to-day operation and maintenance of the proposed wind farm.

**Project site:** The project site is the aerial extent of the affected properties (~19 800ha) within which the wind farm is proposed.

**Proponent:** Applicant/Project developer, Aberdeen Wind Facility 1 (Pty) Ltd will be the party responsible for the construction and day-to-day operation and maintenance of the proposed wind farm.

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

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

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

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

**Tower:** The tower, which supports the nacelle to which the rotor is attached, is constructed from tubular steel or concrete. It is approximately 200m tall. The nacelle and the rotor are attached to the top of the tower. The tower on which a wind turbine is mounted is not just a support structure. It also raises the wind turbine so that its blades safely clear the ground and so it can reach the stronger winds at higher elevations. The tower must be strong enough to support the nacelle and blades, and to sustain vibration, wind loading and the overall weather elements for the lifetime of the wind turbine.

**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.

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

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

# ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| DEFF | National Department of Environment, Forestry and Fisheries |
| DHSWS | Department of Human Settlements, Water and Sanitation |
| EAP | Environmental Assessment Practitioner |
| ECO | Environmental Control Officer |
| EIA | Environmental Impact Assessment |
| EMPr | Environmental Management Programme |
| EPC | Engineering Procurement Contractor |
| ECO | Environmental Control Officer |
| EO | Environmental Officer |
| GG | Government Gazette |
| GN | Government Notice |
| Ha | Hectare |
| I&AP | Interested and Affected Party |
| $km^2$ | Square kilometres |
| kV | Kilovolt |
| $m^2$ | Square meters |
| m/s | Meters per second |
| MW | Mega Watt |
| NEMA | National Environmental Management Act (Act No 107 of 1998) |
| NHRA | National Heritage Resources Act (Act No 25 of 1999) |
| NIRP | National Integrated Resource Planning |
| NWA | National Water Act (Act No 36 of 1998) |
| PM | Project Manager |
| SHE | Safety, Health and Environment |
| SAHRA | South African Heritage Resources Agency |
| SANRAL | South African National Roads Agency Limited |

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# CHAPTER 1: INTRODUCTION

This Environmental Management Programme has been compiled for the Aberdeen Wind Facility 1. The project site is located approximately 20km west of the town of Aberdeen in the Eastern Cape Province. The site is located within the Dr Beyers Naude Local Municipality in the Sarah Baartman District Municipality. The Aberdeen Wind Facility 1 will include a maximum of 41 wind turbines with a contracted capacity of up to 240MW and associated infrastructure to be constructed over an area of approximately 19 800ha in extent, known as the project site.

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. This EMPr is applicable to Aberdeen Wind Facility 1 (Pty) Ltd employees and contractors working on the pre-construction, construction, and operation and maintenance phases of the Aberdeen Wind Facility 1. The document must 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 of the project.

In terms of the Duty of Care provision in S28(1) the project Developer 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. In terms of NEMA, it has become the legal duty of a project Developer to consider a project holistically, and to consider the cumulative effect of a variety of impacts. While no permitting or licensing requirements arise directly by virtue of the Aberdeen Wind Facility 1, this section will be applicable throughout the life cycle of the project.

# CHAPTER 2: PROJECT DETAILS

The facility is proposed in response to identified objectives of the national and provincial government, and local and district municipalities to develop renewable energy facilities for power generation purposes. The development of the wind energy facilities will assist in achieving the energy mix (through a process of diversification) as set out in the Integrated Resources Plan (IRP), as well as aiding in the stabilisation of the country's electricity supply.

The project site for the Aberdeen Wind Facility 1 is situated on four different properties, namely:

» Farm Koppieskraal 157
» Remainder of the Farm Doornpoort 93
» Portion 1 of Farm Doorn Poort 93
» Farm Kraanvogel Kuil 155
» Portion 4 of Farm Sambokdoorns 92

A main access road up to 2.5km in length and up to 10m in width will provide access to the facility, and ultimately to all three planned wind farm sites (that is, a shared access route). The access to the facility/ies will be via an existing (unnamed) gravel road off the R61 between Beaufort West and Aberdeen. The gravel road is well established (~10m wide excluding road reserve), however it's likely portions of this road will require upgrading to accommodate the movement of heavy vehicles. This road traverses Portion 4 of Farm Sambokdoorns 92.

The project site has an extent of ~19 800ha which is considered sufficient in extent (allowing sufficient space to avoid any major environmental sensitivities) and suitable for the development of up to 41 wind turbines from a technical perspective (**Figure 2.1** and **Table 2.1**).

A development area[2] of approximately 9180 ha has been identified within the project site and assessed as part of the Basic Assessment process. Within this development area a development footprint, or area to be transformed is estimated to be up to 120ha of the development:

» Up to 41 wind turbines with a maximum hub height of up to 200m. The tip height of the turbines will be up to 300m.
» Concrete turbine foundations and turbine hardstands.
» An internal road network between project components inclusive of stormwater infrastructure.
» Medium-voltage (MV) power lines internal to the wind farm trenched and located adjacent to internal access roads, where feasible.
» Substation, Battery Energy Storage System (BESS) and O&M buildings hub, including:
  - On-site facility substation (132kV).
  - Battery Energy Storage System (BESS).
  - Operation and Maintenance buildings, including control centre
» Warehouse, laydown area and site camp hub, including:
  - Construction laydown areas

[2] The development area is that identified area where the 240MW wind farm is planned to be located. This area has been selected as a practicable option for the facility, considering technical preference and constraints. The development area is ~9180ha in extent.

- Site camp
- Warehousing and buildings

» Upgrade to a main access road of approximately 2.5km in length and up to 10m in width.

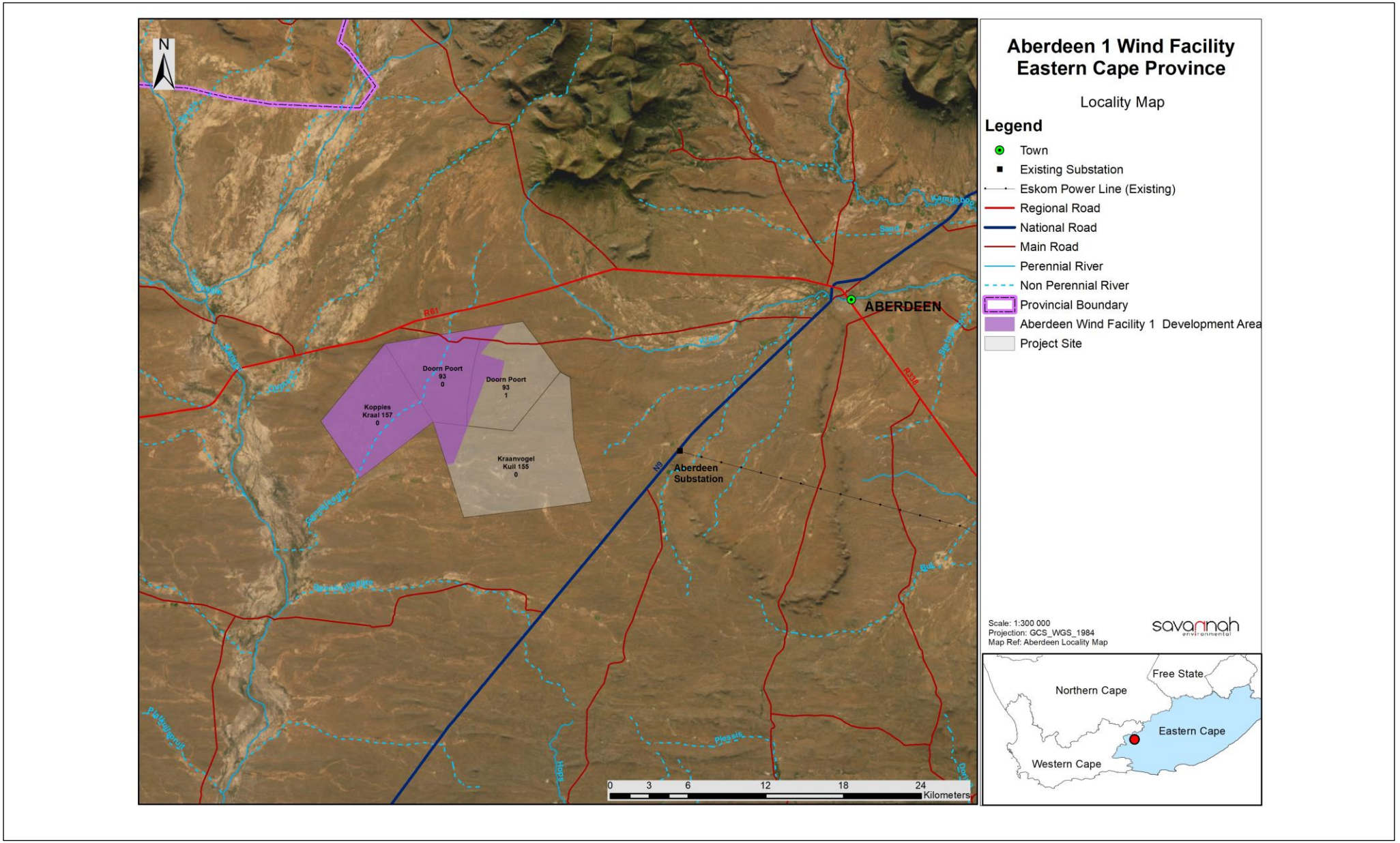


**Figure 2.1:** Locality map showing the location of the project site proposed for the Aberdeen Wind Facility 1

**Table 2.1:** Detailed description of the Aberdeen Wind Facility 1 project site

| | |
|---|---|
| **Province** | Eastern Cape |
| **District Municipality** | Sarah Baartman District Municipality |
| **Local Municipality** | Dr Beyers Naude Local Municipality |
| **Ward number(s)** | Ward 1 |
| **Nearest town(s)** | Aberdeen (20km west of the Aberdeen Wind Facility 1) |
| **Affected Properties: Farm name(s), number(s) and portion numbers** | Wind Farm:<br>» Farm Koppieskraal 157<br>» Remainder of the Farm Doorn Poort 93<br>» Portion 1 of Farm Doorn Poort 93<br>» Farm Kraanvogel Kuil 155<br>Access Road<br>» Portion 4 of Farm Sambokdoorns 92 |
| **SG 21 Digit Code (s)** | » C00100000000015700000 - Farm Koppieskraal 157<br>» C00100000000009300000 - Remainder of the Farm Doorn poort 93<br>» C00100000000009300001 - Portion 1 of Farm Doorn Poort 93<br>» C00100000000015500000 - Farm Kraanvogel Kuil 155<br>» C00100000000009200004 - Portion 4 of Farm Sambokdoorns 92 |
| **Current zoning and land use** | Zoning: Agricultural<br>Land Use: Farming |
| **Site central coordinates** | 23°42'58.25"E, 32°32'09.96"S |
| **Start point of the access road to be upgraded** | 23°43'35.13"E, 32°29'24.36"S |

## 2.1. Findings of the Environmental Impact Assessment

The BA report together with the specialist studies contained within **Appendices D-M** provide a detailed assessment of the potential impacts that may result from the development of the Aberdeen Wind Facility 1.

No environmental fatal flaws or unacceptable impacts were identified in the detailed specialist studies conducted, provided that the recommended mitigation measures are implemented. These measures include, amongst others, the avoidance of sensitive features within the development footprint and the undertaking of the construction and operational bird and bat monitoring, as specified by the specialists.

The potential environmental impacts associated with the Aberdeen Wind Facility 1 identified and assessed through the BA process include:

» Impacts on ecology, flora and fauna.
» Impacts on freshwater resources.
» Impacts on avifauna.
» Impacts on bats.
» Impacts on land use, soils and agricultural potential.
» Impacts on heritage resources, including archaeology, palaeontology and the cultural landscape.
» Noise impacts due to the construction and operation of the wind energy facility.
» Visual impacts on the area imposed by the components of the facility.
» Positive and negative socio- economic impacts.
» Traffic impacts, including increased pressure on the existing road network.

The significance of these impacts are presented in the table below:

| Specialist assessment | Overall significance of impact of the proposed project considered in isolation | Cumulative significance of impact of the project and other projects in the area |
|---|---|---|
| Ecology | Low | Low |
| Freshwater resources | Low | Medium |
| Avifauna | Medium | Medium |
| Bats | Medium | High |
| Agriculture | Low | Medium |
| Heritage (archaeology, palaeontology and cultural landscape) | High | High |
| Noise | Low | Low |
| Visual | Medium | High |
| Socio-Economic | Low (Negative)<br>Medium (Positive) | Medium(Negative)<br>High (Positive) |
| Traffic | Low | Medium |

# 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 facility. 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, noise, 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 Aberdeen Wind Facility 1. 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 Aberdeen Wind Facility 1 and/or as the project develops. The EMPr has been developed as a set of environmental specifications (i.e. principles of environmental management). The specifications have been developed on the basis of the findings of the Environmental Impact Assessment (EIA), 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.

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 Aberdeen Wind Facility 1.
- 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.

Aberdeen Wind Facility 1 (Pty) Ltd 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. The adequacy and efficacy of implementation is to be monitored by an independent Environmental Control Officer (ECO). Since this EMPr is part of the BA process for the Aberdeen Wind Facility 1, 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 operation 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 first three chapters provide background to the EMPr and the Aberdeen Wind Facility 1, 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 Aberdeen Wind Facility 1 (Pty) Ltd as the project owner, to minimise environmental impacts and achieve environmental compliance. For each of the phases of implementation, an over-arching environmental **goal** is stated. In order to meet this goal, a number of **objectives** are listed. The EMPr 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 EIA specialist studies**

| | |
|---|---|
| **Project component/s** | List of project components affecting the objective, i.e.:<br>» Wind turbines;<br>» Access roads; and<br>» Associated infrastructure. |
| **Potential Impact** | Brief description of potential environmental impact if objective is not met. |
| **Activity/risk source** | Description of activities which could impact on achieving objective. |
| **Mitigation: Target/Objective** | Description of the target; include quantitative measures and/or dates of completion. |

| **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 plan. |
| **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 throughout the life of the wind energy whenever changes, such as the following, occur:

» Planned activities change (i.e. in terms of the components of the wind energy facility).
» 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.
» Significant progress has been made in achieving an objective or target such that it should be re-examined to determine if it is still relevant or should be modified, etc.

## 4.1. Project Team

This EMPr was compiled by[3]:

| **EMP Compilers** | |
|---|---|
| Karen Jodas | Savannah Environmental |
| Nkhensani Masondo | Savannah Environmental |
| Matthew Ellero | Savannah Environmental |
| Nicolene Venter | Savannah Environmental |
| **Input from Specialist Consultants** | |
| 3Foxes Biodiversity Solutions | Terrestrial Ecology |
| Brian Colloty Consulting | Aquatic and freshwater resources |
| Birds and Bats Unlimited | Avifauna |
| Inkululeko Wildlife Services | Bats |
| JG Afrika | Traffic |
| Enviro Acoustic Research | Noise |
| LOGIS | Visual |
| CTS Heritage | Heritage (including cultural landscape, archaeology and palaeontology) |
| Tony Barbour | Social |
| Terra Africa | Soils and Agricultural potential |

The Savannah Environmental team have extensive knowledge and experience in environmental impact assessment and environmental management, having been involved in EIA processes for more than fifteen (15) years. They have managed and drafted Environmental Management Programmes for other power generation projects throughout South Africa, including numerous wind and solar energy facilities.

[3] Additional specialist input to the process was provided by Jennifer Meneghelli of SRK Consulting (Stormwater Management Plan) and Charles Warren-Codrington of SMEC South Africa (Desktop Geotechnical). This information has informed the EMPr.

# CHAPTER 5: ROLES AND RESPONSIBILITIES

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

For the purposes of the EMPr, the generic roles that need to be defined are those of the:
» Developer;
» Project Manager/Site Manager;
» Environmental Control Officer;
» Contractors; and
» Contractor's Safety, Health and Environment Representative/Environmental Officer.

It is acknowledged that the specific titles for these functions may vary once the project is implemented. The purpose of this section of the EMPr is to give a generic outline of what these roles typically entail. It is expected that this will be further defined during project implementation.

### i) The Developer

As the Applicant/proponent, Aberdeen Wind Facility 1 (Pty) Ltd must ensure that the implementation of the project complies with the requirements of all environmental authorisations and all other permits, and obligations emanating from other relevant environmental legislation.

### ii) Project Manager/Site Manager

The Project Manager/Site Manager is responsible for overall management of project and EMPr implementation. The following tasks will fall within his/her responsibilities:

» Be fully conversant with the BA for the project, the EMPr, the conditions of the Environmental Authorisation (once issued), and all relevant environmental legislation.
» Be fully knowledgeable with the contents of all relevant licences and permits.
» Be familiar with the recommendations and mitigation measures of this EMP, and implement these measures.
» 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.
» Monitor site activities on a daily basis for compliance.
» Ensure that the EMPr is correctly implemented throughout the project by means of site inspections and meetings. This must be documented as part of the site meeting minutes.
» Conduct internal audits of the construction site against the EMPr.
» Confine the construction site to the demarcated area.
» Rectify transgressions through the implementation of corrective action.

### iii) Environmental Control Officer

A suitably qualified Environmental Control Officer (ECO)[4] must be appointed by the project Developer 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 BA.
- 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 all the licences and permits issued to the site.
- Be fully knowledgeable of the contents of all relevant environmental legislation.
- 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 the compliance of the EMPr, EA and the legislation 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 or site-specific plans.
- Ensure that if the EMPr, EA and/or the legislation conditions, regulations or specifications are not followed then appropriate measures are undertaken to address any non-compliances (for example an ECO may cease construction or an activity to prevent a non-compliance from continuing).
- 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 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.

The ECO must be present full-time on site for the site preparation and initial clearing activities to ensure the correct demarcation of no-go areas, to 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 compliance audits can be undertaken, provided that adequate compliance with the EA, environmental permits and EMPr is achieved. The developer should appoint a designated Environmental Officer (EO) to be present on-site to deal with any environmental issues as the arise. 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.

### iv) Contractors

The Lead Contractor is responsible for the following:

- Ensure compliance with the EA, environmental permits and the EMPr at all times during construction.
- Have the overall responsibility of the EMPr and its implementation.

[4] The ECO should have a relevant degree or technical diploma in environmental management and at least 2 years experience in the field

- Ensure that all appointed contractors and sub-contractors are aware of the EMPr and their respective responsibilities.
- Provide all necessary supervision during the execution of the project.
- Comply with any special conditions as stipulated by landowners.
- Inform and educate all employees about the environmental risks associated with the various activities to be undertaken, and highlight those activities which should be avoided during the construction process in order to minimise significant impacts to the environment.
- Maintain an environmental register which keeps a record of all incidents which occur on the site during construction. These incidents include:
  - Public involvement / complaints
  - Health and safety incidents
  - Hazardous materials stored on site
  - Non-compliance incidents
  - 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.
- Where construction activities are undertaken is close to any inhabited area, the necessary precautions shall be taken by the Contractor to safeguard the lives and property of the inhabitants.
- Conduct audits to ensure compliance to the EMPr.
- Ensure there is communication with the Project Manager, the ECO, and relevant discipline engineers on matters concerning the environment.
- Should the Contractor require clarity on any aspect of the EMPr the Contractor must contact the Environmental Consultant/Officer for advice.

Contractors and Service Providers must be aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMPr. 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 contractor's obligations in this regard include the following:

- Employees must have a basic understanding of the key environmental features of the construction site and the surrounding environment.
- A copy of the EMPr must be easily accessible to all on-site staff members.
- Employees must be familiar with the requirements of this EMPr and the environmental specifications as they apply to the construction of the wind energy facility.
- Prior to commencing any site works, all employees and sub-contractors must have attended an environmental awareness training course which must provide staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
- Staff will be informed of environmental issues as deemed necessary by the 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
- Any lack of adherence to the above will be considered as non-compliance to the specifications of the EMPr
- 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 that they can constructively contribute towards the successful implementation of the EMPr (i.e. ensure their staff are appropriately trained as to the environmental obligations)

**v) Contractor's Safety, Health and Environment Representative/Environmental Officer**

The Contractor's Safety, Health and Environment (SHE) Representative/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. In addition, the SHE/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.

The Contractor's SHE/EO should:
- Be well versed in environmental matters.
- Understand the relevant environmental legislation and processes.
- 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.

**OBJECTIVE 2: Establish clear reporting, communication, and responsibilities during operation in relation to overall implementation of the EMPr during operation**

Formal responsibilities are necessary to ensure that key procedures are executed during operation. Several professionals will form part of the operation team. For the purposes of the EMPr, the generic roles that need to be defined are those of the:

- Operations Manager; and
- Environmental Manager

It is acknowledged that the specific titles for these functions may vary once the project is implemented. The purpose of this section of the EMPr is to give a generic outline of what these roles typically entail. It is expected that this will be further defined during project implementation.

**i) Operations Manager**

The Plant Manager will:

- Ensure that adequate resources (human, financial, technology) are made available and appropriately managed for the successful implementation of the operational EMPr.
- Conduct annual basis reviews of the EMPr to evaluate its effectiveness.
- Take appropriate action as a result of findings and recommendations in management reviews and audits.
- Provide forums to communicate matters regarding environmental management.

**ii) Environmental Manager**

The Environmental Manager will:

- Develop and Implement an Environmental Management System (EMS) for the wind energy facility and associated infrastructure.
- Manage and report on the wind energy facility's environmental performance.
- Maintain a register of all known environmental impacts and manage the monitoring thereof.
- Conduct internal environmental audits and co-ordinate external environmental audits.
- Liaise with statutory bodies (such as the National and Provincial Department of Environmental Affairs and conservation authorities) on environmental performance and other issues.
- Conduct environmental training and awareness for the employees who operate and maintain the wind energy facility.
- Compile environmental policies and procedures.
- Liaise with interested and affected parties on environmental issues of common concern.
- Track and control the lodging of any complaints regarding environmental matters.

The Environmental Manager must provide fourteen (14) days written notification to the DFFE that the Aberdeen Energy Facility 1 operation phase will commence.

# CHAPTER 6: MANAGEMENT PROGRAMME: PLANNING AND DESIGN

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

- Ensures that the design of the wind energy facility 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 identified environmental sensitivities, as well as any landowner and community concerns and that these are appropriately addressed through design and planning (where applicable).
- Enables the construction activities to be undertaken without significant disruption to other land uses and activities in the area.
- Ensures that the best environmental options are selected for the wind energy facility.

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

## 6.1. Objectives

**OBJECTIVE 1: To ensure that the design of the facility responds to the identified environmental constraints and opportunities**

Subject to final turbine micro-siting and subsequent acceptance from DFFE, the optimised development footprint detailed in **Figure 2.3** must be implemented. Cognisance of sensitive areas defined in **Figure 2.2** and within the BA Report should be considered when undertaking the final design of the facility.

| | |
|---|---|
| **Project component/s** | » Wind turbines.<br>» Access roads and crane hardstand areas.<br>» Cabling between turbines.<br>» Substation, BESS and O&M Building hub<br>» Laydown area, warehouse area, and site camp hub<br>» All other associated infrastructure. |
| **Potential Impact** | » Design fails to respond optimally to the identified environmental considerations.<br>» Employment creation for the construction, operation and decommissioning activities. |
| **Activities/risk sources** | » Positioning of turbines and alignment of access roads and underground cabling.<br>» Positioning of Substation, BESS and O&M Building hub.<br>» Positioning of Warehouse area, laydown area and site camp hub.<br>» Pre-construction activities, e.g. geotechnical investigations. |
| **Mitigation: Target/Objective** | » To ensure that the design of the wind energy facility responds to the identified environmental constraints and opportunities, including the constraints identified through the BA process.<br>» To ensure that pre-construction activities are undertaken in an environmentally friendly manner by e.g. avoiding identified sensitive areas. |

» Optimal planning of visual infrastructure to minimise visual impact.

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| Plan and conduct pre-construction activities in an environmentally responsible manner and in a manner that does not lead to unnecessary impacts and disturbance. | Developer<br>EPC Contractor | Design phase<br>Pre-Construction |
| Consider design level mitigation measures recommended by the specialists, especially with respect to noise, flora, fauna, aquatic terrestrial ecology, avifauna, bats, and heritage sites, as detailed within the BA report and relevant appendices. | Developer<br>EPC Contractor | Design phase |
| Following the final site layout plan of Aberdeen Wind Facility 1, a revised layout must be submitted to DFFE for review and approval prior to commencing with construction. Micro-siting must take all recommended mitigation measures into consideration. No development is permitted within the identified no-go areas, other than that specified within the specialist studies. | Developer<br>EPC Contractor | Design phase |
| Minimise the development footprint as far as possible. | Developer | Design phase |
| Preconstruction walk-though of the development footprint to ensure that there are no individuals of Sensitive Species 1212 within the development footprint. | Developer | Design phase |
| Locate temporary-use areas such as construction camps and lay-down areas in low sensitivity or previously disturbed areas. | Developer<br>EPC Contractor | Design phase<br>Construction |
| Minimise the development footprint in areas mapped as high sensitivity (i.e. near watercourses and other ecologically significant features). | Developer | Design phase<br>Construction |
| Turbines and buildings must avoid impact on the sensitive features of the site such as the larger drainage features and low hills of the site. | Developer<br>EPC Contractor | Design phase<br>Construction |
| Appropriate design of roads and other infrastructure to minimise faunal impacts and allow fauna to pass over, through or underneath these features as appropriate. | Developer<br>EPC Contractor | Design phase<br>Construction |
| Ensure that the mitigation hierarchy is applied with a particular emphasis on reducing the development footprint, rehabilitating disturbed areas and minimising degradation around the site | Developer<br>EPC Contractor | Design phase<br>Construction |
| The most significant form of mitigation would be to select a development area, which contained no drainage lines. It is therefore recommended that any tracks avoid these areas, or make use of existing access across these systems. | Developer | Design phase |
| Existing roads to be used or the upgrade of existing tracks rather than constructing entirely new roads wherever possible. | Developer<br>EPC Contractor | Design phase |
| Use the smallest possible working corridor. Outside the working corridor, all watercourses are to be considered no go areas. Any unnecessary intrusion into these areas is prohibited. Where intrusion is required, the working corridor must be kept to a minimum and demarcated clearly, before any construction commences. | Developer<br>EPC Contractor | Design phase |
| Water diversions must be temporary in nature and no permanent walls, berms or dams may be installed within a watercourse. | Developer<br>EPC Contractor | Construction |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| A pre-construction walkthrough with an aquatic specialist is recommended and they can assist with the revision of the stormwater management plan and Aquatic Rehabilitation and Monitoring plan, coupled to micro-siting of the final layout. | Developer | Design phase<br>Pre-construction |
| The channel profile, regardless of the current state of the river / water course, will be reinstated thus preventing any impoundments from being formed. The related designs must be assessed by an aquatic specialist during a pre-construction walkdown. | Developer | Design phase<br>Pre-construction |
| If possible, that size of blade laydowns, hardstands must also be limited to reduce the overall footprint, which should be achievable as the areas are flat, thus cut/fill embankments to create level areas should also minimal. | Developer | Design phase |
| The stormwater management plan must detail the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems, and provide recommendations on inspection frequency and effective mitigation measures. | Developer | Design phase |
| Minimise duration of build and avoid all avifauna sensitive areas (e.g., CRM-designated high-risk areas). | Developer | Design phase<br>Construction |
| Roads and tracks to avoid all avifauna sensitive areas wherever possible. | Developer | Design phase<br>Construction |
| Turbines and buildings to avoid High bat sensitive areas (especially confirmed roosts, dams, functional reservoirs, major drainage lines and the prescribed buffers around these). | Developer<br>EPC Contractor | Design phase<br>Construction |
| Minimize disturbance of Medium-High bat sensitive areas (especially potential roosts, secondary drainage lines and the prescribed buffers around these). | Developer<br>EPC Contractor | Design phase<br>Construction<br>Operation |
| Minimize the length and breadth of proposed roads to thus minimize the clearing and disturbance of natural areas (including potential bat roosting habitat). | Developer | Design phase |
| The supporting infrastructure must be constructed as closely as possible together to avoid fragmentation of the entire project site. | Developer | Design phase |
| Aberdeen Wind Energy Facility 1 (Pty) Ltd to inform landowners regarding access restriction around the infrastructure to ensure the landowner is not expecting to return sheep farming to areas of the farm where access will no longer be possible. | Developer | Pre-construction and construction |
| All no-go areas identified by the specialists to be avoided | Developer | Design phase |
| Development to be setback from the N9 and the R61 by at least 1km on either side. | Developer | Design phase |
| Development to be setback from graded resources and farmstead settlements identified in the HIA as IIIB and IIIC, by 500m. | Developer | Design phase |
| Development to be setback from farmsteads forming part of the settlement pattern identified by the HIA by at least 500m | Developer | Design phase |
| A no-go development buffer of 100m must be implemented around rock art Site 35548 identified by the heritage specialists. | Developer | Design phase |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| A 500m no development buffer area must be implemented around sites ABD003, 004, 036, 037, 039, 044 and 061 identified by the heritage specialists. | Developer | Design phase |
| It is recommended that the Developer reach agreement with the land owner that the house identified by the noise specialists will not be used for residential purposes; and/or a noise abatement programme must be designed to ensure that the projected noise levels are less than 45 dBA at NSR05 (during periods when the NSR05 is used for residential purposes). This could include using a WTG (within 3,000 m from NSR05) that has different sound reduction modes (such as a WTG with a noise emission level less than 108 dBA re 1 pW). | Developer<br>EPC Contractor | Design phase |
| Minimizing night-time activities when working within 2,000 m from NSR05. Work should only take place at one WTG location to minimize potential night-time cumulative noises (when working at night within 2,000m from NSR); | Developer<br>EPC Contractor | Design phase<br>Construction |
| The applicant must notify the NSR05 when night-time activities will be taking place within 1,000m from the NSR | Developer<br>EPC Contractor | Design phase<br>Construction |
| Re-evaluate the noise impact should the layout be revised where:<br>• any WTG, located within 1,500 m from a confirmed NSR, are moved closer to the NSR;<br>• any new WTG are introduced within 1,500m from an NSR;<br>• the number of WTG within 2,000m from an NSR are increased; | Developer<br>EPC Contractor | Design phase |
| Re-evaluate the noise impact should the Developer make use of a wind turbine with a maximum SPL exceeding 109.2 dBA re 1 pW | Developer<br>EPC Contractor | Design phase |
| The applicant must plan the completion of noisiest activities (such a pile driving, rock breaking and excavation) during the daytime period (even though it is expected that it is highly unlikely that this may take place at night) | D Developer<br>EPC Contractor | Design phase<br>Construction |
| Retain and maintain natural vegetation in all areas outside of the development footprint, but within the project site. | Developer | Design phase |
| Plan the placement of laydown areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) where possible. | Developer | Design phase |
| Plan lighting as follows:<br>» Implement needs-based night lighting if considered acceptable by the SACAA.<br>» Limit aircraft warning lights to the turbines on the perimeter according to SACAA requirements, thereby reducing the overall impact.<br>» Shield the sources of light by physical barriers (walls, vegetation, or the structure itself).<br>» Limit mounting heights of lighting fixtures, or alternatively use foot-lights or bollard level lights. | Developer<br>EPC Contractor | Design phase<br>Operation |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| » Make use of minimum lumen or wattage in fixtures.<br>» Make use of down-lighters, or shielded fixtures.<br>» Make use of Low-Pressure Sodium lighting or other types of low impact lighting.<br>» Make use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes. | | |
| The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the Developer intends following for the construction phase of the project. | Developer | Design phase |
| Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase. | Developer<br>EPC Contractor | Design phase |
| The recruitment selection process should seek to promote gender equality and the employment of women wherever possible. | Developer<br>EPC Contractor | Design phase |
| Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase. | Developer<br>EPC Contractor | Design phase |
| The Stakeholder Engagement Plan and Community Health, Safety and Security Plan should include a Grievance Mechanism that enables stakeholders to report resolve incidents | Developer<br>EPC Contractor | Design phase |
| The Developer should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for. The agreement should be signed before the construction phase commences. | Developer<br>EPC Contractor | Design phase<br>Construction |
| Existing internal roads should be used where possible. In the event that new roads are required, these roads should be rehabilitated on completion of the construction phase. | Developer | Design phase/<br>Construction |
| The footprint associated with the construction related activities (access roads, construction camps, workshop etc.) should be minimised. | Developer | Design phase |
| Implement agreements with affected landowners regarding the generation of additional income. | Developer | Design phase |
| Use mobile batching plants and quarries in close proximity to the site. | Developer<br>EPC Contractor | Design phase<br>Construction |
| Turbines falling into Class 5[5] must be mitigated with 2-tiers of mitigation (striped-blade and SDOD).<br>Should human SDOD be implemented it should be in place for 24 months and should it prove unnecessary in a review of the number of risky flights recorded (e.g. < 1 per month) then it can be discontinued until such time that increasing Passage Rates or RD or LC fatalities are found | Developer<br>EPC Contractor | Design phase<br>Construction |

[5] Turbines ABE003, ABE005, ABE008, ABE009, ABE027 fall within risk Class 5

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| Turbines in Class 4[6] to be mitigated with 1-tier of mitigation (preferably striped-blade) | Developer<br>EPC Contractor | Design phase<br>Construction |

| | |
|---|---|
| **Performance Indicator** | » Design meets the objectives and does not degrade the environment.<br>» Design and layouts respond to the mitigation measures and recommendations in the BA report. |
| **Monitoring** | » Ensure that the design implemented meets the objectives and mitigation measures in the BA report through review of the facility design by the Project Manager and ECO prior to the commencement of construction. |

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

| | |
|---|---|
| **Project Component/s** | » Wind turbines.<br>» Access roads and crane hardstand areas.<br>» Cabling between turbines.<br>» Substation, BESS and O&M Building hub<br>» Laydown area, warehouse area, and site camp hub<br>» All other associated infrastructure. |
| **Potential Impact** | » Impact on identified sensitive areas.<br>» Design fails to respond optimally to the environmental considerations. |
| **Activities/Risk Sources** | » Positioning of all project components<br>» Pre-construction activities, e.g. geotechnical investigations, site surveys of substation footprint, and internal access roads and environmental walk-through surveys.<br>» Positioning of temporary sites. |
| **Mitigation: Target/Objective** | » To ensure that the design of the power plant responds to the identified environmental constraints and opportunities.<br>» To ensure that pre-construction activities are undertaken in an environmentally friendly manner.<br>» To ensure that the design of the power plant 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. | Developer | Pre-construction |
| Obtain abnormal load permits for transportation of project components to site (if required). | Contractor(s) | Prior to construction |
| The necessary biodiversity permits must be obtained prior to removal of any species of concern. | Developer | Pre-construction |
| A pre-construction walkthrough with an aquatic specialist is recommended and they can assist with the development of the stormwater management plan and Aquatic Rehabilitation and Monitoring plan, coupled to micro-siting of the final layout. | Developer | Pre-construction |

[6] Turbines ABE001, ABE002, ABE004, ABE006, ABE007, ABE010, ABE011, ABE016, ABE017, ABE018, ABE022, ABE023, ABE024, ABE026, ABE028, ABE029, ABE030, ABE033, ABE040, ABE041, ABE042 fall within risk Class 4

| Mitigation: Action/Control | Responsibility | Timeframe |
|---|---|---|
| Obtain any additional environmental permits required (e.g. water use license, protected plant permits, faunal relocation permit, etc.). Copies of permits/licenses must be submitted to the Director: Environmental Impact Evaluation at the DFFE, and kept on site during the construction and operation phases of the project. | Developer | Design phase |
| Search and rescue of species of conservation concern should be conducted prior to clearing activities. | Developer<br>EPC Contractor | Pre-construction |
| Any stormwater within the site must be handled in a suitable manner, i.e. trap sediments, and reduce flow velocities | Developer<br>EPC Contractor | Pre-construction |
| Stormwater from hardstand areas, buildings and the substations must be managed using appropriate channels and swales when located within steep areas. | Developer<br>EPC Contractor | Pre-construction |
| No stormwater runoff must be allowed to discharge directly into the watercourses. The runoff should rather be dissipated over a broad area covered by natural vegetation or managed using appropriate channels and swales when located within steep embankments. | Developer<br>EPC Contractor | Pre-construction |
| Develop a detailed method statement for the implementation of the alien invasive management plan and open space management plan for the site (refer to **Appendix C**). | Developer | Pre-construction |
| Develop a detailed method statement for the implementation of the plant rescue and protection plan for the site (refer to **Appendix E**). | Developer | Pre-construction |
| Develop a detailed method statement for the implementation of the re-vegetation and habitat rehabilitation plan for the site (refer to **Appendix D**). | Developer | Pre-construction |
| Develop a detailed method statement for the implementation of the traffic and transportation management plan for the site (refer to **Appendix F**). | Developer | Pre-construction |
| Develop an effective monitoring system to detect any leakage or spillage of all hazardous substances during their transportation, handling, use and storage. This must include precautionary measures to limit the possibility of oil and other toxic liquids from entering the soil or storm water systems. | Developer | Pre-construction |
| Prepare a detailed Fire Management Plan in collaboration with surrounding landowners. | Developer | Pre-construction |
| Develop and implement an alien, invasive and weeds eradication/control plan. | Developer<br>Specialist | Pre-construction |
| Develop and implement an Aquatic Rehabilitation and Monitoring plan | Developer<br>Specialist | Pre-construction |
| An aquatic comprehensive rehabilitation / monitoring plan must be developed in consultation with a specialist, and must be implemented from the project onset i.e. during the detailed design phase prior to construction, to ensure a net benefit to the environment within all areas that will remain undisturbed. | Developer<br>EPC Contractor<br>Specialist | Pre-construction |

| Mitigation: Action/Control | Responsibility | Timeframe |
|---|---|---|
| Improve the current stormwater and energy dissipation features not currently found along the tracks and roads within the region by local landowners/public works entities where possible. | Developer | Pre-construction |
| All pipe culverts must be removed and replaced with suitable sized box culverts, where road levels are raised. Crossings that are installed below the natural ground level are to be constructed with an appropriate drop inlet structure on the upstream side to ensure that headcut erosion does not develop as a result of the gradient change from the natural ground level to the invert level of the culvert. | Developer | Pre-construction |

| | |
|---|---|
| **Performance Indicator** | » Layout does not destroy/degrade no-go areas.<br>» No disturbance of no-go areas.<br>» Permits are obtained and relevant conditions complied with.<br>» Relevant management plans and Method Statements prepared and implemented. |
| **Monitoring** | » Review of the design by the Project Manager and the ECO prior to the commencement of construction.<br>» Monitor ongoing compliance with the EMPr. |

**OBJECTIVE 3: Ensure compliance of required mitigation measures and recommendations by contractors**

| | |
|---|---|
| **Project Component/s** | » Wind turbines.<br>» Access roads and crane hardstand areas.<br>» Cabling between turbines.<br>» Substation, BESS and O&M Building hub<br>» Laydown area, warehouse area, and site camp hub<br>» All other associated infrastructure. |
| **Potential Impact** | » Impact on identified sensitive areas.<br>» Planning fails to respond optimally to the environmental considerations. |
| **Activities/Risk Sources** | » Positioning of all project components<br>» Pre-construction activities.<br>» Positioning of temporary sites.<br>» Employment and procurement procedures. |
| **Mitigation: Target/Objective** | » To ensure that appropriate planning is undertaken by the contractor to ensure compliance with the conditions of the EA and EMPr.<br>» To ensure that pre-construction and 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<br>EPC Contractor | Pre-construction |
| Create awareness of skills through posters and media announcements and set-up a skills desk at a central and | Developer<br>EPC Contractor | Pre-construction |

| Mitigation: Action/Control | Responsibility | Timeframe |
|---|---|---|
| accessible location. The skills desk should serve to record local job seeker skills. | | |
| Develop a local community safety forum to establish monitoring methods for the surrounding community. | Developer<br>EPC Contractor | Pre-construction |
| The developer should encourage the EPC contractor to increase the local procurement practices and promote the employment of people from local communities, as far as feasible, to maximise the benefits to the local economies. | Developer<br>EPC Contractor | Pre-construction |
| The developer should engage with local authorities and business organisations to investigate the possibility of procuring construction materials, goods and products from local suppliers were feasible. | Developer<br>EPC Contractor | Pre-construction |
| Preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes topics such as no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc. | Developer<br>EPC Contractor | Pre-construction |
| The Developer should hold contractors liable for compensating farmers and communities in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the Developer, the contractors, and neighbouring landowners. The agreement should also cover loses and costs associated with fires caused by construction workers or construction related activities. | Developer<br>EPC Contractor | Design phase<br>Construction |
| The Developer and contractor should develop a Code of Conduct for construction workers. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be subject to appropriate disciplinary action and/or dismissed. All dismissals must comply with the South African labour legislation. The Code of Conduct should be signed by the Developer and the contractors before the contractors move onto site. The Code of Conduct should form part of the Community Health, Safety and Security Plan. | Developer<br>EPC Contractor | Design phase<br>Construction |
| A Method Statement must be compiled for the management of pests and vermin within the site, specifically relating to the canteen area if applicable. | EPC Contractor | Construction |

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

**OBJECTIVE 4: To ensure effective communication mechanisms**

It is important to maintain on-going communication with the public (including affected and surrounding landowners) during the construction and operation phases of the Aberdeen Wind Facility 1. Any issues and concerns raised should be addressed as far as possible in as short a timeframe as possible.

| | |
|---|---|
| **Project component/s** | » Wind turbines.<br>» Access roads and crane hardstand areas.<br>» Cabling between turbines.<br>» Substation, BESS and O&M Building hub<br>» Laydown area, warehouse area, and site camp hub<br>» All other associated infrastructure. |
| **Potential Impact** | » Impacts on affected and surrounding landowners and land uses. |
| **Activity/risk source** | » Activities associated with pre-construction phase.<br>» Activities associated with construction of the wind energy facility.<br>» Activities associated with operation. |
| **Mitigation: Target/Objective** | » Effective communication with affected and surrounding landowners.<br>» Addressing any issues and concerns raised as far as possible in as short a timeframe as possible. |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| Compile and implement a grievance mechanism procedure for the public (including the affected and surrounding landowners) (using **Appendix B**) to be implemented during both the construction and operation phases of the wind energy facility and if applicable during decommissioning. This procedure should include the details of the contact person who will be receiving issues raised by interested and affected parties, and the process that will be followed to address issues. The mechanism must also include procedures to lodge complaints in order for the local community to express any complaints or grievances with the construction process. A Public Complaints register must be maintained by the Contractor to record all complaints and queries relating to the project and the actions taken to resolve the issue.<br><br>A Project Specific Grievance Mechanism will be developed and implemented prior to construction. | Developer<br>EPC Contractor<br>O&M Operator | Pre-construction (construction procedure)<br>Pre-operation (operation procedure) |
| Develop and implement a grievance mechanism for the construction, operation and closure phases of the wind energy facility for all employees, contractors, subcontractors and site personnel. This procedure should be in line with the South African Labour Law. | Developer<br>EPC Contractor<br>O&M Operator | Pre-construction (construction procedure)<br>Pre-operation (operation procedure) |
| Meet with the affected owners and discuss their concerns over property and land values, as well as educate and inform them on the potential environmental impacts that could ensue. | Developer | Pre-construction |
| Develop an incident reporting system to record non-conformances to the EMPr. | EPC Contractor | Pre-construction (construction procedure)<br>Pre-operation (operation procedure) |

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| **Performance Indicator** | » Effective communication procedures in place for all phases as required. |
| **Monitoring** | » An incident reporting system used to record non-conformances to the EMPr.<br>» Grievance mechanism procedures implemented.<br>» Public complaints register developed and maintained. |

# CHAPTER 7: MANAGEMENT PROGRAMME: CONSTRUCTION

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

- Ensures that construction activities are properly 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, protected tree species, and habitats of ecological value.
- Minimises impacts on fauna using the site.
- Minimises the impact on heritage sites should they be uncovered.
- Ensures rehabilitation of disturbed areas following the execution of the works, such that residual environmental impacts are remediated or curtailed.

An environmental baseline must be established during the undertaking of construction activities, where possible.

## 7.1. Objectives

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

**OBJECTIVE 1: Securing the site and site establishment**

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|---|---|
| **Project component/s** | » Wind turbines.<br>» Access roads and crane hardstand areas.<br>» Cabling between turbines.<br>» Substation, BESS and O&M Building hub<br>» Warehouse area, laydown area and site camp hub.<br>» All other associated infrastructure. |
| **Potential Impact** | » Hazards to landowners and public.<br>» Security of materials.<br>» Substantially increased damage to natural vegetation.<br>» Potential impact on fauna and avifauna habitat. |
| **Activities/risk sources** | » Open excavations (foundations and cable trenches).<br>» Movement of construction employees, vehicles and plant equipment in the area and on-site. |
| **Mitigation: Target/Objective** | » To secure the site against unauthorised entry.<br>» To protect members of the public/landowners/residents. |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| Secure the site, working areas and excavations in an appropriate manner. Adequate protective measures must be implemented to prevent unauthorised access to the working area and the internal access/haul routes. | EPC Contractor<br>EO | During site establishment<br>Maintenance: for duration of Contract |
| The Contractor must take all reasonable measures to ensure the safety of the public in the surrounding area. Where the public could be exposed to danger by any of the works or site activities, the Contractor must, as appropriate, provide suitable flagmen, barriers and/or warning signs in English and any other relevant indigenous languages, all to the approval of the Site Manager. All unattended open excavations shall be adequately demarcated and/or fenced. | EPC Contractor | During site establishment<br>Maintenance: for duration of Contract |
| Where necessary to control access, fence and secure the area and implement access control procedures. | EPC Contractor | During site establishment<br>Maintenance: for duration of Contract |
| Establish SABS 089: 1999 Part 1 approved bunded areas for the storage of hazardous materials and hazardous waste. | EPC Contractor | During site establishment and during construction |
| Establish the necessary ablution facilities with chemical toilets and provide adequate sanitation facilities and ablutions for construction workers (1 toilet per every 15 workers) at appropriate locations on site. These must be situated outside of any delineated watercourses or the buffers shown. | EPC Contractor | During site establishment and during construction |
| A water use authorisation application must be submitted and obtained from the DWS prior to any abstraction of groundwater | Developer | Prior to water use |
| Supply adequate weather and vermin proof waste collection bins and skips (covered at minimum with secured netting or shade cloth) at sites where construction is being undertaken. Separate bins should be provided for general and hazardous waste. As far as possible, provision should be made for separation of waste for recycling. | EPC Contractor | Site establishment, and duration of construction |
| Demarcate all areas to be cleared with construction tape or other appropriate and effective means. However, caution should be exercised to avoid using material that might entangle fauna. | EPC Contractor | Construction |
| No unauthorized persons should be allowed onto the site and site access should be strictly controlled | EPC Contractor | Construction |
| Management of the site should take place within the context of an Open Space Management Plan. | EPC Contractor | Construction |
| Clearly demarcate riparian areas near to the development footprint as restricted areas with appropriate signage and barriers. | EPC Contractor | Construction |
| Vegetation clearance must be restricted to the authorised footprint | EPC Contractor | Construction |
| Removal of obstacles to allow for access of construction must be kept to only were essential. | EPC Contractor | Construction |
| Land clearance must only be undertaken immediately prior to construction activities and only within the development footprint/servitude | Developer | Construction |

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| **Performance Indicator** | » Site is secure and there is no unauthorised entry.<br>» No members of the public/ landowners injured as a result of construction activities.<br>» Fauna and flora is protected as far as practically possible.<br>» Appropriate and adequate waste management and sanitation facilities provided at construction site. |
| **Monitoring** | » Regular visual inspection of the fence for signs of deterioration/forced access.<br>» An incident reporting system must be used to record non-conformances to the EMPr.<br>» Public complaints register must be developed and maintained on site.<br>» ECO/ EO to monitor all construction areas on a continuous basis until all construction is completed; immediate reporting back to the site manager.<br>» ECO/ EO to address any infringements with responsible contractors as soon as these are recorded. |

**OBJECTIVE 2: Appropriate management of the construction site and construction workers**

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|---|---|
| **Project Component/s** | » Wind turbines.<br>» Access roads and crane hardstand areas.<br>» Cabling between turbines.<br>» Substation, BESS and O&M Building hub<br>» Warehouse area, laydown area and site camp hub.<br>» All other associated infrastructure. |
| **Potential Impact** | » Damage to indigenous natural vegetation and sensitive areas.<br>» Damage to and/or loss of topsoil (i.e. pollution, compaction etc.).<br>» Impacts on the surrounding environment due to inadequate sanitation and waste removal facilities.<br>» Pollution/contamination of the environment. |
| **Activities/Risk Sources** | » Vegetation clearing and levelling of equipment storage area/s.<br>» Access to and from the equipment storage area/s.<br>» Ablution facilities.<br>» Contractors not aware of the requirements of the EMPr, leading to unnecessary impacts on the surrounding environment. |
| **Mitigation: Target/Objective** | » Limit equipment storage within demarcated designated areas.<br>» Ensure adequate sanitation facilities and waste management practices.<br>» Ensure appropriate management of actions by on-site personnel in order to minimise impacts to the surrounding environment. |

| Mitigation: Action/Control | Responsibility | Timeframe |
|---|---|---|
| To minimise impacts on the surrounding environment, contractors must be required to adopt a certain Code of Conduct and commit to restricting construction activities to areas within the development footprint. Contractors and their sub-contractors must be familiar with the conditions of the Environmental Authorisation, the BA Report, and this EMPr, as well as the requirements of all relevant environmental legislation. | EPC Contractor | Construction |
| Contractors must ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct. | EPC Contractor and sub-contractor/s | Pre-construction |

| Mitigation: Action/Control | Responsibility | Timeframe |
|---|---|---|
| Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads. | EPC Contractor | Construction |
| Maintenance must be undertaken regularly on all vehicles and maintenance machinery to prevent hydrocarbon spills. | EPC Contractor | Construction |
| Vehicles and equipment must travel within demarcated areas and not outside of the construction footprint; | EPC Contractor | Construction |
| Ensure that construction workers are clearly identifiable. All workers must carry employee identification cards and wear identifiable clothing. | EPC Contractor | Construction |
| All personnel should undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and snakes which are often persecuted out of fear or superstition, waste management and the importance of not undertaking activities that could result in pollution of those watercourses. | EPC Contractor | Construction |
| Regular toolbox talks should be undertaken to ensure appropriate levels of environmental awareness. | EPC Contractor | Construction |
| Contact details of emergency services must be prominently displayed on site. | EPC Contractor | Construction |
| Contractor must provide adequate firefighting equipment on site and provide firefighting training to selected construction staff. | EPC Contractor | Construction |
| Personnel trained in first aid must be on site to deal with smaller incidents that require medical attention. | EPC Contractor | Construction |
| Road borders must be regularly maintained to ensure that vegetation remains short to serve as an effective firebreak. An emergency fire plan must be developed with emergency procedures in the event of a fire. | EPC Contractor | Construction |
| Ensure waste storage facilities are maintained and emptied on a regular basis. | EPC Contractor | Construction |
| No domestic and other waste must be left at the site and must be transported with the maintenance vehicles to an authorised waste dumping area. | EPC Contractor | Construction |
| 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. Proof of disposal to be retained as proof of responsible disposal. | EPC Contractor | Construction |
| All contaminated water must be contained by means of careful run-off management on site. | EPC Contractor | Construction |
| 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. | EPC Contractor | Construction |
| Ensure ablution facilities are appropriately maintained. Ablutions must be cleaned regularly and associated waste disposed of at a registered/permitted waste disposal site. | EPC Contractor and sub-contractor/s | Construction |

| Mitigation: Action/Control | Responsibility | Timeframe |
|---|---|---|
| Ablutions must be removed from site when construction is completed. | | |
| Cooking and eating of meals must take place in a designated area. No open fires made by the construction teams are allowable during the construction phase. | EPC Contractor and sub-contractor/s | Construction |
| All litter must be deposited in a clearly marked, closed, animal-proof disposal bin in the construction area. Particular attention needs to be paid to food waste. | EPC Contractor and sub-contractor/s | Construction |
| The strict use and management of all hazardous materials used on site should be practiced. Keep a record of all hazardous substances stored on site. Clearly label all the containers storing hazardous waste. | EPC Contractor | Construction |
| All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. | EPC Contractor | Construction |
| Ensure proper health and safety plans in place during the construction period to ensure safety on and around site during construction, including fencing of the property and site access restriction. | EPC Contractor and sub-contractor/s | Pre-construction |
| All disturbed areas that are not used such as excess road widths, should be rehabilitated with locally occurring shrubs and grasses after construction to reduce the overall footprint of the development. | EPC Contractor and sub-contractor/s | Post-Construction |
| On completion of the construction phase, all construction workers must leave the site within one week of their contract ending. | EPC Contractor and sub-contractor/s | Post - Construction |
| Removal of obstacles to allow for access of construction vehicles must be kept to only where essential. | EPC Contractor and sub-contractor/s | Construction |
| Prior arrangements must be made with the landowner and neighbouring landowners to ensure that farm and game animals are moved to areas where they cannot be injured by vehicles traversing the area. | EPC Contractor and sub-contractor/s | Construction |
| No boundary fence must be opened without the landowner or neighbouring landowners' permission | EPC Contractor and sub-contractor/s | Construction |
| Where possible, conduct the construction activities outside of the rainy season; | EPC Contractor and sub-contractor/s | Construction |
| Vehicles and equipment must park in designated parking areas | EPC Contractor and sub-contractor/s | Construction |
| Contractors appointed by the Developer must ensure that construction workers who are found guilty of stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation. | EPC Contractor | Pre-construction/ Construction |
| An Environmental Control Officer (ECO) should be appointed to monitor the construction phase. | EPC Contractor | Pre-construction/ Construction |

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| **Performance Indicator** | » Code of Conduct drafted before commencement of the construction phase. Appropriate training of all staff is undertaken prior to them commencing work on the construction site.<br>» Ablution and waste removal facilities are in a good working order and do not pollute the environment due to mismanagement.<br>» All areas are rehabilitated promptly after construction in an area is complete.<br>» Excess vegetation clearing and levelling is not undertaken.<br>» No complaints regarding contractor behaviour or habits. |
| **Monitoring** | » Regular audits of the construction camps and areas of construction on site by the EO.<br>» Proof of disposal of sewage at an appropriate licensed wastewater treatment works.<br>» Proof of disposal of waste at an appropriate licensed waste disposal facility.<br>» An incident reporting system must be used to record non-conformances to the EMPr.<br>» Observation and supervision of Contractor practices throughout the construction phase by the EO.<br>» Complaints will be investigated and, if appropriate, acted upon. |

**OBJECTIVE 3: Maximise local employment and business opportunities associated with the construction phase**

It is acknowledged that skilled personnel are required for the construction of the wind turbines and associated infrastructure. However, where semi-skilled and unskilled labour is required, opportunities for local employment should be maximised as far as possible. Employment of locals and the involvement of local Small, Micro and Medium Enterprises (SMMEs) would enhance the social benefits associated with the wind energy facility, even if the opportunities are only temporary. The procurement of local goods could furthermore result in positive economic spin-offs.

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| **Project component/s** | » Construction activities associated with the establishment of the wind energy facility, including associated infrastructure. |
| **Potential Impact** | » The opportunities and benefits associated with the creation of local employment and business should be maximised. |
| **Activities/risk sources** | » The employment of outside contractors to undertake the work and who make use of their own labour will reduce the employment and business opportunities for locals. Employment of local labour will maximise local employment opportunities. |
| **Mitigation: Target/Objective** | » The Developer, in discussions with the local municipality, should aim to employ as many workers (skilled, semi-skilled / low-skilled) from the local areas/ towns, as possible.<br>» The Developer should also develop a database of local BBBEE service providers. |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase. | EPC Contractor | Construction |
| Where reasonable and practical, the Developer should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area. | EPC Contractor | Construction |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria. | EPC Contractor | Construction |
| Before the construction phase commences the Developer should meet with representatives from the DM to establish the existence of a skills database for the area. If such as database exists, it should be made available to the contractors appointed for the construction phase. | EPC Contractor | Construction |
| The Developer should liaise with the Dr Beyers Naude Local Municipality with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g., construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction service providers. These companies should be notified of the tender process and invited to bid for project-related work. | EPC Contractor | Construction |

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| **Performance Indicator** | » Maximum amount of semi and unskilled labour locally sourced where possible.<br>» Local suppliers and SMMEs contracted where possible.<br>» Skills transfer facilitated where required.<br>» Apprenticeship programmes established |
| **Monitoring and Reporting** | » Contractors and appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase. |

**OBJECTIVE 4: Avoid the negative social impacts on family structures and social networks due to the presence of construction workers from outside the area**

The migration of people to the area could result in social conflicts between the local population and the migrant work force as the local population could perceive these migrant workers as "stealing" their employment opportunities. Likewise, the influx of people into the area, could potentially lead to a temporary increase in the level of crime, illicit activity and possibly a deterioration of the health of the local community through the spread of infectious diseases. Without any form of income these individuals run the risk of exacerbating the level of poverty within the area. Aside from the broader community issues the increase in the number of people in the area is likely to have an adverse effect on crime levels, incidents of trespassing, development of informal trading and littering. There is also potentially a likelihood of increased stock theft.

The low and semi-skilled workers are likely to be local residents and will therefore from part of the local family and social network.

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| **Project component/s** | » Construction and establishment activities associated with the establishment of the wind energy facility, including associated infrastructure.<br>» Construction work force. |

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|---|---|
| **Potential Impact** | » The presence of construction workers who live outside the area and who are housed in local towns can impact on family structures and social networks.<br>» Presence of construction workers on site may result in loss of livestock due to stock theft and damage to farm infrastructure, such as gates and fences. Poaching of wild animals may also occur.<br>» Impacts on the surrounding environment due to inadequate sanitation and waste removal facilities.<br>» Impact on the safety of farmers and communities (increased crime etc.) by construction workers and also damage to farm infrastructure such as gates and fences.<br>» Increase in production and GDP-R. |
| **Activities/risk sources** | » The presence of construction workers can impact negatively on family structures and social networks, especially in small, rural communities.<br>» The presence of construction workers on the site can result in stock thefts or illegal hunting/ trapping of fauna and or game and damage to farm infrastructure. |
| **Mitigation: Target/Objective** | » Avoid and/or minimise the potential impact of construction workers on the local community and their livelihoods.<br>» To minimise impacts on the social and biophysical environment.<br>» Maximise the economic benefit to the local municipality.<br>» Prohibit theft of stock and valuables on impacted and adjacent farm portions.<br>» Procure goods and services, as far as practically possible, from the local municipality.<br>» Initiate site access control and monitor movement to and from the site. |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| Ensure that any damages or losses to nearby affected farms that can be linked to the conduct of construction workers are adequately reimbursed | EPC Contractor | Construction |
| Assign a dedicated person to deal with complaints and concerns of affected parties | EPC Contractor | Construction |
| The Developer should consider the option of establishing a Monitoring Committee for the construction phase that representatives from local landowners, farming associations, and the local municipality. This monitoring committee should be established prior to commencement of the construction phase and form part of the Stakeholder Engagement Plan. | Developer | Construction |
| The Developer and the contractor should implement an HIV/AIDS, COVID-19 and Tuberculosis (TB) awareness programme for all construction workers at the outset of the construction phase. The programmes should form part of the CHSSP | Developer | Construction |
| Engage with local authorities and inform them of the development as well as discuss with them their ability to meet the additional demands on social and basic services created by the in migration of workers | EPC Contractor | Construction |
| Where feasible, assist the municipality in ensuring that the quality of the local social and economic infrastructure does not deteriorate through the use of social responsibility allocations | EPC Contractor | Construction |
| Implement a policy that no employment will be available at the gate. | EPC Contractor | Pre-construction/ construction |
| Discuss with local associations how crime related issue could be mitigated. | EPC Contractor | Pre-construction/ construction |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| The contractor should provide transport for workers to and from the site on a daily basis. This will enable the contactor to effectively manage and monitor the movement of construction workers on and off the site. | EPC Contractor | Pre-construction/ construction |
| The contractor must ensure that all construction workers from outside the area are transported back to their place of residence within 2 days for their contract coming to an end. | EPC Contractor | Construction / Post Construction |
| No construction workers, with the exception of security personnel, should be permitted to stay over-night on the site. | EPC Contractor | Pre-construction/ construction |
| All farm gates must be closed after passing through. | EPC Contractor | Pre-construction/ construction |
| Contractors appointed by the Developer should provide daily transport for low and semi-skilled workers to and from the site. | EPC Contractor | Pre-construction/ construction |

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| **Performance Indicator** | » No criminal activities attributable to the construction workers are reported.<br>» No complaints received from landowners or the general public. |
| **Monitoring and Reporting** | » An incident reporting system must be used to record non-conformances to the EMPr.<br>» Public complaints register must be developed and maintained on site. |

## OBJECTIVE 5: Control of noise pollution stemming from construction activities

Various construction activities would be taking place during the development of the facility and may pose a noise risk to the closest receptors. These activities could include temporary or short-term activities where small equipment is used (such as the digging of trenches to lay underground power lines/cabling). The impact of such activities is generally very low. Impacts may however occur where activities are undertaken at night.

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| **Project component/s** | » Wind turbines.<br>» Access roads and crane hardstand areas.<br>» Cabling between turbines.<br>» Substation, BESS and O&M Building hub<br>» Warehouse area, laydown area and site camp hub.<br>» All other associated infrastructure. |
| **Potential Impact** | » Increased noise levels at potentially sensitive receptors. |
| **Activity/risk source** | » Site preparation and earthworks.<br>» Construction-related transport.<br>» Foundations or plant equipment installation.<br>» Building activities. |
| **Mitigation: Target/Objective** | » Ensure that maximum noise levels at potentially sensitive receptors are less than 65dBA.<br>» Prevent the generation of disturbing or nuisance noises.<br>» Ensure acceptable noise levels at surrounding stakeholders and potentially sensitive receptors.<br>» Ensure compliance with the National Noise Control Regulations.<br>» Ensure night-time noise levels less than 45 dBA. |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| Minimizing night-time activities when working within 2,000m from any NSR. Work should only take place at one WTG location to minimize potential night-time cumulative noises (when working at night within 2,000m from NSR 5 and 8. | Developer | Construction |
| The Developer must notify the NSR 5 and 8 when night-time activities will be taking place within 1,000m from the NSR; and | Developer | Construction |
| The Developer must plan the completion of noisiest activities (such a pile driving, rock breaking and excavation) during the daytime period (even though it is expected that it is highly unlikely that this may take place at night). | Developer | Construction |
| The Developer can plan construction activities at the closest WTG (ABE037 and ABE038) to take place during a period when the structure is not used for residential purposes; | Developer | Design Phase<br>Construction |
| Ensure that all equipment is maintained and fitted with the required noise abatement equipment. Engine bay covers over heavy equipment could be pre-fitted with sound absorbing material. Heavy equipment that fully encloses the engine bay should be considered, ensuring that the seam gap between the hood and vehicle body is minimised; | EPC Contractor | Weekly inspection |
| Include a component covering environmental noise in the Health and Safety Induction to sensitize all employees and contractors about the potential impact from noise, especially those employees and contractors that have to travel past receptors at night, or might be required to do work close (within 1,500m) to NSR at night. This should include issues such as minimising the use of vehicle horns | EPC Contractor | Construction |
| Investigates any reasonable and valid noise complaint if registered by a receptor staying within 2,000 m from the location where construction activities are taking place, or where night-time construction activities are required, or where an operational WTG are located. A complaint register, keeping a full record of the complaint, must be kept by the Developer | EPC Contractor | Construction |
| With regard to unavoidable noisy night-time construction activities in the vicinity of NSR (closer than 1,500 m from any identified NSR), the contractor and Environmental Control Officer (ECO) must liaise with local NSR on how best to minimise impact and the NSR must be kept informed of the nature and duration of intended activities | EPC Contractor | Construction |
| The construction crew must abide by the local by-laws regarding noise. | EPC Contractor | Construction phase |

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| **Performance Indicator** | » Construction activities do not change the existing ambient sound levels with more than 7dB.<br>» Ensure that maximum noise levels at potentially sensitive receptors are less than 65 dBA.<br>» No noise complaints are registered |
| **Monitoring and Reporting** | » Ambient sound measurements are recommended to take place prior to the construction of the wind energy facility. |

**OBJECTIVE 6: Management of dust and emissions and damage to roads**

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

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| **Project component/s** | » Wind turbines.<br>» Access roads and crane hardstand areas.<br>» Cabling between turbines.<br>» Substation, BESS and O&M Building hub<br>» Warehouse area, laydown area and site camp hub.<br>» All other associated infrastructure. |
| **Potential Impact** | » Dust impacts can occur from cleared areas and from vehicle movement along gravel roads.<br>» Release of minor amounts of air pollutants (for example $NO_2$, CO and $SO_2$) from vehicles and construction equipment. |
| **Activities/risk sources** | » The movement of construction vehicles and their activities on the site.<br>» Clearing of vegetation and topsoil.<br>» Excavation, grading and scraping.<br>» Transport of materials, equipment and components.<br>» Re-entrainment of deposited dust by vehicle movements.<br>» Wind erosion from topsoil and spoil stockpiles and unsealed roads and surfaces.<br>» Fuel burning from construction vehicles with combustion engines. |
| **Mitigation: Target/Objective** | » To avoid and or minimise the potential dust impacts associated with heavy vehicles, and also minimise damage to roads.<br>» To ensure emissions from all vehicles are minimised, where possible, for the duration of the construction phase.<br>» To minimise nuisance to the community and adjacent landowners from dust emissions and to comply with workplace health and safety requirements for the duration of the construction phase. |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| Reduce and control construction dust using approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent). | EPC Contractor | Construction phase |
| Dust Suppression of gravel roads during the construction phase, as required. | EPC Contractor | Construction phase |
| Regular maintenance of gravel roads by the Contractor during the construction phase. | EPC Contractor | Construction phase |
| Vehicles and equipment must be maintained in a road-worthy condition at all times. Road worthy certificates must be in place for all heavy vehicles at the outset of the construction phase and updated on a as and when required | EPC Contractor | Construction phase |
| Vehicles used to transport sand and building materials must be fitted with tarpaulins or covers when travelling on roads. | EPC Contractor | Construction phase |
| Ensure vehicles adhere to speed limits on public roads and speed limits set within the site by the Site Manager. | Contractor Transportation contractor | Duration of contract |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| Disturbed areas must be re-vegetated as soon as practicable after construction is complete in an area. | EPC Contractor | At completion of the construction phase |

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| **Performance Indicator** | » Appropriate dust suppression measures implemented on site during the construction phase.<br>» Drivers made aware of the potential safety issues and enforcement of strict speed limits when they are employed or before entering the site.<br>» Road worthy certificates in place for all heavy vehicles at the outset of the construction phase and updated on a monthly basis. |
| **Monitoring and Reporting** | » The Developer and appointed EO must monitor indicators listed above to ensure that they have been met for the construction phase.<br>» Immediate reporting by personnel of any potential or actual issues with nuisance dust or emissions to the Site Manager.<br>» An incident reporting system must be used to record non-conformances to the EMPr.<br>» Public complaints register must be developed and maintained on site. |

## OBJECTIVE 7: Conservation of the existing soil resource within the site and in the adjacent areas

The natural soil on the site needs to be preserved as far as possible to minimise impacts on the environment. Soil degradation including erosion (by wind and water) and subsequent deposition elsewhere is of a concern. Uncontrolled run-off relating to construction activities (excessive wetting, etc.) will also lead to accelerated erosion. Degradation of the natural soil profile due to excavation, stockpiling, compaction, pollution and other construction activities will affect soil forming processes and associated ecosystems.

A set of strictly adhered to mitigation measures are required to be implemented in order to effectively limit the impact on the environment. The disturbed areas where human impact is likely are the focus of the mitigation measures laid out below.

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| **Project component/s** | » Wind turbines.<br>» Access roads and crane hardstand areas.<br>» Cabling between turbines.<br>» Substation, BESS and O&M Building hub<br>» Warehouse area, laydown area and site camp hub.<br>» All other associated infrastructure. |
| **Potential Impact** | » Erosion and soil loss.<br>» Increased runoff.<br>» Downstream sedimentation. |
| **Activities/risk sources** | » Rainfall and wind erosion of disturbed areas.<br>» Excavation, stockpiling and compaction of soil.<br>» Concentrated discharge of water from construction activity.<br>» Stormwater run-off from sealed surfaces.<br>» Mobile construction equipment movement on site.<br>» Roadside drainage ditches.<br>» Project related infrastructure, such as buildings, turbines and fences. |
| **Mitigation: Target/Objective** | » To minimise erosion of soil from site during construction.<br>» To minimise damage to vegetation by erosion or deposition.<br>» To retain all topsoil with a stable soil surface |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| Prevent any spills from occurring. Machines must be parked within hard park areas and must be checked daily for fluid leaks. | EPC Contractor | Construction |
| Stockpile topsoil for re-use in rehabilitation phase. Maintain stockpile shape and protect from erosion. | EPC Contractor | Construction |
| Spillages of cement to be cleaned up immediately and disposed or re-used in the construction process. | EPC Contractor | Construction |
| Spill kits to be kept on active parts of the construction site and at site offices. | EPC Contractor | Construction |
| Cement batching to take place in designated areas only, as approved on site layout (if applicable). | EPC Contractor | Construction |
| When preparing the hard setting area, cuts should be used for fill with little or no wastages. | EPC Contractor | Construction |
| Implement erosion control measures denuded areas as required and monitor erosion and manage all occurrences according to the erosion management plan (refer to **Appendix M**). Erosion control measures should be implemented in areas where slopes have been disturbed. | EPC Contractor | Construction |
| Control depth of all excavations and stability of cut faces/sidewalls. | EPC Contractor | Construction |
| Reapplying topsoil:<br>» Spoil materials and subsoil must be back-filled first, then covered with topsoil.<br>» Immediate replacement of topsoil after the undertaking of construction activities within an area.<br>» Generally, topsoil should be re-applied to a depth slightly greater than the topsoil horizon of a pre-selected undisturbed reference site.<br>» The minimum depth of topsoil needed for re-vegetation to be successful is approximately 20 cm.<br>» If the amount of topsoil available is limited, a strategy must be devised to optimise re-vegetation efforts with the topsoil available.<br>» Reapplied topsoil should be landscaped in a way that creates a variable microtopography of small ridges and valleys that run parallel to existing contours of the landscape. The valleys become catch-basins for seeds and act as run-on zones for rainfall, increasing moisture levels where the seeds are likely to be more concentrated. This greatly improves the success rate of re-vegetation efforts.<br>» To stabilise reapplied topsoil and minimise raindrop impact and erosion:<br>* Use organic material from cleared and shredded woody vegetation where possible<br>* Alternatively, suitable geotextiles or organic erosion mats can be used as necessary<br>» Continued monitoring will be necessary to detect any sign of erosion early enough to allow timeous mitigation. | EPC Contractor | Construction |
| Re-applied topsoil needs to be re-vegetated as soon as possible. | EPC Contractor | Construction |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| Implement general erosion control measures/practises:<br>» Runoff control and attenuation can be achieved by using any or a combination of sand bags, logs, silt fences, storm water channels and catch-pits, shade nets, geofabrics, seeding or mulching as needed on and around cleared and disturbed areas.<br>* Ensure that all soil surfaces are protected by vegetation or a covering to avoid the surface being eroded by wind or water.<br>» Ensure that heavy machinery does not compact areas that are not meant to be compacted as this will result in compacted hydrophobic, water repellent soils which increase the erosion potential of the area.<br>» Prevent the concentration or flow of surface water or storm water down cut or fill slopes or along pipeline routes or roads and ensure measures to prevent erosion are in place prior to construction.<br>» Minimise and restrict site clearing to areas required for construction purposes only and restrict disturbance to adjacent undisturbed natural vegetation.<br>» Vegetation clearing should occur in parallel with the construction progress to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then result in sedimentation.<br>» When implementing dust control measures, prevent over-wetting, saturation, and run-off that may cause erosion and sedimentation. | EPC Contractor | Construction |
| Conservation measures should be applied to ensure that soil does not get unusable or unproductive and to ensue soil stabilisation. | EPC Contractor | Construction |
| There should be regular dust suppression during construction and site preparation. | EPC Contractor | Construction |
| Regular monitoring for erosion during construction to ensure that no erosion problems have developed as result of the disturbance, as per the Erosion Management and Rehabilitation Plans for the project. During the wet season monitoring every 2 months is recommended and every 6 months during the dry season. However, monitoring should also occur after any large rainfall events. | ECO | Construction |
| All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. | EPC Contractor | Construction |
| Wherever excavation is necessary, topsoil should be set aside and replaced to encourage natural regeneration of the local indigenous species. | EPC Contractor | Construction |
| All bare areas, as a result of the development, should be revegetated with locally occurring species, to bind the soil and limit erosion potential. | EPC Contractor | Construction |
| Silt traps should be used where there is a danger of topsoil eroding and entering streams and other sensitive areas | EPC Contractor | Construction |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| Construction of gabions and other stabilisation features to prevent erosion must be undertaken, if deemed necessary. | EPC Contractor | Construction |
| Land clearance must only be undertaken immediately prior to construction activities and only within the development footprint/servitude. | EPC Contractor | Construction |
| Unnecessary land clearance must be avoided. | EPC Contractor | Construction |
| Level any remaining soil removed from excavation pits that remained on the surface instead of allowing small stockpiles of soil to remain on the surface. | EPC Contractor | Construction |
| Regularly monitor the site to check for areas where signs of soil erosion may start to appear. | EPC Contractor | Construction |
| Should any soil erosion be detected, it must be addressed immediately through rehabilitation and surface stabilisation techniques. | EPC Contractor | Construction |
| Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use. Any erosion / sedimentation must be resolved through whatever additional interventions maybe necessary (i.e., extension, energy dissipaters, spreaders, etc). | Developer | Construction phase |
| All pipe culverts must be removed and replaced with suitable sized box culverts, where road levels are raised. Crossings that are installed below the natural ground level are to be constructed with an appropriate drop inlet structure on the upstream side to ensure that headcut erosion does not develop as a result of the gradient change from the natural ground level to the invert level of the culvert. | Developer<br>EPC Contractor | Construction |
| Maintenance must be undertaken regularly on all vehicles and construction/maintenance. | EPC Contractor | Construction |

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| **Performance Indicator** | » Minimal level of soil erosion around site.<br>» Minimal level of soil degradation.<br>» No activity outside demarcated areas.<br>» Acceptable state of excavations.<br>» No activity in restricted areas.<br>» Acceptable state of excavations, as determined by EO and ECO.<br>» Progressive return of disturbed and rehabilitated areas to the desired end state (refer also to the Plant Rescue and Protection Plan in **Appendix E**).<br>» No indications of visible topsoil loss. |
| **Monitoring and Reporting** | » Continual inspections of the site by the EO.<br>» Reporting of ineffective sediment control systems and rectification as soon as possible.<br>» If soil loss is suspected, acceleration of soil conservation and rehabilitation measures must be implemented. |

**OBJECTIVE 8: Minimise the impacts on and loss of indigenous vegetation, control of alien invasive plants and impact to freshwater resources**

The Aberdeen Wind Facility 1 project site falls almost entirely within the Eastern Lower Karoo vegetation type with a small extent of Southern Karoo Riviere along the Gannaleegte River in the south of the site. Although there is some variation in vegetation composition within the site depending on soil depth, underlying geology and rockiness, these differences represent different communities rather than different vegetation type

In terms of Regulation 15E of the CARA Regulations, 1984 (GNR 1048) where category 1, 2 and 3 plants occur, a land user is required to control such plants. In terms of the lifecycle of the project, the land user will be required to control any of these species by means of the following methods:

- A site-specific eradication and management programme for alien invasive plants must be implemented during construction.
- Regular monitoring by the operation and maintenance team for alien plants must occur and could be conducted simultaneously with erosion monitoring.
- When alien plants are detected, these must be controlled and cleared using the recommended control measures for each species.
- Clearing methods must aim to keep disturbance to a minimum. No planting or importing any listed invasive alien plant species (all Category 1a, 1b and 2 invasive species) to the site for landscaping, rehabilitation or any other purpose must be undertaken.

No application is required in this regard, and management measures are detailed in the Environmental management Programme (EMPr) for the facility.

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| **Project component/s** | » Wind turbines.<br>» Access roads and crane hardstand areas.<br>» Cabling between turbines.<br>» Substation, BESS and O&M Building hub<br>» Warehouse area, laydown area and site camp hub.<br>» All other associated infrastructure.. |
| **Potential Impact** | » Loss of plant cover leading to loss of faunal habitat and loss of specimens of protected plants.<br>» Soil erosion.<br>» Increased fire hazards.<br>» Increased water use. |
| **Activity/risk source** | » Site preparation and clearing.<br>» Soil disturbance<br>» Introduction of plant propagules with people and vehicles.<br>» Activities outside of designated construction areas.<br>» Driving off designated routes. |
| **Mitigation: Target/Objective** | » To limit construction activities to designated areas.<br>» Implement invasive plant clearing prior to construction, but after site demarcation. |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| Access control onto the site during construction. | EPC Contractor | Construction |
| Monitoring of construction activities to ensure that staff remain within the demarcate development footprint. | EPC Contractor | Construction |
| Communicate clearly to all contractors that no disturbance outside the demarcated areas will be tolerated. | EPC Contractor | Construction |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| Demarcate all areas to be cleared with construction tape or other appropriate and effective means. However, caution should be exercised to avoid using material that might entangle fauna. | EPC Contractor | Construction |
| No fires should be allowed within the site. | EPC Contractor | Construction |
| Where large cut and fill areas are required, these must be stabilised and rehabilitated during the construction process, to minimise erosion and sedimentation. | EPC Contractor | Construction<br>Operation |
| Removal of vegetation must only be when essential for the continuation of the project. Do not allow any disturbance to the adjoining natural vegetation cover or soils. | EPC Contractor | Construction |
| No fuelwood collection should be allowed on-site. | EPC Contractor | Construction |
| Wherever excavation is necessary, topsoil should be set aside and replaced after construction to encourage natural regeneration of the local indigenous species. | EPC Contractor | Construction |
| Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible. | EPC Contractor | Construction |
| Vegetation clearing should occur in a phased manner in accordance with the construction programme to minimise erosion and/or run-off. | EPC Contractor | Construction |
| Vegetation clearance must be restricted to infrastructure and access road areas. | EPC Contractor | Construction |
| Materials and equipment must only be stored in the pre-determined laydown areas. | EPC Contractor | Construction |
| Unnecessary impacts on surrounding natural vegetation must be avoided, The construction impacts must be contained to the footprint of the wind energy facility. | EPC Contractor | Construction |
| Avoid creating conditions in which alien plants may become established:<br>» Keep disturbance of indigenous vegetation to a minimum<br>» Rehabilitate disturbed areas as quickly as possible once construction is complete in an area<br>» Do not import soil from areas with alien plants. | EPC Contractor | Construction |
| Establish an on-going monitoring programme to detect, quantify and remove any alien species that may become established and identify the problem species (as per Conservation of Agricultural Resources Act and Act 43 of 1983 and NEM: Biodiversity Act). | EPC Contractor | Construction |
| Immediately control any alien plants that become established using registered control methods appropriate for the particular species in question. Where necessary, obtain an opinion from a registered Pest Control Officer. | EPC Contractor | Construction |
| All alien plant re-growth must be monitored and should these alien plants reoccur these plants should be re-eradicated. The scale of the development does however not warrant the use of a Landscape Architect and / or Landscape Contractor. | EPC Contractor | Construction |

| 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 (a registered Pest Control Officer). 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. | EPC Contractor | Construction |
| A registered Pest Control Officer must be appointed to implement the invasive alien plants and weeds management plan. The Pest Control Officer must supervise the clearing team to ensure compliance with the invasive alien plants and weeds management plan. | EPC Contractor | Construction |
| All cleared areas should be revegetated with indigenous perennial species from the local area. | EPC Contractor | Construction |
| Minimise the development footprint as far as possible and rehabilitate disturbed areas that are no longer required by the operational phase of the development. | EPC Contractor | Construction |
| Sandbags used in any diversion or for any other activity within a watercourse must be in a good condition, so that they do not burst and empty sediment into the watercourse. | Developer<br>EPC Contractor | Construction |
| There should be reduced activity at the site after large rainfall events when the soils are wet. No driving off of hardened roads should occur immediately following large rainfall events until soils have dried out and the risk of bogging down has decreased. | EPC Contractor | Construction |
| Appropriate ablution facilities must be located well away from any watercourses and must be regularly maintained. | EPC Contractor | Construction |
| Containment of all contaminated water by means of careful run-off management on site. | EPC Contractor | Construction |
| Monitoring of construction activities to ensure that the development footprint within sensitive areas is restricted to the authorised development footprint. | EPC Contractor | Construction |

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| **Performance Indicator** | » No disturbance outside of designated work areas.<br>» Limited alien infestation within project control area.<br>» Construction activities restricted to the development footprint. |
| **Monitoring and Reporting** | » Observation of vegetation clearing activities by ,the EO throughout the construction phase.<br>» Monitoring of alien plant establishment within the site on an on-going basis. |

## OBJECTIVE 9: Protection of terrestrial fauna

As many as 60 mammals are listed for the wider study area in the MammalMap database, but many of these are introduced or conservation-dependent and approximately 45 can be considered to be free-roaming and potentially impacted by the development. This includes two red-listed species, the Black-footed Cat Felis nigripes (vulnerable) and Mountain Reedbuck (Endangered). The Mountain Reedbuck occurs in the wider area but as there is no suitable habitat for this species within the site, the site is considered low-sensitivity

for the Mountain Reedbuck and it is confirmed as absent from the site. The Black-footed Cat is also known from occasional records from the wider area, but prefers areas with a mix of more open and higher cover areas. As this is a shy and secretive species, it is difficult to confirm as absent or present within a site. However, given the generally sparse cover at the site, it is considered to have a low favourableness for this species. No other mammals of concern were observed at the site and it is unlikely that any such species are present.

In terms of reptiles, only 14 species have been recorded from the four quarter-degree squares closest to the site, suggesting that the area has not been well-sampled in the past. When this is expanded to encompass the majority of the Eastern Lower Karoo, this rises to 45 species, which is a more realistic total for the wider area. Diversity within the site is however likely to be relatively low as the habitat is relatively homogenous and there are no significant rocky outcrops present that would attract rupiculous species. A total of 15 species are considered likely to be present within the site. The only red-listed species that may be present is the Karoo Dwarf Tortoise (endangered). This small tortoise is seldom observed, even when specifically targeted during herpetofaunal surveys as it is active for only very short parts of the day and may also aestivate for extended periods during unfavourable environmental conditions. They are associated with dolerite ridges and rocky outcrops of the southern Succulent and Nama Karoo biomes. Threats to this species include habitat degradation due to agricultural activities and overgrazing, and predation by the Pied Crows which, in recent decades, have expanded in distribution range. There is however little to no suitable habitat for this species within the site and it is considered absent from the site. No other reptile species of concern are likely to be present within the site.

The site is relatively unfavourable for amphibians, given the lack of permanent water within the site. No species of concern are known from the area.

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| **Project component/s** | » Wind turbines.<br>» Access roads and crane hardstand areas.<br>» Cabling between turbines.<br>» Substation, BESS and O&M Building hub<br>» Warehouse area, laydown area and site camp hub.<br>» All other associated infrastructure.. |
| **Potential Impact** | » Vegetation clearance and associated impacts on faunal habitats.<br>» Traffic to and from site. |
| **Activity/risk source** | » Site preparation and earthworks.<br>» Foundations or plant equipment installation.<br>» Mobile construction equipment movement on site.<br>» Access road construction activities.<br>» Substation construction facilities. |
| **Mitigation: Target/Objective** | » To minimise footprints of habitat destruction.<br>» To minimise disturbance to resident and visitor faunal species. |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| The extent of clearing and disturbance to the vegetation must be kept to a minimum so that impact on fauna and their habitats is restricted. | EPC Contractor | Construction |
| During construction any fauna directly threatened by the construction activities should be removed to a safe location by the ECO or other suitably qualified person. | EPC Contractor<br>ECO | Construction |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| The illegal collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. Personnel should not be allowed to wander off of the construction site. | EPC Contractor | Construction |
| Employees should be trained (e.g. during toolbox talks) that poisonous animals should not be killed and if encountered the ECO/ EO should be informed. | Developer<br>EPC Contractor | Duration of contract |
| If any parts of the site such as construction camps must be lit at night, this should be done with low-UV type lights (such as most LEDs) as far as practically possible, which do not attract insects and which should be directed downwards. | EPC Contractor | Construction |
| All construction vehicles should adhere to a low-speed limit (40km/h for cars and 30km/h for trucks) to avoid collisions with susceptible species such as snakes and tortoises and rabbits or hares. Speed limits should apply within the facility as well as on the public gravel access roads to the site. | EPC Contractor | Construction |
| If parts of the facility such as the substation are to be fenced, then no electrified strands should be placed within 30cm of the ground as some species such as tortoises are susceptible to electrocution from electric fences as they do not move away when electrocuted but rather adopt defensive behaviour and are killed by repeated shocks. Alternatively, the electrified strands should be placed on the inside of the fence and not the outside or guard wires or mesh can be placed outside of the fence to prevent tortoises from accessing the electrified fence. | EPC Contractor | Construction |
| No excavated holes or trenches should be left open for extended periods as fauna may fall in and become trapped. | EPC Contractor | Duration of contract |
| Any fauna (frogs, snakes, etc.) that are found within the construction area must be moved to the closest point of similar habitat type outside of the areas to be impacted. | EPC Contractor | Duration of contraction |
| It is the contractor's responsibility to continuously monitor the area for newly established alien species during the contract and establishment period, which if present must be removed. Removal of these species shall be undertaken in a way which prevents any damage to the remaining indigenous species and inhibits the re-infestation of the cleaned areas. | EPC Contractor | Construction |

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| **Performance Indicator** | » No disturbance outside of designated work areas.<br>» Minimised clearing of existing/natural vegetation and habitats for fauna.<br>» Limited impacts on faunal species (i.e. noted/recorded fatalities), especially those of conservation concern. |
| **Monitoring and Reporting** | » Observation of vegetation clearing activities by the EO throughout construction phase.<br>» Supervision of all clearing and earthworks by the EO. |

## OBJECTIVE 10: Protection of avifauna

Four seasonally timed site visits (including an additional summer season of monitoring) conducted over the course of 18 months across the entire 288 km$^2$ study area were undertaken to record all flights of Priority species. The site visits recorded 2447 flights of 15 Priority species, of which seven were Red Data (RD) species and six were Least Concern (LC). The study area experienced high rainfall following years of drought which brought in locust swarms, mosquitos, and a rich diversity of birds. 1012 flights were recorded in 1467 hours in the wind energy facility giving a medium-high Passage Rate of 0.69 RD flights per hour. Majority of flights were by Blue Cranes *Anthropoides paradiseus* (47% of all flights) and Ludwig's Bustards *Neotis ludwigii* (29%). Among Least Concern (LC) species the small falcons combined (Lesser Kestrel *Falco naumanni*, Amur Falcon *F. amurensis* and the rare European Hobby *F. subbuteo*) were also common. Least Concern species had a high (combined) Passage Rate of 1.6 flights per hour. Red Data species alone had Passage Rates of 0.69 flights per hour across the wind energy facilities. Additional data were provided by the GPS-tagging of the male Black Harrier "Gulliver" in the Camdeboo Mountains. He indicated that his vast foraging area (~530-km$^2$) across the plains of Camdeboo did not intersect the Aberdeen Wind Facility 1 site anywhere. Previous satellite-tracking of Black Harriers here indicated that only three of the 123 proposed turbines intersected the foraging kernels, and these were the least used (5%) section of the range of the female Black Harrier "Moraea".

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| **Project component/s** | » Wind turbines.<br>» Access roads and crane hardstand areas.<br>» Cabling between turbines.<br>» Substation, BESS and O&M Building hub<br>» Warehouse area, laydown area and site camp hub.<br>» All other associated infrastructure.. |
| **Potential Impact** | » Disturbance of birds (e.g. destruction of habitat).<br>» Displacement of birds.<br>» Collision with project components.<br>» Traffic to and from site. |
| **Activity/risk source** | » Site preparation and earthworks.<br>» Foundations or plant equipment installation.<br>» Mobile construction equipment movement on site.<br>» Access road construction activities.<br>» Substation construction facilities. |
| **Mitigation: Target/Objective** | » To minimise footprints of habitat destruction.<br>» To minimise disturbance to resident and visitor avifaunal species. |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| Appoint an avifaunal specialist to undertake post-construction / operational monitoring | Developer | Post-Construction Operation |
| Monitoring should begin as the wind farm construction is started. This phase should include monitoring nests and roosts and bustard leks on site to determine any disturbance or habitat loss where it may cause irreparable harm. | Developer | Construction |
| Construction activity should be restricted to the immediate footprint of the infrastructure as far as possible, and in particular to the proposed road network. Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species. | EPC Contractor | Construction |

| Mitigation: Action/control | Responsibility | Timeframe |
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| Removal of vegetation must be restricted to a minimum and must be rehabilitated to its former state where possible after construction. | EPC Contractor | Construction |
| Vehicle and pedestrian access to the site should be controlled and restricted as much as possible to prevent unnecessary disturbance of priority species. | EPC Contractor | Construction |

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| **Performance Indicator** | » No disturbance outside of designated work areas.<br>» Minimised clearing of existing/natural vegetation and habitats for avifauna.<br>» Limited impacts on avifaunal species (i.e. noted/recorded fatalities), especially those of conservation concern. |
| **Monitoring and Reporting** | » Observation of vegetation clearing activities by the EO throughout construction phase.<br>» Supervision of all clearing and earthworks by the EO. |

## OBJECTIVE 11: Protection of bats

Pre-construction monitoring was undertaken for bats from 20 September 2021 till 7 October 2022 with 7 visits occurring. During this period the baseline environment was investigated by using acoustic monitoring to document bat activity.

Of the detected species (onsite and offsite), four (viz. the Egyptian Free-tailed Bat, Cape Serotine, Natal Long-fingered Bat, and Mauritian Tomb Bat) have a high fatality risk of collision with turbines and one (viz. the Long-tailed Serotine) has a Medium fatality risk. Of the potentially occurring species, one (viz. Temminck's Myotis) has a Medium-High fatality risk. Of the three priority bat species, the onsite detected Natal Long-fingered Bat is considered most likely to be potentially impacted by the proposed wind energy facility. The offsite detected Cape Horseshoe Bat, and Lesueur's Hairy Bat, which has a High potential occurrence, both have a Low Risk of collision with turbines.

An overall average of 43 bat passes (bp) per night (or 4 bp per hour) at 130 m, 54-74 bp per night (5-6 bp per hour) at 80 m, and 40-50 bat passes (bp) per night (3-4 bp per hour) near ground level was recorded on site. The onsite levels of bat activity are slightly higher than the analogous average values of bat activity recorded at other wind energy facility sites in the Nama Karoo shrublands ecoregion. Onsite bat activity was essentially a reflection of the activity of the predominant Egyptian Free-tailed Bat (the only listed species belonging to the Molossidae family), which exhibited high activity during spring, and especially summer and autumn. The Cape Serotine (the only recorded species belonging to the family Vespertilionidae) was similarly most active in spring, summer, and autumn. The Natal Long-fingered Bat (the only recorded species belonging to the family Miniopteridae) was most active during autumn, winter, and spring (in descending order). The recorded low levels of Natal Long-fingered Bat activity (below 10 bp/night) are not indicative of migration through the site, which would be revealed by high seasonal peaks in the activity peaks of this species. However, since bat migration in South Africa is poorly understood, the possibility of this happening locally in future cannot be ruled out. The Mauritian Tomb Bat (the only recorded species belonging to the family Emballonuridae) was most active during summer.

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| **Project component/s** | » Wind turbines.<br>» Access roads and crane hardstand areas.<br>» Cabling between turbines.<br>» Substation, BESS and O&M Building hub<br>» Warehouse area, laydown area and site camp hub.<br>» All other associated infrastructure. |
| **Potential Impact** | » Roost disturbance or destruction<br>» Destruction, degradation, fragmentation of, and displacement of bats from, foraging habitat<br>» Bat fatalities from collision with turbines, and potential population declines |
| **Activity/risk source** | » Blasting,<br>» Operation of turbines between sunset and sunrise<br>» vegetation clearing,<br>» excavation works,<br>» construction of infrastructure<br>» operational activities<br>» decommissioning of infrastructure,<br>» proliferation of invasive alien flora<br>» noise,<br>» Erosion<br>» light,<br>» Traffic<br>» dust |
| **Mitigation: Target/Objective** | » Minimise potential bat roosts disturbed<br>» Minimise disturbance or destruction of natural habitat<br>» The annual estimated number of actual bat fatalities must not exceed the wind energy facility bat fatality threshold calculated as per MacEwan et al. 2018 (or later) |

| **Mitigation: Action/control** | **Responsibility** | **Timeframe** |
|---|---|---|
| Avoid blasting within 2 km of a confirmed roost | ECO<br>EPC Contractor | Construction |
| Minimize degradation of terrestrial habitat by implementing and maintaining effective invasive alien plant, stormwater, erosion, sediment, and dust control measures | Developer<br>ECO<br>EPC Contractor | Construction and Operational Phase |

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| **Performance Indicator** | » Confirmed roosts remain undisturbed.<br>» Potential roosts remain undisturbed where possible.<br>» Artificial lighting is effectively minimized throughout the life of the wind energy facility<br>» Operational bat monitoring is performed as per Aronson et al. 2020 (or later).<br>» Bat fatalities remain below the wind energy facility bat fatality threshold, calculated as per MacEwan et al. 2018 (or later).<br>» If/When the bat fatality threshold is exceeded, this is promptly mitigated by implementing turbine curtailment (as described herein) or better.<br>» The wind energy facility operational bat monitoring reports are submitted to SABAA, EWT, and DFFE. |
| **Monitoring and Reporting** | » Dust, invasive alien plants, erosion, sedimentation, and rehabilitated areas should be effectively monitored and managed.<br>» Confirmed and potential roosts should be checked during operation and decommissioning |

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| | » Bat fatality monitoring should be diligently performed from when the first turbine is operational, through the first two years of operation, and at least every fifth year thereafter throughout the life of the WEF. |

## OBJECTIVE 12: Minimise impacts on heritage sites during the construction of the wind energy facility.

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| **Project component/s** | » Excavations of turbine foundations.<br>» Excavations of trenches for the installation of cabling and infrastructure. |
| **Potential Impact** | » Loss of archaeological artefacts.<br>» Loss of fossil resources.<br>» Impacts on heritage sites.<br>» Impacts on graves or burial sites.<br>» Loss of resources going unnoticed.<br>» Destruction of resources |
| **Activity/risk source** | » All bulk earthworks. |
| **Mitigation: Target/Objective** | » To facilitate the likelihood of noticing heritage resources and ensure appropriate actions in terms of the relevant legislation |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| The Environmental Control Officer (ECO) should be made aware of the possibility of important fossil remains (bones, teeth, fish, petrified wood, plant-rich horizons etc) being found or unearthed during the construction phase of the development. | ECO | Construction |
| Monitoring for fossil material of all major surface clearance and deeper (>1m) excavations by the Environmental Control Officer on an on-going basis during the construction phase. | ECO | Construction |
| Should any significant archaeological resources be uncovered during the course of the construction phase, work must cease in the area of the find and ECPHRA must be contacted regarding an appropriate way forward. | ECO | Construction |
| The Chance Fossil Finds Procedure must be implemented for the duration of construction activities. | ECO | Construction |

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| **Performance Indicator** | » Reporting of and liaison about possible finds of heritage resources.<br>» Heritage resources noticed and rescued.<br>» All heritage items located are dealt with as per the legislative guidelines. |
| **Monitoring and Reporting** | » Ensure staff are aware of heritage resources and the procedure to follow when found.<br>» EO to conduct inspections of open excavations. |

## OBJECTIVE 13: Minimisation of visual impacts associated with construction

During construction heavy vehicles, components, cranes, equipment and construction crews will frequent the area and may cause, at the very least, a visual nuisance to landowners and residents in the area as well as road users.

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| **Project component/s** | » Construction site.<br>» Transportation of staff and equipment. |
| **Potential Impact** | » Visual impact of general construction activities, and the potential scarring of the landscape due to vegetation clearing and the resulting erosion.<br>» Construction traffic. |
| **Activity/risk source** | » The viewing of visual scarring by observers in the vicinity of the wind energy facility or from the roads in the surrounding area. |
| **Mitigation: Target/Objective** | » Minimal disturbance to vegetation cover in close vicinity of the wind energy facility and its related infrastructure.<br>» Minimised construction traffic, where possible.<br>» Minimal visual intrusion by construction activities and intact vegetation cover outside of the immediate construction work areas. |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site. | EPC Contractor | Construction |
| Ensure that vegetation is not unnecessarily removed during the construction period. | EPC Contractor | Construction |
| Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities. | EPC Contractor | Construction |
| Rehabilitate all disturbed areas, construction areas, servitudes etc. immediately after the completion of construction works. | EPC Contractor | Construction |
| Restrict construction activities to daylight hours whenever possible in order to reduce lighting impacts | EPC Contractor | Construction |

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| **Performance Indicator** | » Construction site maintained in a neat and tidy condition.<br>» Site appropriately rehabilitated after construction is complete. |
| **Monitoring** | » Monitoring of vegetation clearing during construction by EO.<br>» Monitoring of rehabilitated areas quarterly for at least a year following the end of construction (by contractor as part of construction contract). |

## OBJECTIVE 14: Appropriate handling and management of waste

The construction of the wind energy facility and associated infrastructure 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)
» liquid waste (including grey water and sewage)

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| **Project Component/s** | » Wind turbines.<br>» Access roads and crane hardstand areas.<br>» Cabling between turbines.<br>» Substation, BESS and O&M Building hub<br>» Warehouse area, laydown area and site camp hub.<br>» All other associated infrastructure.. |
| **Potential Impact** | » Inefficient use of resources resulting in excessive waste generation.<br>» Litter or contamination of the site or water through poor waste management practices. |
| **Activity/Risk Source** | » Packaging.<br>» Other construction wastes.<br>» Hydrocarbon use and storage.<br>» Spoil material from excavation, earthworks and site preparation. |
| **Mitigation: Target/Objective** | » To comply with waste management legislation.<br>» To minimise production of waste.<br>» To ensure appropriate waste storage and disposal.<br>» To avoid environmental harm from waste disposal. |

| Mitigation: Action/Control | Responsibility | Timeframe |
|---|---|---|
| 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 an appropriately licensed landfill. | EPC Contractor | Construction |
| Waste should be appropriately managed and disposed. | EPC Contractor | Construction |
| Construction method and materials must be carefully considered in view of waste reduction, re-use, and recycling opportunities. | EPC Contractor | Construction |
| Construction contractors must provide specific detailed waste management plans to deal with all waste streams. | EPC Contractor | Construction |
| Ensure that no litter, refuse, wastes, rubbish, rubble, debris and builders wastes generated on the premises is placed, dumped or deposited on adjacent/surrounding properties. | EPC Contractor | Construction |
| Specific areas must be designated on-site for the temporary management of various waste streams, i.e. general refuse, 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. | EPC Contractor | Construction |
| 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.). | EPC Contractor | Construction |
| Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors. | EPC Contractor | Construction |

| Mitigation: Action/Control | Responsibility | Timeframe |
|---|---|---|
| Uncontaminated waste must be removed at least weekly for disposal, if feasible; other wastes must be removed for recycling/ disposal at an appropriate frequency. | EPC Contractor | Construction |
| Hydrocarbon waste must be contained and stored in sealed containers within an appropriately bunded area and clearly labelled. This must be regularly removed and recycled (where possible) or disposed of at an appropriately licensed landfill site. | EPC Contractor | Construction |
| Waste must be stored in accordance with the relevant legislative requirements. | EPC Contractor | Construction |
| Waste must be kept to a minimum and must be transported by approved waste transporters to sites designated for their disposal. | EPC Contractor | Construction |
| 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. | EPC Contractor | Construction |
| All liquid wastes must be contained in appropriately sealed vessels/ponds within the footprint of the development, and be disposed of at a designated waste management facility. | EPC Contractor | 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. | EPC Contractor | Construction |
| Regularly serviced chemical toilet facilities and/or septic tank must be used to ensure appropriate control of sewage. | EPC Contractor | Construction |
| Daily inspection of all chemical toilets and septic tanks must be performed by environmental representatives on site. | EPC Contractor | Construction |
| 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. | EPC Contractor | Construction |
| Under no circumstances may waste be burnt or buried on site. | EPC Contractor | 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. | EPC Contractor | Construction |
| Upon the completion of construction, the area must be cleared of potentially polluting materials (including chemical toilets). Spoil stockpiles must also be removed and appropriately disposed of or the materials re-used for an appropriate purpose. | EPC Contractor | Construction |
| Strict management of potential sources of pollution (e.g. litter, hydrocarbons from vehicles & machinery, cement during construction, etc.) within demarcated / bunded areas | EPC Contractor | Construction |
| Any waste generated during construction must be stored in designated containers and removed from the site by the construction teams | EPC Contractor | Construction |
| Any left-over construction materials must be removed from the site. | EPC Contractor | Post-Construction |

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| **Performance Indicator** | » No complaints received regarding waste on site or indiscriminate dumping.<br>» Internal site audits ensuring that waste segregation, recycling and reuse is occurring appropriately.<br>» Provision of all appropriate waste manifests for all waste streams. |

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| **Monitoring** | » Observation and supervision of waste management practices throughout construction phase.<br>» Waste collection will be monitored on a regular basis.<br>» Waste documentation completed.<br>» Proof of disposal of sewage at an appropriate wastewater treatment works.<br>» 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.<br>» An incident reporting system will be used to record non-conformances to the EMPr. |

## OBJECTIVE 15: Appropriate handling and storage of chemicals, hazardous substances

The construction phase may involve the storage and handling of a variety of chemicals including adhesives, abrasives, oils and lubricants, paints and solvents.

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| **Project Component/s** | » Wind turbines.<br>» Access roads and crane hardstand areas.<br>» Cabling between turbines.<br>» Substations.<br>» Laydown area.<br>» All other associated infrastructure. |
| **Potential Impact** | » Release of contaminated water from contact with spilled chemicals.<br>» Generation of contaminated wastes from used chemical containers.<br>» Soil pollution. |
| **Activity/Risk Source** | » Vehicles associated with site preparation and earthworks.<br>» Construction activities of area and linear infrastructure.<br>» Hydrocarbon spills by vehicles and machinery during levelling, vegetation clearance and transport of workers, materials and equipment and fuel storage tanks.<br>» Accidental spills of hazardous chemicals.<br>» Polluted water from wash bays and workshops.<br>» Pollution from concrete mixing. |
| **Mitigation: Target/Objective** | » To ensure that the storage and handling of chemicals and hydrocarbons on-site does not cause pollution to the environment or harm to persons.<br>» To ensure that the storage and maintenance of machinery on-site does not cause pollution of the environment or harm to persons.<br>» Prevent and contain hydrocarbon leaks.<br>» Undertake proper waste management.<br>» Store hazardous chemicals safely in a bunded area. |

| Mitigation: Action/Control | Responsibility | Timeframe |
|---|---|---|
| The Environmental Management Plan (EMP) must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested. | EPC Contractor | Construction |
| Strict use and management of all hazardous materials used on site. | EPC Contractor | Construction |

| Mitigation: Action/Control | Responsibility | Timeframe |
|---|---|---|
| Strict Management of potential sources of pollution (litter, hydrocarbons from vehicles & machinery, cement during construction etc.) within demarcated/bunded areas. | EPC Contractor | Construction |
| Appropriate ablution facilities should be provided for construction workers during construction and on-site staff during the operation of the facility. | EPC Contractor | Construction |
| Implement an emergency preparedness plan during the construction phase. | EPC Contractor | Construction |
| Any liquids stored on site, including fuels and lubricants, must be stored in accordance with applicable legislation. | EPC Contractor | Construction |
| Spill kits must be made available on-site for the clean-up of spills and leaks of contaminants. These must be maintained regularly. | EPC Contractor | Construction |
| Losses of fuel and lubricants from the oil sumps and steering racks of vehicles and equipment must be contained using a drip tray with plastic sheeting filled with absorbent material when not parked on hard standing. | EPC Contractor | Construction |
| Establish an appropriate Hazardous Stores and fuel storage area which is in accordance with the Hazardous Substance Amendment Act, No. 53 of 1992. This must include but not be limited to:<br>» Designated area;<br>» All applicable safety signage;<br>» Firefighting equipment;<br>» Enclosed by an impermeable bund as per the requirements of the relevant standards and any relevant by-laws;<br>» Protected from the elements,<br>» Lockable;<br>» Ventilated; and<br>» Has adequate capacity to contain 110% of the largest container contents. | EPC Contractor | Construction |
| The storage of flammable and combustible liquids such as oils must be stored in compliance with Material Safety Data Sheets (MSDS) files. | EPC Contractor | Construction |
| Corrective action must be undertaken immediately if a complaint is made, or potential/actual leak or spill of polluting substance identified. This includes stopping the contaminant from further escaping, cleaning up the affected environment as much as practically possible and implementing preventive measures. Where required, a NEMA Section 30 report must be submitted to DFFE within 14 days of the incident. | EPC Contractor | Construction |
| In the event of a major spill or leak of contaminants, the relevant administering authority must be immediately notified as per the notification of emergencies/incidents. | EPC Contractor | Construction |
| Spilled concrete must be cleaned up as soon as possible and disposed of at a suitably licensed waste disposal site. | EPC Contractor | Construction |
| Accidental spillage of potentially contaminating liquids and solids must be cleaned up immediately in line with procedures by trained staff with the appropriate equipment. | EPC Contractor | Construction |

| Mitigation: Action/Control | Responsibility | Timeframe |
|---|---|---|
| Any contaminated/polluted soil removed from the site must be disposed of at a licensed hazardous waste disposal facility. | EPC Contractor | Construction |
| All machinery and equipment must be inspected regularly for faults and possible leaks, | EPC Contractor | Construction |
| Routine servicing and maintenance of vehicles must not to take place on-site (except for emergencies). If repairs of vehicles must take place, an appropriate drip tray must be used to contain any fuel or oils. | EPC Contractor | Construction |
| Construction machinery must be stored in an appropriately sealed area. | EPC Contractor | Construction |
| Any storage and disposal permits/approvals which may be required must be obtained, and the conditions attached to such permits and approvals will be compiled with. | EPC Contractor | Construction |
| Transport of all hazardous substances must be in accordance with the relevant legislation and regulations. | EPC Contractor | Construction |
| The sediment control and water quality structures used on-site must be monitored and maintained in an operational state at all times. | EPC Contractor | Construction |
| No discharge of effluents or wash water from cement batching areas should be allowed to enter nearby watercourses. Runoff must be strictly controlled in the vicinity of any cement batching areas. | EPC Contractor | Construction |
| Precautions must be in place to limit the possibility of oil and other toxic liquids from entering the soil or clean stormwater system. | EPC Contractor | Construction |
| As much material must be pre-fabricated and then transported to site to avoid the risks of contamination associated with mixing, pouring and the storage of chemicals and compounds on site. | EPC Contractor | Construction |
| Have appropriate action plans on site, and training for contactors and employees in the event of spills, leaks and other potential impacts to the aquatic systems. All waste generated on-site during construction must be adequately managed. | EPC Contractor | Construction |
| Minimise fuels and chemicals stored on site. | EPC Contractor | Construction |
| Implement a contingency plan to handle spills, so that environmental damage is avoided. | EPC Contractor | Construction |
| Drip trays must be used during all fuel/chemical dispensing and beneath standing machinery/plant. | EPC Contractor | Construction |
| In the case of petrochemical spillages, the spill must be collected immediately and stored in a designated area until it can be disposed of in accordance with the Hazardous Chemical Substances Regulations, 1995 (Regulation 15). | EPC Contractor | Construction |
| Implement appropriate measures to ensure strict use and management of all hazardous materials used on site | EPC Contractor | Construction and operation |
| In the event of a significant spill or leak of hazardous substances (petrol and diesel) during the construction or operational phase, such incident(s) must be reported to all relevant authorities, including the Chief Director: Development Planning of the | EPC Contractor | Construction and operation |

| Mitigation: Action/Control | Responsibility | Timeframe |
|---|---|---|
| DEA&DP, in accordance with section 30(5) of the NEMA pertaining to the control of incidents. | | |
| Implement appropriate measures to ensure strict management of potential sources of pollutants (e.g. litter, hydrocarbons from vehicles and machinery, cement during construction etc.) | EPC Contractor | Construction and operation |
| Implement appropriate measures to ensure containment of all contaminated water by means of careful run-off management on the development site. | EPC Contractor | Construction and operation |
| Any solid waste should be appropriately stored at the site until such time that it can be disposed of at a licensed facility, suitable of accepting such waste. | EPC Contractor | Construction |
| Working protocols incorporating pollution control measures (including approved method statements by the contractor) should be clearly set out in the Construction Environmental Management Plan (CEMP) for the project and strictly enforced. | EPC Contractor | Construction and operation |

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| **Performance Indicator** | » No chemical spills outside of designated storage areas.<br>» No water or soil contamination by spills.<br>» Safe storage of hazardous chemicals.<br>» Proper waste management. |
| **Monitoring** | » Observation and supervision of chemical storage and handling practices and vehicle maintenance throughout construction phase.<br>» A complaints register must be maintained, in which any complaints from the community will be logged.<br>» An incident reporting system must be used to record non-conformances to the EMPr.<br>» On-going visual assessment to detect polluted areas and the application of clean-up and preventative procedures.<br>» Monitor hydrocarbon spills from vehicles and machinery during construction continuously and record volume and nature of spill, location and clean-up actions.<br>» Monitor maintenance of drains and intercept drains weekly.<br>» Analyse soil samples for pollution in areas of known spills or where a breach of containment is evident when it occurs.<br>» Records of accidental spills and clean-up procedures and the results thereof must be audited on an annual basis by the ECO.<br>» Records of all incidents that caused chemical pollution must be kept and a summary of the results must be reported to management annually. |

## OBJECTIVE 16: Effective management of concrete batching plant

Concrete is required during the construction of the wind energy facility. In this regard there could be a need to establish a temporary batching plant within the site. Batching plants are facilities/installations that combine various ingredients to form concrete. Some of these inputs include sand, water, aggregate (rocks, gravel, etc.), fly ash, potash, and cement.

Turbid and highly alkaline wastewater, dust emissions and noise are the key potential impacts associated with concrete batching plants. Concrete batching plants, cement, sand and aggregates can produce

dust. Potential pollutants in batching plant wastewater and stormwater include cement, sand, aggregates, chemical additive mixtures, fuels and lubricants.

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| **Project component/s** | » Concrete batching plant. |
| **Potential Impact** | » Dust emissions.<br>» Release of contaminated water.<br>» Generation of contaminated wastes from used chemical containers<br>» Inefficient use of resources resulting in excessive waste generation. |
| **Activity/risk source** | » Operation of the batching plant.<br>» Packaging and other construction wastes.<br>» Hydrocarbon use and storage.<br>» Spoil material from excavation, earthworks and site preparation. |
| **Mitigation: Target/Objective** | » To ensure that the operation of the batching plant does not cause pollution to the environment or harm to persons. |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| Where possible concrete batching plants should be sited such that impacts on the environment or the amenity of the local community from noise, odour or polluting emissions are minimised. | EPC Contractor | Construction phase |
| The provision of natural or artificial wind barriers such as trees, fences and landforms may help control the emission of dust from the plant. | EPC Contractor | Construction phase |
| The concrete batching plant site should demonstrate good maintenance practices, including regular sweeping to prevent dust build-up. | EPC Contractor | Construction phase |
| The prevailing wind direction should be considered to ensure that bunkers and conveyors are sited in a sheltered position to minimise the effects of the wind. | EPC Contractor | Construction phase |
| Aggregate material should be delivered in a damp condition, and water sprays or a dust suppression agent should be correctly applied to reduce dust emissions and reduce water usage. | EPC Contractor | Construction phase |
| Conveyors must be designed and constructed to prevent fugitive dust emissions. This may include covering the conveyor with a roof, installing side protection barriers and equipping the conveyor with spill trays, which directs material to a collection point. Belt cleaning devices at the conveyor head may also assist to reduce spillage. | EPC Contractor | Construction phase |
| The site should be designed and constructed such that clean stormwater, including roof runoff, is diverted away from contaminated areas and directed to the stormwater discharge system. | EPC Contractor | Construction phase |
| Contaminated stormwater and process wastewater should be captured and recycled where possible. A wastewater collection and recycling system should be designed to collect contaminated water. | EPC Contractor | Construction phase |
| Areas where spills of oils and chemicals may occur should be equipped with easily accessible spill control kits to assist in prompt and effective spill control. | EPC Contractor | Construction phase |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| Ensure that all practicable steps are taken to minimise the adverse effect of noise emissions. This responsibility includes not only the noise emitted from the plant and equipment but also associated noise sources, such as radios, loudspeakers and alarms. | EPC Contractor | Construction phase |
| Where possible, waste concrete should be used for construction purposes at the batching plant or project site. | EPC Contractor | Construction phase |

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| **Performance Indicator** | » No complaints regarding dust.<br>» No water or soil contamination by chemical spills.<br>» No complaints received regarding waste on site or indiscriminate dumping. |
| **Monitoring and Reporting** | » Observation and supervision of chemical storage and handling practices and vehicle maintenance throughout the construction phase.<br>» A complaints register must be maintained, in which any complaints from the community must be logged. Complaints will be investigated and, if appropriate, acted upon.<br>» An incident reporting system must be used to record non-conformances to the EMPr.<br>» The Developer or appointed ECO/EO must monitor indicators listed above to ensure that they have been met for the construction phase. |

## OBJECTIVE 17: Traffic management and transportation of equipment and materials to site

The construction and decommissioning phases of the project will be the most significant in terms of traffic impacts resulting from the transport of equipment (including turbine components) and materials and construction crews to the site and the return of the vehicles after delivery of materials. Potential impacts associated with transportation and access relate mostly to works within the site boundary (i.e. the wind energy facility and ancillary infrastructure) and the external road network. This section should be read in conjunction with the Traffic and Transportation Plan attached as **Appendix F**.

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| **Project component/s** | » Wind turbines.<br>» Access roads and crane hardstand areas.<br>» Cabling between turbines.<br>» Substation, BESS and O&M Building hub<br>» Laydown area, warehouse and site camp hub.<br>» All other associated infrastructure.. |
| **Potential Impact** | » Traffic congestion, particularly on narrow roads or on road passes where overtaking is not permitted.<br>» Risk of accidents.<br>» Deterioration of road pavement conditions (i.e. both surfaced and gravel road) due to abnormal loads. |
| **Activity/risk source** | » Construction vehicle movement.<br>» Speeding on local roads.<br>» Degradation of local road conditions.<br>» Site preparation and earthworks.<br>» Foundations or plant equipment installation.<br>» Mobile construction equipment movement on-site.<br>» Substation construction activities. |

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| **Mitigation: Target/Objective** | » Minimise impact of traffic associated with the construction of the wind energy facility on the local traffic volume, existing infrastructure, property owners, animals, and road users.<br>» To minimise the potential for negative interaction between pedestrians or sensitive users and traffic associated with the wind energy facility construction.<br>» To ensure all vehicles are roadworthy and all materials/equipment are transported appropriately and within any imposed permit/licence conditions. |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| Heavy vehicles travelling on secondary roads should adhere to low-speed limits to minimise noise and dust pollution. | Contractor(s), (Transportation sub-contractor) | Construction |
| If feasible, no construction activities should be carried out during weekends and outside day time working hours | Contractor | Construction |
| Stagger component delivery to the site. | Contractor | Construction |
| Stagger the construction period. | Contractor | Construction |
| The use of mobile batching plants and quarries in close proximity to the project site would decrease the impact on the surrounding road network. | Contractor | Construction |
| Staff and general trips should occur outside of peak traffic periods. | Contractor | Construction |
| Regular maintenance of gravel roads by the contractor during the construction phase. | Contractor | Construction |
| A designated access (or accesses) to the proposed site must be created to ensure safe entry and exit. | Contractor | Construction |
| Appropriate road management strategies must be implemented on external and internal roads with all employees and contractors required to abide by standard road and safety procedures. | Contractor(s), (Transportation sub-contractor) | Duration of contract |
| Construction vehicles carrying material to the site should avoid using roads through densely populated built-up areas. | Contractor(s), (Transportation sub-contractor) | Duration of contract |
| The movement of all vehicles (barring clearing machinery) within the site must be on designated roadways. | Contractor(s) | Duration of contract |
| All hazardous substances must be transported in accordance with the relevant legislation and regulations. | Contractor(s) | Duration of contract |
| Roads must be designed so that changes to surface water runoff are avoided and erosion is not initiated. | Contractor(s) | Duration of contract |

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| **Performance Indicator** | » No traffic incidents involving project personnel or appointed contractors.<br>» Appropriate signage in place.<br>» No complaints resulting from traffic congestion, delays or driver negligence associated with construction of the wind energy facility. |
| **Monitoring** | » Visual monitoring of traffic control measures to ensure they are effective.<br>» 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.<br>» An incident reporting system will be used to record non-conformances to the EMPr. |

**OBJECTIVE 18: Ensure appropriate rehabilitation of disturbed areas such that residual environmental impacts are remediated or curtailed**

Areas requiring rehabilitation will include all areas disturbed during the construction phase and that are not required for regular operation and maintenance operations. Rehabilitation should be undertaken in an area as soon as possible after the completion of construction activities within that area.

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| **Project component/s** | » Wind turbines.<br>» Access roads and crane hardstand areas.<br>» Cabling between turbines.<br>» Substation, BESS and O&M Building hub<br>» Laydown area, warehouse and site camp hub.<br>» All other associated infrastructure.. |
| **Potential Impact** | » Environmental integrity of the site undermined resulting in reduced visual aesthetics, erosion, compromised land capability and the requirement for on-going management intervention. |
| **Activity/risk source** | » Site preparation and earthworks.<br>» Excavation of foundations and trenches.<br>» Temporary laydown areas.<br>» Temporary access roads/tracks.<br>» Other disturbed areas/footprints. |
| **Mitigation: Target/Objective** | » To ensure and encourage site rehabilitation of disturbed areas.<br>» To ensure that the site is appropriately rehabilitated following the execution of the works, such that residual environmental impacts (including erosion) are remediated or curtailed. |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| A site rehabilitation programme should be compiled and implemented (refer to **Appendix D**). | Contractor in consultation with Specialist | Construction |
| Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken. | EPC Contractor | Following execution of the works |
| All cleared areas should be revegetated with indigenous perennial shrubs and succulents from the local area. Dead material from site clearing can be used to encourage this process and can be set aside during clearing and later placed on the cleared areas to encourage recovery. | EPC Contractor | Following execution of the works |
| Rehabilitation of the working areas must be concurrent with the construction of the project. | EPC Contractor | Construction |
| All temporary facilities, equipment and waste materials must be removed from site and appropriately disposed of. | EPC Contractor | Following execution of the works |
| Necessary drainage works and anti-erosion measures must be installed, where required, to minimise loss of topsoil and control erosion. | EPC Contractor | Following execution of the works |
| Re-vegetated areas may have to be protected from wind erosion and maintained until an acceptable plant cover has been achieved. | EPC Contractor | Following execution of the works |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| On-going alien plant monitoring and removal should be undertaken on all areas of natural vegetation on an annual basis. | EPC Contractor | Construction |
| All areas disturbed by construction related activities, such as access roads on the site, construction camps etc., should be rehabilitated at the end of the construction phase. | EPC Contractor | Construction |
| The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed. The specifications for the rehabilitation programme should be included in the EMPr | EPC Contractor | Construction |
| The implementation of the Rehabilitation Programme should be monitored by the ECO. | Contractor<br>ECO | Construction |

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| **Performance Indicator** | » All portions of site, including construction camp and working areas, cleared of equipment and temporary facilities.<br>» Topsoil replaced on all areas and stabilised.<br>» Disturbed areas rehabilitated and acceptable plant cover achieved on rehabilitated sites.<br>» Closed site free of erosion and alien invasive plants. |
| **Monitoring and Reporting** | » On-going inspection of rehabilitated areas in order to determine the effectiveness of the rehabilitation measures implemented during the operational lifespan of the wind energy facility.<br>» On-going alien plant monitoring and removal should be undertaken on an annual basis.<br>» An incident reporting system must be used to record non-conformances to the EMPr. |

### 7.2. Detailing Method Statements

**OBJECTIVE 19: 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:

» Details of the 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
- 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).
- Stipulate the stormwater management procedures recommended in the stormwater management 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 the 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 rivers, streams or existing drainage systems.
  - Should grey water (i.e. water from basins, showers, baths, kitchen sinks etc.) need to be disposed of, link into existing facilities or sewerage systems where possible. Where no facilities are available, grey water runoff must be controlled to ensure there is no unacceptable seepage 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, borrow pits 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 the 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 protocol for when roads are in use.
- Requirements on gate control protocols.

The Contractor may not commence with the activity covered by the Method Statement until it has been reviewed by the Site Manager, 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.

### 7.3. Awareness and Competence: Construction Phase of the Aberdeen Wind Facility 1

**OBJECTIVE 20: 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 Contractors are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMPr. 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 is to have copies of the relevant Method Statements and be aware of the content thereof.

- Ensuring that a copy of the EMPr is readily available on-site, and that all senior site staff is 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 wind energy facility.
- 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 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 on-site, 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:

### *7.3.1 Environmental Awareness Training*

Environmental Awareness Training must be undertaken by the Contractor and must take the form of an on-site talk and demonstration by the EO 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 SHE Officer on site.

### *7.3.2 Induction Training*

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 EO and should include discussing the developer'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 the 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 SHE Officer on site.

### *7.3.3 Toolbox Talks*

Toolbox talks should be held on a scheduled and regular basis (at least once a week) 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 the prevention of the reoccurrence thereof. Records of attendance and the awareness talk subject must be kept on file.

## 7.4. Monitoring Programme: Construction Phase of the Aberdeen Wind Facility 1

**OBJECTIVE 20: 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. Monitoring during construction must be on-going for the duration of this phase. The Project Manager must ensure that the monitoring is conducted and reported.

The aim of the monitoring and auditing process will 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
- 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.

### *7.4.1. Non-Conformance Reports*

All supervisory staff including Foremen, Resident Engineers, and the ECO must be provided with 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. Records of penalties imposed may be required by the relevant authority within 48 (forty eight) hours.

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.

### *7.4.2. Incident Reports*

According to Section 30 of National Environmental Management Act (NEMA), an "Incident" is defined as an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed.

In terms of the requirements of NEMA, the responsible person must, within 14 days of the incident, report to the Director General, provincial head of department and municipality such information as is available to enable an initial evaluation of the incident, including:

(a) the nature of the incident;
(b) the substances involved and an estimation of the quantity released and their possible acute effect on persons and the environment and data needed to assess these effects;
(c) initial measures taken to minimise impacts;
(d) causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure; and
(e) measures taken and to be taken to avoid a recurrence of such incident.

### *7.4.3. Monitoring Reports*

A monitoring report will be compiled by the ECO on a monthly basis (or as dictated by the conditions of the EA) 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, or any other aspect as per the Appendix 7 of the EIA Regulations (2014, as amended 2017). The EPC 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.

### *7.4.4. Audit Report*

The Developer must ensure that project compliance with the conditions of the Environmental Authorisation is audited by an independent auditor, and that the audit reports are submitted to the Director: Compliance Monitoring at the DFFE at intervals as dictated by the conditions of the EA. Such audits must be undertaken during both the construction and operation phases of the wind energy facility. The effectiveness of the mitigation measures and recommendations for amongst others the following: grievance incidents; waste management, alien and open space management, re-vegetation and rehabilitation, plant rescue and protection and traffic and transportation should be audited. The results must form part of the project monitoring and audit reports.

### *7.4.5. Final Audit Report*

A final environmental audit report must be compiled by an independent external auditor and be submitted to DFFE upon completion of the construction and rehabilitation activities (within 30 days of completion of the construction phase). 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 8: MANAGEMENT PROGRAMME: OPERATION

**Overall Goal:** To ensure that the operation of the wind energy facility 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 Aberdeen Wind Facility 1 in a way that:

» Ensures that operation activities are properly managed in respect of environmental aspects and impacts.
» Enables the wind energy facility 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.
» Minimises impacts on fauna using the site.

An environmental manager must be appointed during operation whose duty will be to ensure the implementation of the operational EMPr.

## 8.1. Objectives

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

**OBJECTIVE 1: Securing the site and general maintenance during operation**

Safety issues may arise with public access to wind turbines (e.g. unauthorised entry to the site) or to the wind energy facility substations. Prevention and control measures to manage public access are therefore important.

General maintenance at the Aberdeen Wind Facility 1 will be required during the operation of wind energy facility. The maintenance required may also include the replacement of wind turbines, if required during the operation lifetime of the facility.

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| **Project component/s** | » Wind turbines.<br>» Access roads and crane hardstand areas.<br>» Substation, BESS and O&M Building hub<br>» Laydown area, warehouse and site camp hub.<br>» All other associated infrastructure. |
| **Potential Impact** | » Hazards to landowners and public. |
| **Activities/risk sources** | » Uncontrolled access to the wind energy facility and associated infrastructure. |
| **Mitigation: Target/Objective** | » To secure the site against unauthorised entry.<br>» To protect members of the public/landowners/residents. |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| The Environmental Manager must provide fourteen (14) days written notification to the DFFE that the Aberdeen Wind Facility 1 operation phase will commence. | EM | Prior to operation |
| General onsite maintenance of the wind turbines during the operation phase must in no way impact or negatively affect the environment, and contractors or other service providers providing onsite maintenance must be made aware of this EMPr and the content thereof. | O&M Operator | Operation |
| Secure access to the site and entrances. | O&M Operator | Operation |
| Post information boards about public safety hazards and emergency contact information. | O&M Operator | Operation |
| Stormwater run-off infrastructure must be maintained to mitigate both the flow and water quality impacts of any stormwater leaving the site. | O&M Operator | Operation |
| No stormwater runoff must be allowed to discharge directly into any water course along roads, and flows should thus be allowed to dissipate over a broad area covered by natural vegetation. | O&M Operator | Operation |
| Should wind turbines be required to be replaced, the following will apply:<br>» Site access must be confirmed for the transportation of the required turbine components and equipment to the site and turbine location of the infrastructure to be replaced.<br>» Materials and turbine structures are to be stored within the previously disturbed construction laydown area. No disturbance of areas outside of these areas should occur.<br>» Full clean-up of all materials must be undertaken after the removal and replacement of the wind turbine and associated infrastructure is complete, and disturbed areas appropriately rehabilitated.<br>» Most of the materials used for wind turbines can be recycled. The majority of the turbine (excluding the blades) can be recovered and re-used or recycled. Recyclable materials must be transported off-site by truck and managed at appropriate facilities in accordance with relevant waste management regulations. No waste materials may be left on-site following the replacement.<br>» Waste material which cannot be recycled shall be disposed of at an appropriately licensed waste disposal site or as required by the relevant legislation. | O&M Operator | Operation |
| If soil erosion is detected, the area must be stabilised by the use of geo-textiles (or other appropriate means) and facilitated re-vegetation. | O&M Operator | Operation |
| Maintenance must be undertaken regularly on all vehicles and maintenance machinery to prevent hydrocarbon spills. | O&M Operator | Operation |
| No domestic and other waste must be left at the site and must be transported with the maintenance vehicles to an authorised waste dumping area. | O&M Operator | Operation |

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| **Performance Indicator** | » Site is secure and there is no unauthorised entry.<br>» No members of the public/ landowners injured.<br>» No complaints from landowners/ public. |
| **Monitoring and Reporting** | » Regular visual inspection of fence for signs of deterioration/forced access.<br>» An incident reporting system must be used to record non-conformances to the EMPr.<br>» A public complaints register must be developed and maintained on site.<br>» Landowners should be consulted regularly. |

**OBJECTIVE 2: Protection of indigenous natural vegetation, fauna and maintenance of rehabilitation**

The Ecological Impact Assessment has identified impacts of medium significance to be associated with the development of Aberdeen Wind Facility 1 prior to the implementation of appropriate recommendation and mitigation measures. There are no impacts associated with the development of the Aberdeen Wind Facility 1 on terrestrial biodiversity that cannot be mitigated to an acceptable level. As such, should all the proposed mitigation be implemented, the development is deemed acceptable from a terrestrial ecological impact perspective. No impacts of a high significance or fatal flaws are expected to occur after implementation of the recommended mitigation measures.

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| **Project component/s** | » Areas requiring regular maintenance.<br>» Route of the security team.<br>» Wind energy facility including access roads and laydown area hub.<br>» Areas disturbed during the construction phase and subsequently rehabilitated at its completion. |
| **Potential Impact** | » Disturbance to or loss of vegetation and/or habitat.<br>» Alien plant invasion.<br>» Environmental integrity of site undermined resulting in reduced visual aesthetics, erosion, compromised land capability and the requirement for on-going management intervention. |
| **Activity/Risk Source** | » Movement of employee vehicles within and around site. |
| **Mitigation: Target/Objective** | » Maintain minimised footprints of disturbance of vegetation/ habitats on-site.<br>» Ensure and encourage plant regrowth in non-operational areas of post-construction rehabilitation. |

| Mitigation: Action/Control | Responsibility | Timeframe |
|---|---|---|
| Site access control and monitoring of staff on site to ensure that people remain within the operational areas of the wind farm. | O&M Operator | Operation |
| Monitoring of select populations of Sensitive Species 1212 near to the development footprint to ensure that these populations are not being impacted. Should it become apparent that individuals are being lost, seed from locally sourced individuals should be used to cultivate seedlings that can be placed into the wild to replace the lost individuals. | O&M Operator<br>ECO | Operation |
| Any potentially dangerous fauna such as snakes or fauna threatened by the maintenance and operational activities should be removed to a safe location. | O&M Operator | Operation |

| Mitigation: Action/Control | Responsibility | Timeframe |
|---|---|---|
| The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden by anyone except landowners or other individuals with the appropriate permits and permissions where required. | O&M Operator | Operation |
| All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. | O&M Operator | Operation |
| If any parts of the site must be lit at night for security purposes, this should be done with downward-directed low-UV type lights (such as most LEDs and HPS bulbs), which attract fewer insects. | O&M Operator | Operation |
| All vehicles accessing the site should adhere to a low-speed limit (40km/h max) to avoid collisions with susceptible species such as snakes and tortoises. | O&M Operator | Operation |
| If parts of the facility such as the substation are to be fenced, then no electrified strands should be placed within 30cm of the ground as some species such as tortoises are susceptible to electrocution from electric fences as they do not move away when electrocuted but rather adopt defensive behaviour and are killed by repeated shocks. Alternatively, the electrified strands should be placed on the inside of the fence and not the outside. | O&M Operator | Operation |
| All roads and other hardened surfaces should have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. | O&M Operator | Operation |
| An erosion monitoring programme should be put in place for at least 3 years after construction. Any problems observed should be rectified as soon as possible using the appropriate revegetation and erosion control works. | O&M Operator | Operation |
| Erosion management at the site should take place according to the Erosion Management Plan and Rehabilitation Plan. This should make provision for annual monitoring and rehabilitation. | O&M Operator | Operation |
| All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. | O&M Operator | Operation |
| There should be follow-up rehabilitation and revegetation of any remaining bare areas with indigenous perennial shrubs, grasses and trees from the local area. | O&M Operator | Operation |
| Alien management at the site should take place according to the Alien Invasive Management Plan | O&M Operator | Operation |
| Regular (annual) monitoring for alien plants during operation to ensure that no alien invasive problems have developed as result of the disturbance, as per the Alien Management Plan for the project. | O&M Operator | Operation |
| Woody aliens should be controlled on at least an annual basis using the appropriate alien control techniques as determined by the species present. | O&M Operator | Operation |

| Mitigation: Action/Control | Responsibility | Timeframe |
|---|---|---|
| Rehabilitate disturbed terrestrial habitat and water resources (bat foraging habitat) based on consultation with an appropriate experienced specialist(s) | O&M Operator | Operation |
| Due to the disturbance at the site as well as the increased runoff generated by the hard infrastructure, alien plant species are likely to be a long-term problem at the site and a long-term control plan will need to be implemented. Problem plant species are already present in the area and are likely to increase rapidly if not controlled. | O&M Operator | Operation |
| Regular monitoring for alien plants within the development footprint as well as adjacent areas which receive runoff from the facility must be undertaken as these are also likely to be prone to invasion problems. | O&M Operator | Operation |
| Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible. | O&M Operator | Operation |
| Vehicle movements must be restricted to designated roadways. | O&M Operator | Operation |
| In order to increase general faunal protection, the use of any pesticide in the wind energy facility area should be prohibited. | O&M Operator | Operation |
| Roads must be maintained to ensure limited erosion and impact on areas adjacent to roadways. | O&M Operator | Operation |
| Vegetation control within the wind energy facility should be by manual clearing and herbicides should not be used except to control alien plants in the prescribed manner if necessary. | O&M Operator Specialist | Operation |
| All alien plant re-growth must be monitored and should these alien plants reoccur these plants should be re-eradicated. The scale of the development does however not warrant the use of a Landscape Architect and / or Landscape Contractor. | O&M Operator | Operation |
| The use of herbicides 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. | O&M Operator | Operation |
| Implement an animal removal plan to ensure safety of workers and fauna. | O&M Operator | Operation |
| Fire breaks should be established, where appropriate and as discussed with the landowners. Access roads could also act as fire breaks. | O&M Operator Specialist | Duration of contract |
| There should be follow-up rehabilitation and revegetation of any remaining bare areas with indigenous perennial shrubs and succulents from the local area. | O&M Operator | Operation |
| Annual site inspection for erosion with follow up remedial action where problems are identified. | Specialist | Annual monitoring until successful re-establishment of vegetation in an area |

| Mitigation: Action/Control | Responsibility | Timeframe |
|---|---|---|
| Noise and disturbance on the site should be kept to a minimum during operation and maintenance activities. | O&M Operator | Operation |
| Upon completion of the construction at the site, the water diversions shall be removed to restore natural flow patterns. Under no circumstance shall a new channel or drainage canals be excavated to divert water away from construction activities. | O&M Operator | Operation |
| All disturbed areas beyond the construction site that are intentionally or accidentally disturbed during the construction phase must be rehabilitated. | Contractor | Operation |

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| **Performance Indicator** | » No further disturbance to vegetation or terrestrial faunal habitats.<br>» No erosion problems resulting from operational activities within the wind energy facility.<br>» Low abundance of alien plants within affected areas.<br>» Maintenance of a ground cover that resist erosion.<br>» Continued improvement of rehabilitation efforts. |
| **Monitoring** | » Observation of vegetation on-site by environmental manager.<br>» Regular inspections to monitor plant regrowth/performance of rehabilitation efforts and weed infestation compared to natural/undisturbed areas.<br>» Annual monitoring with records of alien species presence and clearing actions.<br>» Annual monitoring with records of erosion problems and mitigation actions taken with photographs. |

**OBJECTIVE 3: Protection of avifauna**

The Avifauna Impact Assessment identified that all impacts associated with the development of the Aberdeen Wind Facility development footprint will be of a medium to high significance before mitigation and can be mitigated to an acceptable level of impact (i.e. medium). No impacts of a high significance or fatal flaws are expected to occur with the implementation of the recommended mitigation measures.

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| **Project component/s** | » Wind turbines.<br>» Substation. |
| **Potential Impact** | » Disturbance to or loss of birds as a result of collision with the turbine blades and project components.<br>» Destruction of habitat.<br>» Displacement of birds.<br>» Collision with project components.<br>» Traffic to and from site. |
| **Activity/risk source** | » Spinning turbine blades.<br>» Substation. |
| **Mitigation: Target/Objective** | » More accurately determine the impact of the operating wind energy facility on collision-prone Red Data species.<br>» Minimise impacts associated with the turbines and the substation. |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| Once operational, vehicle and pedestrian access to the site should be controlled and restricted to prevent unnecessary destruction of vegetation. | O&M operator | Operation |
| Post-construction monitoring, as per the recommendation of the BARESG guidelines (Jenkins et al. 2015) should be conducted to:<br>• Quantify bird numbers and movements (replicating baseline data collection), and<br>• Estimate bird mortalities. | Developer<br>Specialist | Operation |
| Carcass monitoring should be undertaken by trained observers, able to cover 4-5 turbines per day in all weather throughout the year at ~40% or more of all the turbines, overseen by an ornithologist competent to determine species identification, and a manager to collate and analyse each years' data | Developer<br>Specialist | Operation |
| Turbines falling into Class 5[7] must be mitigated with 2-tiers of mitigation (striped-blade and SDOD).<br>Should human SDOD be implemented it should be in place for 24 months and should it prove unnecessary in a review of the number of risky flights recorded (e.g. < 1 per month) then it can be discontinued until such time that increasing Passage Rates or RD or LC fatalities are found | Developer | Operation |
| Turbines in Class 4[8] to be mitigated with 1-tier of mitigation (preferably striped-blade) | Developer | Operation |
| Estimating bird fatality rates should be conducted and include:<br>• Estimation of searcher efficiency and scavenger removal rates using carcasses;<br>• Carcass searches; and<br>• Data analysis incorporating systematically collected data from the above mentioned bullets; these biases should then inform the fatality rates. | Developer<br>Specialist | Operation |
| Carcass monitoring should be undertaken by trained observers, able to cover 4-5 turbines per day in all weather throughout the year at ~40% or more of all the turbines, overseen by an ornithologist competent to determine species identification, and a manager to collate and analyse each years' data. | Developer<br>Specialist | Operation |

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| **Performance Indicator** | » Minimal additional disturbance to bird populations on the wind energy facility site.<br>» Continued improvement of bird protection devices, as informed by the operational monitoring.<br>» Regular provision of clearly worded, logical and objective information on the interface between the local avifauna and operating wind energy facility.<br>» Clear and logical recommendations on why, how and when to institute mitigation measures to reduce avian impacts of the development, from the pre-construction to operation phase. |

[7] Turbines ABE003, ABE005, ABE008, ABE009, ABE027 fall within risk Class 5

[8] Turbines ABE001, ABE002, ABE004, ABE006, ABE007, ABE010, ABE011, ABE016, ABE017, ABE018, ABE022, ABE023, ABE024, ABE026, ABE028, ABE029, ABE030, ABE033, ABE040, ABE041, ABE042 fall within risk Class 4

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| **Monitoring and Reporting** | » Observation of avifaunal populations and incidence of injuries/death from collisions from turbine blades.<br>» Monitoring of facility and reporting where fatalities do occur.<br>» Review of bird monitoring report on a full year of post-construction monitoring. |

## OBJECTIVE 4: Protection of bat species

Based on the bat activity recorded at the Aberdeen Wind Facility 1 project site the significance ratings for the majority of the impacts to bats posed by the development are predicted to be medium or high before mitigation, depending on the impact being considered. After mitigation, all impacts are predicted to be of a medium to low significance. Based on the opportunity for reduction of the impacts through appropriate mitigation measures from a high or medium significance to a medium acceptable significance, no fatal flaws are expected to occur.

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|---|---|
| **Project component/s** | » Wind turbines.<br>» Substation. |
| **Potential Impact** | » Bat fatalities from collision with turbines, and potential population declines |
| **Activity/risk source** | » Operation of turbines between sunset and sunrise |
| **Mitigation: Target/Objective** | » The annual estimated number of actual bat fatalities must not exceed the WEF's bat fatality threshold calculated as per MacEwan et al. 2018 (or later). |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| Monitor bat fatalities as soon as the first turbine is operational - as per Aronson *et al*. 2020 (or later) - during the wind energy facility's first two years of operation, and then every fifth year thereafter. | Developer<br>ECO<br>Contractor | Operation |
| Mitigate bat fatalities adaptively by consulting Aronson *et al.* 2020 (or later), and the best available relevant scientific information. Adequate financial provision should be made to permit effective monitoring, management, and mitigation of bat fatalities throughout the life of the wind farm. | Developer<br>ECO<br>Contractor | Operation |
| If the monitoring and data analysis are poorly performed and/or if fatalities exceed the WEF's bat fatality threshold (to be calculated as per MacEwan et al. 2018 or later), and unless reliable and comprehensive operational monitoring data and a suitably experienced bat specialist indicate otherwise, Reduce fatalities by implementing curtailment of all turbines below an initial cut-in speed of 6 m/s during temperatures of 12 °C or warmer from sunset to sunrise in February, March, and September. | Developer<br>ECO<br>Contractor | Operation |
| Report the annual operational bat monitoring results to SABAA (the South African Bat Assessment Association), EWT (the Endangered Wildlife Trust), and DFFE (the national Department of Forestry, Fisheries, and the Environment). | Developer<br>ECO<br>Contractor | Operation |
| Minimize artificial lighting | Developer<br>ECO | Operation |

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

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| **Performance Indicator** | » Operational bat monitoring is performed as per Aronson et al. 2020 (or later).<br>» Bat fatalities remain below the WEF's bat fatality threshold, calculated as per MacEwan et al. 2018 (or later).<br>» If/When the bat fatality threshold is exceeded, this is promptly mitigated by implementing turbine curtailment (as described herein) or better.<br>» The wind energy facility's operational bat monitoring reports are submitted to SABAA, EWT, and DFFE. |
| **Monitoring and Reporting** | » Bat fatality monitoring should be diligently performed from when the first turbine is operational, through the first two years of operation, and at least every fifth year thereafter throughout the life of the wind energy facility. |

## OBJECTIVE 5: Minimisation of visual impact

Overall, the significance of the visual impacts associated with the proposed Aberdeen Wind Facility 1 is expected to be high as a result of the generally undeveloped character of the landscape. The facility would be visible within an area that contains certain sensitive visual receptors who could consider visual exposure to this type of infrastructure to be intrusive. Such visual receptors include people travelling along the national, arterial and secondary roads, as well as, residents of rural homesteads and tourists passing through or holidaying in the region.

Conventional mitigation (e.g. such as screening of the structures) of the potential visual impacts is highly unlikely to succeed due to the nature of the development and the receiving environment. The overall potential for mitigation is therefore generally low.

Even though it is possible that the potential visual impacts may exceed acceptable levels within the context of the receiving environment, the proposed development is not considered to be fatally flawed.

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| **Project component/s** | » Wind energy facility (including access roads).<br>» Substation.<br>» Ancillary infrastructure. |
| **Potential Impact** | » Risk to aircraft in terms of the potential for collision.<br>» Enhanced visual intrusion.<br>» Visual impact of the wind energy facility degradation (including operational wind turbines) and vegetation rehabilitation failure. |
| **Activity/risk source** | » Size/scale of turbines.<br>» Associated lighting.<br>» Wind turbines and other infrastructure.<br>» Access roads.<br>» Other associated infrastructure.<br>» Viewing of the degradation and vegetation rehabilitation failure by observers on or near the site. |
| **Mitigation: Target/Objective** | » To minimise the potential for visual impact. |

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| | » To ensure that the wind energy facility complies with Civil Aviation Authority requirements for turbine visibility to aircraft.<br>» Minimise the contrast with the surrounding environment and visibility of the turbines to humans.<br>» The containment of light emitted from the substation in order to eliminate the risk of additional night-time visual impacts.<br>» Well maintained and neat facility. |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| Maintain the general appearance of the facility as a whole, including the turbines, servitudes and the ancillary buildings. | O&M Operator | Operation and maintenance |
| Maintain roads and servitudes to forego erosion and to suppress dust. | O&M Operator | Operation |
| Monitor rehabilitated areas, and implement remedial action as and when required. | O&M Operator | Operation |
| Lighting of the wind energy facility (for example security lights) should be kept to a minimum. Lights should be directed downwards. | O&M Operator | Operation |
| Aviation warning lights must be mounted on the turbine hub or such measures specified by the South African Civil Aviation Authority consent. | O&M Operator | Operation and maintenance |
| Minimise night lighting with motion sensors and make use of an infra-red security system. Maintain lighting focused on the development and angled low. | O&M Operator | Operation |
| If turbines are to be lit at night, lighting should be kept to a minimum and should preferably not be white light. Flashing strobe-like lights should be used where possible. | O&M Operator | Operation |

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| **Performance Indicator** | » Appropriate visibility of infrastructure to aircraft.<br>» Well maintained and neat facility with intact vegetation on and in the vicinity of the wind energy facility. |
| **Monitoring and Reporting** | » Ensure that aviation warning lights or other measures are installed before construction is completed and are fully functional at all times.<br>» Monitoring of the entire site on an ongoing basis by the operator. |

**OBJECTIVE 6: Minimisation of noise impacts from turbines**

It was determined that the potential noise impacts, without mitigation, would be:

- of a low significance for the construction of access roads;
- of a low significance relating to noises from construction traffic;
- of a low significance for the daytime construction activities (hard standing areas, excavation and concreting of foundations and the assembly of the WTG and other infrastructure);
- of a potential medium significance for the night-time construction activities (the pouring of concrete, erection of WTG).

Mitigation measures are available and were included in this report, that should reduce the significance of the noise impact to low;

- of a low significance for daytime operational activities (noises from wind turbines) when considering the worst-case SPL; and
- of a low significance for night-time operational activities (noises from wind turbines) when considering the worst-case SPL.

No impacts of a high significance or fatal flaws were identified.

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|---|---|
| **Project component/s** | » Wind energy facility (including access roads). |
| **Potential Impact** | » Increased noise levels at potentially sensitive receptors.<br>» Changing ambient sound levels could change the acceptable land use capability.<br>» Disturbing character of noise from the wind turbines.. |
| **Activity/risk source** | » Simultaneous operation of a number of wind turbines. |
| **Mitigation: Target/Objective** | » Prevent the generation of nuisance noises.<br>» Ensure acceptable noise levels at surrounding stakeholders and potentially sensitive receptors. |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| Consider all reasonable noise complaints | O&M Operator | Operation |
| No new residential dwellings to be developed within areas enveloped by the 42 dBA noise level contour | O&M Operator | Operation |
| Structures located within the 42 dBA noise level contour should not be used for permanent residential use | O&M Operator | Operation |
| Future noise-monitoring is recommended should the structures at NSR05 be used for residential purposes. | O&M Operator | Operation |
| Where practicable, mobile equipment should be fitted with broadband (white-noise generators/alarms ), rather than tonal reverse alarms. | O&M Operator | Operation |

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|---|---|
| **Performance Indicator** | » Ensure that the change in ambient sound levels as experienced by potentially sensitive receptors is less than 7 dBA |
| **Monitoring and Reporting** | » Noise monitoring after the first year of operation and any additional monitoring as recommended by the specialist thereafter |

**OBJECTIVE 7: Appropriate handling and management of hazardous substances and waste**

The operation of the wind energy facility will involve the generation of limited waste products. The main wastes expected to be generated by the operation activities includes general solid waste and hazardous waste.

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|---|---|
| **Project component/s** | » Wind turbines.<br>» Substations.<br>» Associated infrastructure. |
| **Potential Impact** | » Inefficient use of resources resulting in excessive waste generation.<br>» Litter or contamination of the site or water through poor waste management practices. |

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|---|---|
| **Activity/risk source** | » Generators and gearbox – turbines.<br>» Transformers and switchgear – substation.<br>» Fuel and oil storage. |
| **Mitigation: Target/Objective** | » To comply with waste management legislation.<br>» To minimise production of waste.<br>» To ensure appropriate waste disposal.<br>» To avoid environmental harm from waste disposal. |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| Hazardous substances must be stored in sealed containers within a clearly demarcated designated area. | O&M Operator | Operation |
| Storage areas for hazardous substances must be conducted within a secured and clearly demarcated area. | O&M Operator | Operation |
| All structures and/or components replaced during maintenance activities must be appropriately disposed of at an appropriately licensed waste disposal site or sold to a recycling merchant for recycling. | O&M Operator | Operation |
| Care must be taken to ensure that spillage of oils and other hazardous substances are limited during maintenance. Handling of these materials should take place within an appropriately sealed and bunded area. Should any accidental spillage take place, it must be cleaned up according to specified standards regarding bioremediation. | O&M Operator | Operation and maintenance |
| Waste handling, collection and disposal operations must be managed and controlled by a waste management contractor. | O&M Operator / waste management contractor | Operation |
| Used oils and chemicals:<br>» Where these cannot be recycled, appropriate disposal must be arranged with a licensed facility in consultation with the administering authority.<br>» Waste must be stored and handled according to the relevant legislation and regulations. | O&M Operator | Operation |
| General waste must be recycled where possible or disposed of at an appropriately licensed landfill. | O&M Operator | Operation |
| Spill kits must be made available on-site for the clean-up of spills and leaks of contaminants. | O&M Operator | Operation and maintenance |
| Hazardous waste (including hydrocarbons) and general waste must be stored and disposed of separately. | O&M Operator | Operation |
| Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors. | O&M Operator/ waste management contractor | Operation |
| No waste may be burned or buried on site. | O&M Operator | Operation |
| Appropriate ablution facilities should be provided for construction workers during construction and on-site staff during the operation of the facility. | Contractor | Operation |

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|---|---|
| **Performance Indicator** | » No complaints received regarding waste on site or dumping.<br>» Internal site audits identifying that waste segregation, recycling and reuse is occurring appropriately. |

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|---|---|
| | » Provision of all appropriate waste manifests.<br>» No contamination of soil. |
| **Monitoring and Reporting** | » Waste collection must be monitored internally on a regular basis.<br>» Waste documentation must be completed and made available for inspection on request.<br>» An incidents/complaints register must be maintained, in which any complaints from the community must be logged. Complaints must be investigated and, if appropriate, acted upon.<br>» Regular reports on exact quantities of all waste streams exiting the site must be compiled by the waste management contractor and monitored by the environmental manager. All appropriate waste disposal certificates must accompany the monthly reports. |

**OBJECTIVE 8: Maximise benefits and opportunities for local communities associated with local employment, skills opportunities, socio-economic development plans and a community trust**

The proposed facility will create up to 50 permanent employment positions which will be retained for approximately 20-25 years. Of these, up to 6 will be highly skilled and skilled positions comprising facilities managers, technicians, and environmental engineers. The reaming positions will be created for semi-skilled and low skilled staff i.e. security personnel.

| | |
|---|---|
| **Project component/s** | » Wind energy facility.<br>» Day to day operational activities associated with the wind energy facility including maintenance. |
| **Potential Impact** | » The opportunities and benefits associated with the creation of local employment and business should be maximised as far as possible. |
| **Activity/risk source** | » The operation phase of the wind energy facility will create permanent employment opportunities.<br>» The establishment of a wind energy facility has the potential to create an attraction for visitors to the area. The development also has the potential to promote the benefits of renewable energy projects. |
| **Mitigation: Target/Objective** | » Create medium- to long-term full time employment opportunities for locals. |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| The operator of the wind energy facility should be encouraged to, as far as possible, procure materials, goods and products required for the operation and maintenance of the facility from local suppliers to increase the positive impact in the local economy. | O&M Operator | Operation |
| Where possible, local labour should be considered for employment so as to increase the positive impact on the local economy. | O&M Operator | Operation |
| As far as possible, local small and medium enterprises should be approached to investigate the opportunities for supply inputs required for the maintenance and operation of the facility. | O&M Operator | Operation |

| Mitigation: Action/control | Responsibility | Timeframe |
|---|---|---|
| The developer should consider establishing vocational training programmes for the local labour force to promote the development of skills required by the wind energy facility and thus provide for the opportunities for these people to be employed in other similar facilities elsewhere in the future | O&M Operator | Operation |
| Implement a skills development and training programme aimed at maximizing the number of employment opportunities for local community members. | Developer and O&M operator | Construction and operation |
| Maximise opportunities for local content, procurement, and community shareholding. | Developer and O&M operator | Construction and operation |
| The Developers should liaise with the Dr Beyers Naude Local Municipality to identify projects that can be supported by Socio-economic development contributions. | Developer and O&M operator | Construction and operation |
| Clear criteria for identifying and funding community projects and initiatives in the area should be identified. The criteria should be aimed at maximising the benefits for the community as a whole and not individuals within the community. | Developer and O&M operator | Construction and operation |
| Strict financial management controls, including annual audits, should be instituted to manage the Socio-economic development contributions. | Developer and O&M operator | Construction and operation |

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| **Performance Indicator** | » Maximum amount of semi and unskilled labour locally sourced where possible.<br>» Local suppliers and SMMEs contracted where possible.<br>» Skills transfer facilitated where required.<br>» A social development and economic development programme developed and implemented. |
| **Monitoring and Reporting** | » Indicators listed above must be met for the operation phase. |

**OBJECTIVE 9: Implement an appropriate fire management plan during the operation phase**

The vegetation on the site may be at risk of fire, especially during drought conditions experienced in the area. The increased presence of people on the site could increase the risk of veld fires, particularly in the dry season.

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| **Project Component/s** | » Operation and maintenance of the wind energy facility and associated infrastructure. |
| **Potential Impact** | » Veld fires can pose a personal safety risk to local farmers and communities, and their homes, crops, livestock and farm infrastructure, such as gates and fences. In addition, fire can pose a risk to the wind energy facility infrastructure. |
| **Activities/Risk Sources** | » The presence of operation and maintenance personnel and their activities on the site can increase the risk of veld fires. |
| **Mitigation: Target/Objective** | » To avoid and or minimise the potential risk of veld fires on local communities and their livelihoods. |

| Mitigation: Action/Control | Responsibility | Timeframe |
|---|---|---|
| Provide adequate firefighting equipment on site. Apply for membership to the local Fire Protection Association, should there be one. | O&M Operator | Operation |
| Provide fire-fighting training to selected operation and maintenance staff. | O&M Operator | Operation |
| Ensure that appropriate communication channels are established to be implemented in the event of a fire. | O&M Operator | Operation |
| Fire breaks should be established where and when required. Cognisance must be taken of the relevant legislation when planning and burning firebreaks (in terms of timing, etc.). Access roads may also act as fire breaks. | O&M Operator | Operation |
| Upon completion of the construction phase, an emergency evacuation plan must be drawn up to ensure the safety of the staff and surrounding land users in the case of an emergency. | O&M Operator | Operation |
| Contact details of emergency services should be prominently displayed on site. | O&M Operator | Operation |

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| **Performance Indicator** | » Firefighting equipment and training provided before the construction phase commences.<br>» Appropriate fire breaks in place. |
| **Monitoring and Reporting** | » The Developer must monitor indicators listed above to ensure that they have been met. |

**OBJECTIVE 10: Ensure appropriate operation and maintenance of the battery energy storage system**

Risks associated with Battery Energy Storage Systems include mechanical breakdown, and exposure to high temperatures which may lead to batteries overheating and leaking. The generation of hazardous waste is also associated with the incorrect disposal of batteries and components. These risks may result in fires, electrocutions and spillage of toxic and hazardous substances into the surrounding environment, resulting in soil and water contamination as well as health impacts on surrounding communities.

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|---|---|
| **Project Component/s** | » Battery Energy Storage System. |
| **Potential Impact** | » Fire and safety risks<br>» Leakages and impacts on soils and water resources. |
| **Activities/Risk Sources** | » Inappropriate operation and maintenance of BESS. |
| **Mitigation: Target/Objective** | » To avoid and or minimise the potential risk of associated with the operation and maintenance of the BESS. |

| Mitigation: Action/Control | Responsibility | Timeframe |
|---|---|---|
| Compile (and adhere to) a procedure for the safe handling of battery cells | O&M Contractor | Operation |
| Ensure that battery supplier user guides, safety specifications and MSDS are filed on site at all times. | O&M Contractor | Operation |
| Operate, maintain and monitor the BESS as per supplier specifications. | O&M Contractor | Operation |

| Mitigation: Action/Control | Responsibility | Timeframe |
|---|---|---|
| Compile method statements for approval by the Technical/SHEQ Manager for battery cell, electrolyte and battery cell/ container replacement. Maintain method statements on site. | O&M Contractor | Operation |
| Compile an emergency response plan for implementation in the event of a spill or leakage. | O&M Contractor | Operation |
| Batteries must be strictly maintained by the supplier or suitably qualified persons for the duration of the project life cycle. No unauthorised personnel should be allowed to maintain the BESS. | O&M Contractor | Operation |
| Ensure that all maintenance contractors/ staff are familiar with the supplier's specifications. | O&M Contractor | Operation |
| Provide signage on site specifying the types of batteries in use and the risk of exposure to hazardous material and electric shock. | O&M Contractor | Operation |
| Provide signage on site specifying how electrical and chemical fires should be dealt with by first responders, and the potential risks to first responders (e.g. toxic fumes). Provide suitable firefighting equipment on site. | O&M Contractor | Operation |
| Lithium-ion batteries must have battery management systems (containment, automatic alarms and shut-off systems) to monitor and protect cells from overcharging or damaging conditions. | O&M Contractor | Operation |
| Maintain strict access control to the battery storage area. | O&M Contractor | Operation |
| Undertake regular visual checks on BESS equipment to identify signs of damage or leaks. | O&M Contractor | Operation |
| Provide environmental awareness training to all personnel on site. Training should include discussion of:<br>o Potential impact of electrolyte spills on groundwater;<br>o Suitable disposal of waste and effluent;<br>o Key measures in the EMPr relevant to worker's activities;<br>o How incidents and suggestions for improvement can be reported.<br>Ensure that all attendees remain for the duration of the training and on completion sign an attendance register that clearly indicates participants' names. | O&M Contractor | Operation |

| | |
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| **Performance Indicator** | » BESS operated and maintained in accordance with supplier specifications.<br>» Appropriate signage on site.<br>» Employees appropriately trained.<br>» Required documentation available on site.<br>» Firefighting equipment and training provided before the operation phase commences. |
| **Monitoring and Reporting** | » The O&M contractor must monitor indicators listed above to ensure that they have been met. |

### 8.2. Monitoring Programme: Operation Phase of the Aberdeen Wind Facility 1.

**OBJECTIVE 11: 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. An internal environmental audit must be conducted every 6 months and an external audit must be conducted once a year in order to confirm compliance with the requirements of all environmental permits (including the Environmental Authorisation, once issued) for the project, this EMPr, and all relevant legislation. The results of the audit reports must be made available to the DFFE and the relevant authorities on request, and must be part of monitoring and audit reports. An annual audit report must be compiled and submitted to DFFE. The aim of the auditing process would be to routinely 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.
- Aid in the communication and feedback to authorities and stakeholders.

# CHAPTER 9: MANAGEMENT PROGRAMME: DECOMMISSIONING

The turbine infrastructure which will be utilised for the Aberdeen Wind Facility 1 is expected to have a lifespan of up to 20 - 25 years (with maintenance). Equipment associated with this wind energy facility would only be decommissioned once it has reached the end of its economic life. It is most likely that decommissioning activities of the infrastructure of the wind energy facility would comprise the dismantling and replacement of the turbines with more appropriate technology/infrastructure available at that time. It must be noted that decommissioning activities will need to be undertaken in accordance with the legislation applicable at that time, which may require this section of the EMPr to be revisited and amended.

*The relevant mitigation measures contained under the construction section should be applied during decommissioning and therefore are not repeated in this section.*

» ***Site Preparation***
Site preparation activities will include confirming the integrity of the access to the site to accommodate the required equipment, preparation of the site (e.g. laydown areas, construction platform) and the mobilisation of construction equipment.

» ***Dismantle and Remove Infrastructure***
The wind infrastructure (turbine and tower sections) of the wind energy facility will be dismantled once it reaches the end of its economic lifespan. A large crane would be required for dismantling the turbine and tower sections. Once dismantled, the components will be reused, recycled, or disposed of in accordance with regulatory requirements (NEMA / NEM:WA). All parts of the turbine would be considered reusable or recyclable except for the blades.

## 9.1. Objectives

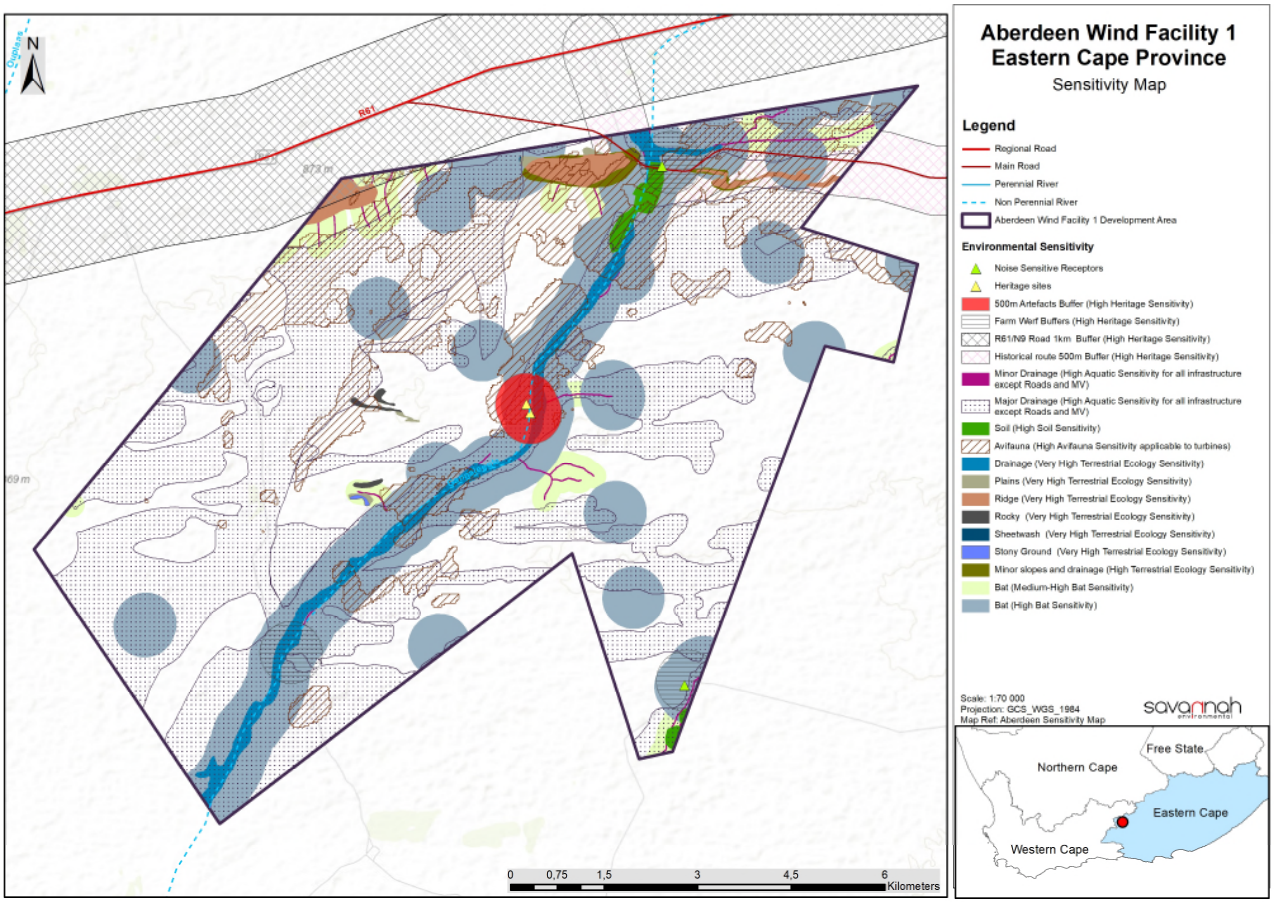
In decommissioning the Aberdeen Wind Facility 1, the Aberdeen Wind Facility 1 (Pty) Ltd must ensure that:

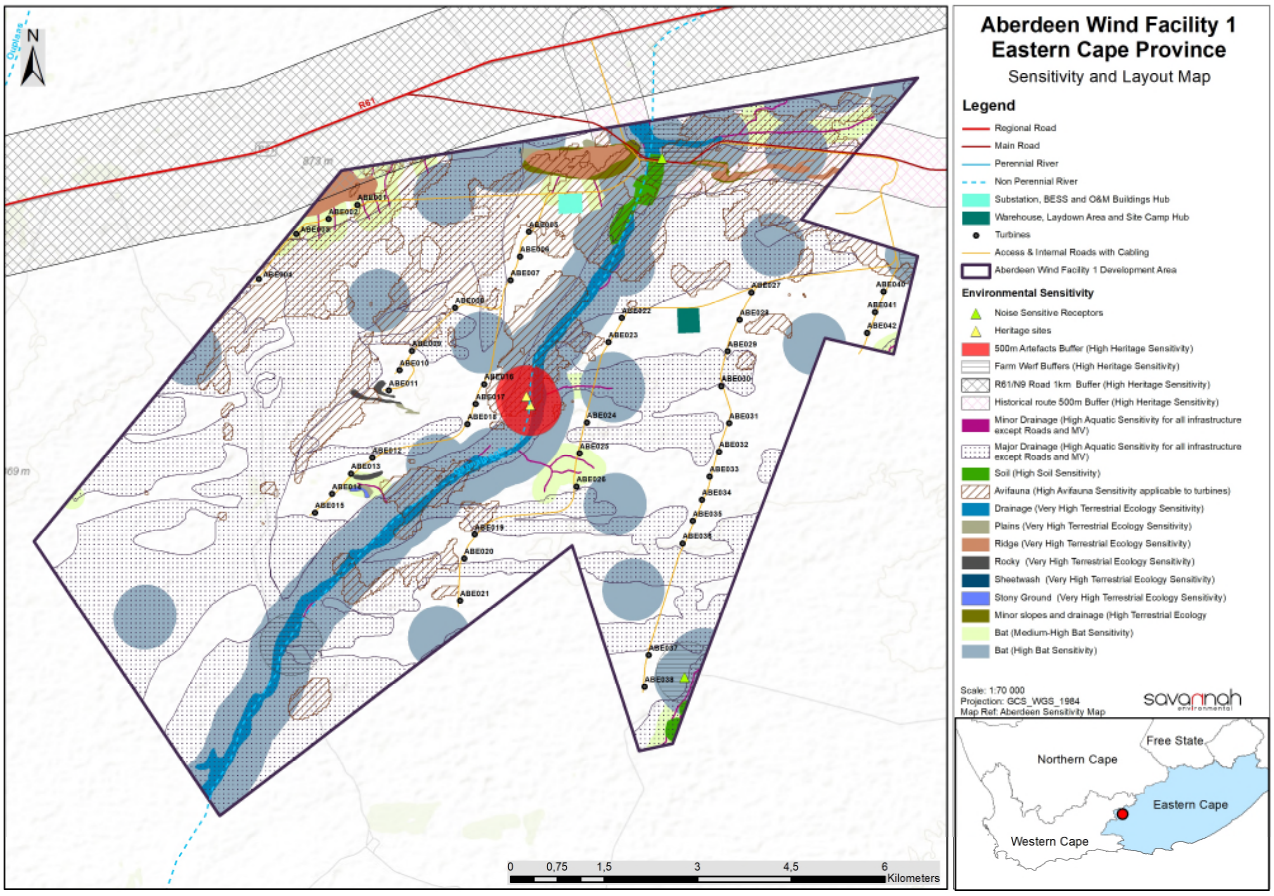
» All structures not required for the post-decommissioning use of the site (may include the turbines, substation, ancillary buildings, monitoring masts) are dismantled and/or demolished, removed and waste material disposed of at an appropriately licensed waste disposal site or as required by the relevant legislation.
» Rehabilitate access/service roads and servitudes not required for the post-decommissioning use of the site. If necessary, an ecologist should be consulted to give input into rehabilitation specifications.
» All disturbed areas are compacted, sloped and contoured to ensure drainage and runoff and to minimise the risk of erosion.
» Monitor rehabilitated areas quarterly for at least a year following decommissioning, and implement remedial action as and when required.
» Any fauna encountered during decommissioning activities should be removed to safety by a suitably qualified person.
» All vehicles should adhere to a low speed limit on site. Heavy vehicles should be restricted to 30km/h and light vehicles to 40km/h.
» All above-ground infrastructures should be removed from the site. Below-ground infrastructure such as cabling can be left in place if it does not pose a risk, as removal of such cables may generate additional disturbance and impact, however, this should be in accordance with the facilities' decommissioning and recycling plan.

- Any potentially dangerous fauna such as snakes or fauna threatened by the decommissioning activities should be removed to a safe location prior to the commencement of decommissioning activities.
- All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.
- Decommissioning disturbance within or near the drainage lines should be kept to a minimum and any disturbance in these areas should be rehabilitated as quickly as possible.
- An erosion monitoring programme should be put in place for at least 3 years after decommissioning and should make provision for annual monitoring and rehabilitation.
- All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques.
- There should be follow-up rehabilitation and revegetation of any remaining bare areas with indigenous perennial shrubs, grasses and trees from the local area.
- Alien management at the site should be implemented post-decommissioning in accordance with an Alien Invasive Management Plan.
- Regular (annual) monitoring for alien plants during decommissioning to ensure that no alien invasive problems have developed as result of the disturbance, as per the Alien Management Plan for the project.
- Woody aliens should be controlled on at least an annual basis using the appropriate alien control techniques as determined by the species present.
- Retrenchments should comply with South African Labour legislation of the day.

The general specifications of Chapter 6 (Construction) and Chapter 7 (Rehabilitation) are also relevant to the decommissioning of the Aberdeen Wind Facility 1 and must be adhered to.

# APPENDIX A:
# FACILITY LAYOUT AND SENSITIVITY MAPS


N
R61
0 0,75 1,5 3 4,5 6
Kilometers
Aberdeen Wind Facility 1
Eastern Cape Province
Sensitivity Map
Legend
Regional Road
Main Road
Perennial River
Non Perennial River
Aberdeen Wind Facility 1 Development Area
Environmental Sensitivity
Noise Sensitive Receptors
Heritage sites
500m Artefacts Buffer (High Heritage Sensitivity)
Farm Warf Buffers (High Heritage Sensitivity)
R61/N9 Road 1km Buffer (High Heritage Sensitivity)
Historical route 500m Buffer (High Heritage Sensitivity)
Minor Drainage (High Aquatic Sensitivity for all infrastructure except Roads and MV)
Major Drainage (High Aquatic Sensitivity for all infrastructure except Roads and MV)
Soil (High Soil Sensitivity)
Avifauna (High Avifauna Sensitivity applicable to turbines)
Drainage (Very High Terrestrial Ecology Sensitivity)
Plains (Very High Terrestrial Ecology Sensitivity)
Ridge (Very High Terrestrial Ecology Sensitivity)
Rocky (Very High Terrestrial Ecology Sensitivity)
Sheetwash (Very High Terrestrial Ecology Sensitivity)
Stony Ground (Very High Terrestrial Ecology Sensitivity)
Minor slopes and drainage (High Terrestrial Ecology Sensitivity)
Bat (Medium-High Bat Sensitivity)
Bat (High Bat Sensitivity)
Scale: 1:70 000
Projection: GCS_WGS_1984
Map Ref: Aberdeen Sensitivity Map
savannah
Free State
Northern Cape
Eastern Cape
Western Cape


Aberdeen Wind Facility 1
Eastern Cape Province
Sensitivity and Layout Map
Legend
Regional Road
Main Road
Perennial River
Non Perennial River
Substation, BESS and O&M Buildings Hub
Warehouse, Laydown Area and Site Camp Hub
Turbines
Access & Internal Roads with Cabling
Aberdeen Wind Facility 1 Development Area
Environmental Sensitivity
Noise Sensitive Receptors
Heritage sites
500m Artefacts Buffer (High Heritage Sensitivity)
Farm Werf Buffers (High Heritage Sensitivity)
R61/N9 Road 1km Buffer (High Heritage Sensitivity)
Historical route 500m Buffer (High Heritage Sensitivity)
Minor Drainage (High Aquatic Sensitivity for all infrastructure except Roads and MV)
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Plains (Very High Terrestrial Ecology Sensitivity)
Ridge (Very High Terrestrial Ecology Sensitivity)
Rocky (Very High Terrestrial Ecology Sensitivity)
Sheetwash (Very High Terrestrial Ecology Sensitivity)
Stony Ground (Very High Terrestrial Ecology Sensitivity)
Minor slopes and drainage (High Terrestrial Ecology
Bat (Medium-High Bat Sensitivity)
Bat (High Bat Sensitivity)
Scale: 1:70 000
Projection: GCS_WGS_1984
Map Ref: Aberdeen Sensitivity Map
savannah environmental
Free State
Northern Cape
Eastern Cape
Western Cape
0 0,75 1,5 3 4,5 6
Kilometers
N
R61

# APPENDIX B:
# GRIEVANCE MECHANISM FOR COMPLAINTS AND ISSUES

# GRIEVANCE MECHANISM / PROCESS

## PURPOSE

This Grievance Mechanism has been developed to receive and facilitate the resolution of concerns and grievances regarding the project's environmental and social performance. The aim of the grievance mechanism is to ensure that grievances or concerns are raised by stakeholders and to ensure such grievances are addressed in a manner that:

- Provides a predictable, accessible, transparent, and credible process to all parties, resulting in outcomes that are fair and equitable, accountable and efficient.
- Promotes trust as an integral component of broader community relations activities.
- Enables more systematic identification of emerging issues and trends, facilitating corrective action and pre-emptive engagement.

The aim of this Grievance Mechanism is to address grievances in a manner that does not require a potentially costly and time-consuming legal process.

## PROCEDURE FOR RECEIVING AND RESOLVING GRIEVANCES

The following proposed grievance procedures are to be complied with throughout the construction, operation and decommissioning phases of the project:

- Local landowners, communities and authorities must be informed in writing by the Developer of the grievance mechanism and the process by which grievances can be brought to the attention of the Developer through its designated representative. This must be undertaken with the commencement of the construction phase.
- A company representative must be appointed as the contact person in order for grievances to be addressed. The name and contact details of the contact person must be provided to local landowners, communities and authorities when requested.
- Project related grievances relating to the construction, operation and or decommissioning phases must be addressed in writing to the contact person. The contact person should assist local landowners and or communities who may lack resources to submit/prepare written grievances, by recording grievances and completing written grievance notices where applicable, translating requests or concerns or by facilitating contact with the nominated contact person. The following information should be obtained, as far as possible, regarding each written grievance, which may act as both acknowledgement of receipt as well as record of grievance received:
    a. The name and contact details of the complainant;
    b. The nature of the grievance;
    c. Date raised, received, and for which the meeting was arranged;
    d. Persons elected to attend the meeting (which will depend on the grievance); and
    e. A clear statement that the grievance procedure is, in itself, not a legal process. Should such avenues be desired, they must be conducted in a separate process and do not form part of this grievance mechanism.
- The grievance must be registered with the contact person who, within 2 working days of receipt of the grievance, must contact the Complainant to discuss the grievance and, if required, agree on suitable

date and venue for a meeting in order to discuss the grievances raised. Unless otherwise agreed, the meeting should be held within 2 weeks of receipt of the grievance.

- The contact person must draft a letter to be sent to the Complainant acknowledging receipt of the grievance, the name and contact details of Complainant, the nature of the grievance, the date that the grievance was raised, and the date and venue for the meeting (once agreed and only if required).
- A grievance register must be kept on site (in electronic format, so as to facilitate editing and updating), and shall be made available to all parties wishing to gain access thereto.
- Prior to the meeting being held the contact person must contact the Complainant to discuss and agree on the parties who should attend the meeting, as well as a suitable venue. The people who will be required to attend the meeting will depend on the nature of the grievance. While the Complainant and or Developer are entitled to invite their legal representatives to attend the meeting/s, it should be made clear to all the parties involved in the process that the grievance mechanism process is not a legal process, and that if the Complainant invites legal representatives, the cost will be their responsibility. It is therefore recommended that the involvement of legal representatives be limited as far as possible, as a matter of last resort, and that this process be primarily aimed at stakeholder relationship management as opposed to an arbitration or litigation mechanism
- The meeting should be chaired by the Developer's representative appointed to address grievances. The Developer must supply and nominate a representative to capture minutes and record the meeting/s.
- Draft copies of the minutes must be made available to the Complainant and the Developer within 5 working days of the meeting being held. Unless otherwise agreed, comments on the Draft Minutes must be forwarded to the company representative appointed to manage the grievance mechanism within 5 working days of receipt of the draft minutes.
- The meeting agenda must be primarily the discussion of the grievance, avoidance and mitigation measures available and proposed by all parties, as well as a clear indication of the future actions and responsibilities, in order to put into effect the proposed measures and interventions to successfully resolve the grievance.
- In the event of the grievance being resolved to the satisfaction of all the parties concerned, the outcome must be recorded and signed off by the relevant parties. The record should provide details of the date of the meeting/s, the names of the people that attended the meeting/s, the outcome of the meeting/s, and where relevant, the measures identified to address the grievance, the party responsible for implementing the required measures, and the agreed upon timeframes for the measures to be implemented.
- In the event of a dispute between the Complainant and the Developer regarding the grievance, the option of appointing an independent mediator to assist with resolving the issue should be discussed. The record of the meeting/s must note that a dispute has arisen and that the grievance has not been resolved to the satisfaction of all the parties concerned.
- In the event that the parties agree to appoint a mediator, the Developer will be required to identify three (3) mediators and forward the names and CVs to the Complainant within 2 weeks of the dispute being declared. The Complainant, in consultation with the Developer, must identify the preferred mediator and agree on a date for the next meeting. The cost of the mediator must be borne by the Developer. The Developer must supply and nominate a representative to capture minutes and record the meeting/s.
- In the event of the grievance, with the assistance of the mediator, being resolved to the satisfaction of all the parties concerned, the outcome must be recorded and signed off by the relevant parties, including the mediator. The record should provide details on the date of the meeting/s, the names of

the people that attended the meeting/s, the outcome of the meeting/s, and where relevant, the measures identified to address the grievance, the party responsible for implementing the required measures, and the agreed upon timeframes for the measures to be implemented.

- In the event of the dispute not being resolved, the mediator must prepare a draft report that summaries the nature of the grievance and the dispute. The report should include a recommendation by the mediator on the proposed way forward with regard to the addressing the grievance.
- The draft report must be made available to the Complainant and the Developer for comment before being finalised and signed by all parties, which signature may not be unreasonably withheld by either party. Unless otherwise agreed, comments on the draft report must be forwarded to the company representative appointed to manage the grievance mechanism within 5 working days. The way forward will be informed by the recommendations of the mediator and the nature of the grievance.

A Complaint is closed out when no further action is required, or indeed possible. Closure status must be classified and captured following mediation or successful resolution in the Complaints Register as follows:

- Resolved. Complaints where a resolution has been agreed and implemented and the Complainant has signed the Confirmation Form.
- Unresolved. Complaints where it has not been possible to reach an agreed resolution despite mediation.
- Abandoned. Complaints where the Complainant is not contactable after one month following receipt of a Complaint and efforts to trace his or her whereabouts have been unsuccessful.

The grievance mechanism does not replace the right of an individual, community, group or organization to take legal action should they so wish. In the event of the grievance not being resolved to the satisfaction of Complainant and or the Developer, either party may be entitled to legal action if an appropriate option, however, this grievance mechanisms aims to avoid such interactions by addressing the grievances within a short timeframe, and to mutual satisfaction, where possible.

# APPENDIX C:
# OPEN SPACE MANAGEMENT PLAN

# ALIEN PLANT AND OPEN SPACE MANAGEMENT PLAN

## 1. PURPOSE

Invasive alien plant species pose the second largest threat to biodiversity after direct habitat destruction. The purpose of this Alien Plant and Open Space Management Plan is to provide a framework for the management of alien and invasive plant species during the construction and operation of the Aberdeen Wind Facility 1 and the associated infrastructure. The broad objectives of the plan include the following:

- Ensure alien plants do not become dominant in parts of the site, or the whole site, through the control and management of alien and invasive species presence, dispersal and encroachment.
- Develop and implement a monitoring and eradication programme for alien and invasive plant species.
- Promote the natural re-establishment and planting of indigenous species in order to retard erosion and alien plant invasion.

This plan should be updated throughout the life-cycle of the wind farm, as required in order to ensure that appropriate measures are in place to manage and control the establishment of alien and invasive plant species and to ensure compliance with relevant legislation.

## 2. LEGISLATIVE CONTEXT

### *Conservation of Agricultural Resources Act (Act No. 43 of 1983)*

In terms of the amendments to the regulations under the Conservation of Agricultural Resources Act (Act No. 43 of 1983), all declared alien plant species must be effectively controlled. Landowners are legally responsible for the control of invasive alien plants on their properties. In terms of this Act, alien invasive plant species are ascribed to one of the following categories:

- Category 1: Prohibited and must be controlled.
- Category 2 (commercially used plants): May be grown in demarcated areas provided that there is a permit and that steps are taken to prevent their spread.
- Category 3 (ornamentally used plants): May no longer be planted. Existing plants may be retained as long as all reasonable steps are taken to prevent the spreading thereof, except within the flood line of watercourses and wetlands.

### *National Environmental Management: Biodiversity Act, 2004 (Act No.10 of 2004)*

The National Environmental Management: Biodiversity Act (NEM:BA) regulates all invasive organisms in South Africa, including a wide range of fauna and flora. Regulations have been published in Government Notices R.506, R.507, R.508 and R.509 of 2013 under NEM:BA. According to this Act and the regulations, any species designated under Section 70 cannot be propagated, grown, bought or sold without a permit. Below is an explanation of the three categories:

- **Category 1a:** Invasive species requiring compulsory control. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.

- **Category 1b:** Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.
- **Category 2:** Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Category 2 plants to exist in riparian zones.
- **Category 3:** Invasive species regulated by activity. An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species. No permits will be issued for Category 3 plants to exist in riparian zones.

The following guide is a useful starting point for the identification of alien plant species: Bromilow, C. 2010. Problem Plants and Alien Weeds of South Africa. Briza, Pretoria.

It is important to note that alien plant species that are regulated in terms of the Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA) as weeds and invader plants are exempted from NEM:BA. This implies that the provisions of the CARA in respect of listed weed and invader plants supersede those of NEM: BA.

## 3. ALIEN PLANT MANAGEMENT PRINCIPLES

### 3.1. Prevention and early eradication

A prevention strategy should be considered and established, including regular surveys and monitoring for invasive alien plants, effective rehabilitation of disturbed areas and prevention of unnecessary disturbance of natural areas.

Monitoring plans should be developed which are designed to identify Invasive Alien Plant Species already on site, as well as those that are introduced to the site by the construction activities. Keeping up to date on which weeds are an immediate threat to the site is important, but efforts should be planned to update this information on a regular basis. When additional Invasive Alien Plant Species are recorded on site, an immediate response of locating the site for future monitoring and either hand-pulling the weeds or an application of a suitable herbicide (where permissible only) should be planned. It is, however, better to monitor regularly and act swiftly than to allow invasive alien plants to become established on site.

### 3.2. Containment and control

If any alien invasive plants are found to become established on site, action plans for their control should be developed, depending on the size of the infestations, budgets, manpower considerations and time. Separate plans of control actions should be developed for each location and/or each species. Appropriate registered chemicals and other possible control agents should be considered in the action plans for each site/species. The use of chemicals are not recommended for any wetland areas. Herbicides should be applied directly to the plant and not to the soil. The key is to ensure that no invasions get out of control. Effective containment and control will ensure that the least energy and resources are required to maintain this status over the long-term. This will also be an indicator that natural systems are impacted to the smallest degree possible.

### 3.3. General Clearing and Guiding Principles

Alien species control programmes are long-term management projects and should consist of a clearing plan which includes follow up actions for rehabilitation of the cleared area. The lighter infested areas should be cleared first to prevent the build-up of seed banks. Pre-existing dense mature stands ideally should be left for last, as they probably will not increase in density or pose a greater threat than they are currently. Collective management and planning with neighbours may be required in the case of large woody invaders as seeds of alien species are easily dispersed across boundaries by wind or watercourses. All clearing actions should be monitored and documented to keep records of which areas are due for follow-up clearing.

#### i. Clearing Methods

Different species require different clearing methods such as manual, chemical or biological methods or a combination of both. Care should however be taken so that the clearing methods used do not encourage further invasion and that they are appropriate to the specific species of concern. As such, regardless of the methods used, disturbance to the soil should be kept to a minimum.

Fire should not be used for alien species control or vegetation management at the site. The best-practice clearing method for each species identified should be used.

» **Mechanical control**
This entails damaging or removing the plant by physical action. Different techniques could be used, e.g. uprooting, felling, slashing, mowing, ringbarking or bark stripping. This control option is only really feasible in sparse infestations or on a small scale, and for controlling species that do not coppice after cutting. Species that tend to coppice, need to have the cut stumps or coppice growth treated with herbicides following the mechanical treatment. Mechanical control is labour intensive and therefore expensive and could cause severe soil disturbance and erosion.

» **Chemical Control**
Although it is usually preferable to use manual clearing methods where possible, such methods may create additional disturbance which stimulates alien plant invasion and may also be ineffective for many woody species which re-sprout. Where herbicides are to be used, the impact of the operation on the natural environment should be minimised by observing the following:

- Area contamination must be minimised by careful, accurate application with a minimum amount of herbicide to achieve good control.
- All care must be taken to prevent contamination of any water bodies. This includes due care in storage, application, cleaning equipment and disposal of containers, product and spray mixtures.
- Equipment should be washed where there is no danger of contaminating water sources and washings carefully disposed of at a suitable site.
- To avoid damage to indigenous or other desirable vegetation, products should be selected that will have the least effect on non-target vegetation.
- Coarse droplet nozzles should be fitted to avoid drift onto neighbouring vegetation.
- The appropriate health and safety procedures should also be followed regarding the storage, handling and disposal of herbicides.
- The use of chemicals is not recommended for wetland areas.

For all herbicide applications, the following Regulations and guidelines should be followed:

- Working for Water: Policy on the Use of Herbicides for the Control of Alien Vegetation.
- Pesticide Management Policy for South Africa published in terms of the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947) – GNR 1120 of 2010.
- South African Bureau of Standards, Standard SANS 10206 (2010).

According to Government Notice No. 13424 dated 26 July 1992, it is an offence to "*acquire, dispose, sell or use an agricultural or stock remedy for a purpose or in a manner other than that specified on the label on a container thereof or on such a container*".

Contractors using herbicides need to have a valid Pest Control Operators License (limited weeds controller) according to the Fertilizer, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 36 of 1947). This is regulated by the Department of Environment, Forestry and Fisheries.

» **Biological control**

Biological weed control consists of the use of natural enemies to reduce the vigour or reproductive potential of an invasive alien plant. Biological control agents include insects, mites, and micro-organisms such as fungi or bacteria. They usually attack specific parts of the plant, either the reproductive organs directly (flower buds, flowers or fruit) or the seeds after they have dropped. The stress caused by the biological control agent may kill a plant outright or it might impact on the plant's reproductive capacity. In certain instances, the reproductive capacity is reduced to zero and the population is effectively sterilised. All of these outcomes will help to reduce the spread of the species.

To obtain biocontrol agents, provincial representatives of the Working for Water Programme or the Directorate: Land Use and Soil Management (LUSM), Department of Environment, Forestry and Fisheries (DEFF) can be contacted.

### 3.4. General management practices

The following general management practices should be encouraged or strived for:

- Establish an on-going monitoring programme for the construction phase to detect and quantify any alien species that may become established.
- Alien vegetation regrowth on areas disturbed by construction must be immediately controlled.
- Care must be taken to avoid the introduction of alien invasive plant species to the site. Particular attention must be paid to imported material such as building sand or dirty earth-moving equipment.
- Stockpiles should be checked regularly and any weeds emerging from material stockpiles should be removed.
- Cleared areas that have become invaded by alien species can be sprayed with appropriate herbicides provided that these herbicides break down on contact with the soil. Residual herbicides should not be used.
- The effectiveness of vegetation control varies seasonally, and this is also likely to impact alien species. Control early in the wet season will allow species to regrow, and follow-up control is likely to be required. It is tempting to leave control until late in the wet season to avoid follow-up control. However, this may allow alien species to set seed before control, and hence will not contribute towards reducing alien species abundance. Therefore, vegetation control should be aimed at the

middle of the wet season, with a follow-up event towards the end of the wet season. There are no exact dates that can be specified here as each season is unique and management must therefore respond according to the state and progression of the vegetation.

- » Alien plant management is an iterative process and it may require repeated control efforts to significantly reduce the abundance of a species. This is often due to the presence of large and persistent seed banks. However, repeated control usually results in rapid decline once seed banks become depleted.
- » Some alien species are best individually pulled by hand. Regular vegetation control to reduce plant biomass within the site should be conducted. This should be timed so as to coincide with the critical growth phases of the most important alien species on site. This will significantly reduce the cost of alien plant management as this should contribute towards the control of the dominant alien species and additional targeted control will be required only for a limited number of species.
- » No alien species should be cultivated on-site. If vegetation is required for aesthetic purposes, then non-invasive, water-wise locally-occurring species should be used.
- » During operation, surveys for alien species should be conducted regularly. It is recommended that this be undertaken every 6 months for the first two years after construction and annually thereafter. All alien plants identified should be cleared using appropriate means.

### 3.5. Monitoring

In order to assess the impact of clearing activities, follow-ups and rehabilitation efforts, monitoring must be undertaken. This section provides a description of a possible monitoring programme that will provide an assessment of the magnitude of alien plant invasion on site, as well as an assessment of the efficacy of the management programme.

In general, the following principles apply for monitoring:

- » Photographic records must be kept of areas to be cleared prior to work starting and at regular intervals during initial clearing activities. Similarly, photographic records should be kept of the area from immediately before and after follow-up clearing activities. Rehabilitation processes must also be recorded.
- » Simple records must be kept of daily operations, e.g. area/location cleared, labour units and, if ever used, the amount of herbicide used.
- » It is important that, if monitoring results in detection of invasive alien plants, that this leads to immediate action.

The following monitoring should be implemented to ensure management of alien invasive plant species.

**Construction Phase**

| Monitoring Action | Indicator | Timeframe |
|---|---|---|
| Document alien species present at the site | List of alien plant species | Preconstruction<br>Monthly during Summer and Autumn<br>3 Monthly during Winter and Spring |
| Document alien plant distribution | Alien plant distribution map within priority areas | 3 Monthly |
| Document and record alien plant control measures implemented | Record of clearing activities | 3 Monthly |

## Operation Phase

| Monitoring Action | Indicator | Timeframe |
|---|---|---|
| Document alien plant species distribution and abundance over time at the site | Alien plant distribution map | Biannually |
| Document alien plant control measures implemented and success rate achieved | Records of control measures and their success rate<br>A decline in alien distribution and cover over time at the site | Biannually |
| Document rehabilitation measures implemented and success achieved in problem areas | Decline in vulnerable bare areas over time | Biannually |

# APPENDIX D:
# RE-VEGETATION AND HABITAT REHABILITATION PLAN

# REVEGETATION AND REHABILITATION PLAN

## 1. PURPOSE

The purpose of the Revegetation and Rehabilitation Plan is to ensure that areas cleared or impacted during construction activities within the development footprint for the Aberdeen Wind Facility 1, and that are not required for operation, are rehabilitated to their original state before the operation phase commences, and that the risk of erosion from these areas is reduced. The purpose of the Rehabilitation Plan for the site can be summarised as follows:

- Achieve long-term stabilisation of all disturbed areas.
- Re-vegetate all disturbed areas with suitable local plant species.
- Minimise visual impact of disturbed areas.
- Ensure that disturbed areas are rehabilitated to a condition similar to that found prior to disturbance.

This Revegetation and Rehabilitation Plan must be read in conjunction with other relevant site-specific plans. Prior to the commencement of construction, a detailed Revegetation and Rehabilitation Plan and Method Statement for the site must be compiled with the aid of a suitably qualified and professionally registered specialist (with a botanical or equivalent qualification).

## 2. RELEVANT ASPECTS OF THE SITE

The Aberdeen Wind Facility 1 project site falls entirely within the Eastern Lower Karoo vegetation type and Southern Karoo Riviera. Although there is some variation in vegetation composition within the site depending on soil depth, underlying geology and rockiness, these differences represent different communities rather than different vegetation types.

According to the DFFE Screening Tool, there are four plant species of concern that may occur within the Aberdeen Wind Facility 1 site. Only Sensitive Species 1212 was observed at the site. It is considered unlikely that any other plant Species of conservation concern (SCC) would be present within the site. The site is therefore considered High sensitivity for the Plant Species Theme. Low hills and rocky areas within the site which have been confirmed as home to sensitive plant species and therefore comprise areas of very high sensitivity.

## 3. REHABILITATION METHODS AND PRACTISES

The following general management practices should be encouraged or strived for:

- Clearing of invaded areas must be conducted as per the Alien Management Plan, included in the EMPr.
- No harvesting of vegetation may be undertaken outside the area to be disturbed by construction activities.
- Indigenous plant material must be kept separate from alien material.
- Indigenous seeds may be harvested for purposes of revegetation in areas that are free of alien invasive vegetation, either at the site prior to clearance or from suitable neighbouring sites.
- Topsoil must be reserved wherever possible on site, to be utilised during rehabilitation.

- Sods used for revegetation must be obtained directly from the site, but not from the sensitive areas. Sods must contain at least a 50mm topsoil layer and be minimally disturbed, in particular to existing root systems. Sods must ideally be obtained from areas as close as possible to the region that is to be rehabilitated.
- Water used for the irrigation of re-vegetated areas must be free of chlorine and other pollutants that might have a detrimental effect on the plants.
- All seeded, planted or sodded grass areas and all shrubs or trees planted are to be irrigated at regular intervals.
- On steep slopes and areas where seed and organic matter retention is low, it is recommended that soil savers are used to stabilise the soil surface. Soil savers are man-made materials, usually constructed of organic material such as hemp or jute and are usually applied in areas where traditional rehabilitation techniques are not likely to succeed.
- In areas where soil saver is used, it must be pegged down to ensure that it captures soil and organic matter flowing over the surface.
- The final rehabilitated area must resemble the current composition and structure of the soil as far as practicably possible.
- Progressive rehabilitation is an important element of the rehabilitation strategy and must be implemented where feasible.
- No construction equipment, vehicles or unauthorised personnel must be allowed onto areas that have been rehabilitated.
- Where rehabilitation sites are located within actively grazed areas, they must be fenced off, this must be undertaken in consultation with the landowner.
- Any runnels, erosion channels or wash-aways developing after revegetation must be backfilled and consolidated and the areas restored to a proper stable condition.
- Re-vegetated areas must be monitored frequently and prepared and revegetation from scratch should inadequate signs of surface coverage or grown be evident after two growth seasons. Adequate recovery must be assessed by a qualified botanist or rehabilitation specialist.
- The stockpiled vegetation from the clearing operations must be reduced to mulch where possible and retained along with topsoil to encourage seedbank regrowth and soil fertility.
- Mulches must be collected in such a manner as to restrict the loss of seed.
- Mulch must be stored for as short a period as possible.
- Mulch is to be harvested from areas that are to be denuded of vegetation during construction activities, provided that they are free of seed-bearing alien invasive plants.
- Where herbicides are used to clear vegetation, species-specific chemicals must be applied to individual plants only. General spraying must be strictly prohibited, and only the correct herbicide type must be applied.
- Once rehabilitated, areas must be protected to prevent trampling and erosion.
- Fencing must be removed once a sound vegetative cover has been achieved.

## 4. MONITORING AND FOLLOW-UP ACTION

Throughout the lifecycle of the development, regular monitoring and adaptive management must be in place to detect any new degradation of rehabilitated areas. During the construction phase, the Environmental Officer (EO) and EPC Contractor will be responsible for initiating and maintaining a suitable monitoring system. Once the development is operational, the Developer will need to identify a suitable entity that will be able to take over and maintain the monitoring cycle and initiate adaptive management as soon as it is required. Monitoring personnel must be adequately trained.

The following are the minimum criteria that must be monitored:

» Associated nature and stability of surface soils.
» Re-emergence of alien and invasive plant species. If noted, remedial action must be taken immediately, as per the alien management plan and mitigation measures contained within the EMPr.

Rehabilitation success, monitoring and follow-up actions are important to achieve the desired cover and soil protection. The following monitoring protocol is recommended:

» Rehabilitation areas must be monitored every 4 months for the first 12 months following construction, or as per the recommendations of specialist.
» Ensure that steep slopes are not de-vegetated unnecessarily and subsequently become hydrophobic (i.e. have increased runoff and a decreased infiltration rate) increasing the erosion potential.
» Soil loss is related to the length of time that soils are exposed prior to rehabilitation or stabilisation. Therefore, the timeframe between construction activities and rehabilitation must be minimised. Phased construction and progressive rehabilitation, where practically possible, are therefore important elements of the erosion control and rehabilitation strategy.
» Any areas showing erosion, must be adaptively managed with particular erosion control measures, depending on the situation.

If the current state of the environment prior to construction (which will be disturbed during the construction phase) is not achieved post impact, within the specified rehabilitation period, maintenance of these areas must continue until an acceptable state is achieved (excluding alien plant species or weeds). Additional rehabilitation methods may be necessary to achieve the current state before construction commences.

Monitoring of the rehabilitation success, as well as follow-up adaptive management, combined with the clearing of emerging alien plant species must all continue for as long as is considered necessary, depending on regrowth rates.

# APPENDIX E:
# PLANT RESCUE AND PROTECTION PLAN

# PLANT RESCUE AND PROTECTION PLAN

## 1. PURPOSE

The purpose of the Plant Rescue and Protection Plan is to implement avoidance and mitigation measures, in addition to the mitigations included in the Environmental Management Programme (EMPr) to reduce the impact of the development of the wind energy facility and associated infrastructure on listed and protected plant species and their habitats during construction and operation. This subplan is required in order to ensure compliance with national and provincial legislation for vegetation clearing and any required destruction or translocation of provincially and nationally protected species within the footprint of the development.

The Plan first provides some legislative background on the regulations relevant to listed and protected species, under the Nature and Environmental Conservation Ordinance (Act 19 of 1974) and trees protected under the National List of Protected Tree Species. This is followed by an identification of protected species present within the development footprint and actions that should be implemented to minimise impact on these species and comply with legislative requirements.

## 2. IDENTIFICATION OF SPECIES OF CONSERVATION CONCERN

Plant species are protected at the national level as well as the provincial level and different permits may be required for different species depending on their protection level. At the national level, protected trees are listed by DFFE under the National List of Protected Trees, which is updated on a regular basis. Any clearing of nationally protected trees requires a permit from DFFE. At the provincial level, all species red-listed under the Red List of South African plants (http://redlist.sanbi.org/) as well as species listed under the Nature and Environmental Conservation Ordinance (Act 19 of 1974) are protected and require provincial permits. The Nature and Environmental Conservation Ordinance (Act 19 of 1974) lists a variety of species as protected.

## 3. IDENTIFICATION OF LISTED SPECIES

According to the DFFE Screening Tool, there are four plant species of concern that may occur within the Aberdeen Wind Facility 1 site. Only Sensitive Species 1212 was observed at the site. It is considered unlikely that any other plant Species of conservation concern (SCC) would be present within the site. The site is therefore considered High sensitivity for the Plant Species Theme. Low hills and rocky areas within the site which have been confirmed as home to sensitive plant species and therefore comprise areas of very high sensitivity.

## 4. MITIGATION & AVOIDANCE OPTIONS

The primary mitigation and avoidance measure that must be implemented at the pre-construction phase is the Pre-construction Walk-Through of the development footprint. This defines which and how many individuals of listed and protected species are found within the development footprint. This information is required for the DFFE and Provincial Eastern Cape Department of Environmental Affairs and Development Planning (DEA&DP) permits which must be obtained before construction can commence.

Where listed plant species fall within the development footprint and avoidance is not possible, then it may be possible to translocate the affected individuals outside of the development footprint. However, not all

species are suitable for translocation. Recommendations in this regard would be made following the walk-through of the facility development footprint before construction, where all listed and protected species within the development footprint will be identified and located.

## 5. RESCUE AND PROTECTION PLAN

### 5.1. Pre-construction

» Identification of all listed species which may occur within the site, based on the SANBI POSA database as well as the specialist BA studies for the site and any other relevant literature.
» Before construction commences at the site, the following actions should be taken:
  - A walk-through of the final development footprint by a suitably qualified botanist/ecologist to locate and identify all listed and protected species which fall within the development footprint. This should happen during the flowering season at the site.
  - A walk-through report following the walk-through which identifies areas where minor deviations to roads and other infrastructure can be made to avoid sensitive areas and important populations of listed species. The report should also contain a full list of localities where listed species occur within the development footprint and the number of affected individuals in each instance, so that this information can be used to comply with the permit conditions required by the relevant legislation. Those species suitable for search as rescue should be identified in the walk-through report.
  - A permit to clear the site and relocate species of concern is required from Provincial Eastern Cape Department of Environmental Affairs and Development Planning (DEA&DP) before construction commences. A tree clearing permit is also required from DFFE to clear protected trees from the site.
  - Once the permits have been issued, there should be a search and rescue operation of all listed species that cannot be avoided, which have been identified in the walk-through report as being suitable for search and rescue within the development footprint. Affected individuals should be translocated to a similar habitat outside of the development footprint and marked for monitoring purposes.

### 5.2. Construction

» Vegetation clearing should take place in a phased manner, so that large cleared areas are not left standing with no activity for long periods of time and pose a wind and water erosion risk. This will require coordination between the contractor and EO, to ensure that the EO is able to monitor activities appropriately.
» All cleared material must be handled according to the Revegetation and Rehabilitation Plan and used to encourage the recovery of disturbed areas.
» EO to monitor vegetation clearing at the site. Any deviations from the plans that may be required should first be checked for listed species by the EO and any listed species present which are able to survive translocation should be translocated to a safe site.
» All areas to be cleared should be demarcated with construction tape, survey markers or similar. All construction vehicles should work only within the designated area.
» Plants suitable for translocation or for use in rehabilitation of already cleared areas should be identified and relocated before general clearing takes place.
» Any listed species observed within the development footprint that were missed during the pre-construction plant sweeps must be translocated to a safe site before clearing commences.

- Many listed species are also sought after for traditional medicine or by collectors and so the EO and ECO must ensure that all staff attend environmental induction training in which the legal and conservation aspects of harvesting plants from the wild are discussed.
- The EO must monitor construction activities in sensitive habitats such as in dune areas carefully to ensure that impacts to these areas are minimised.

### 5.3. Operation

- Access to the site should be strictly controlled and all personnel entering or leaving the site must be required to sign in and out with the security officers.
- The collecting of plants of their parts must be strictly forbidden and signs stating so must be placed at the entrance gates to the site.

## 6. MONITORING AND REPORTING REQUIREMENTS

The following reporting and monitoring requirements are recommended as part of the plant rescue and protection plan:

- Pre-construction walk-through report detailing the location and distribution of all listed and protected species. This must include a walk-through of all infrastructure including all new access roads, cables, buildings and the substation. The report must include recommendations of route adjustments where necessary, as well as provide a full account of how many individuals of each listed species will be impacted by the development. Details of plants suitable for search and rescue must also be included.
- Permit applications to DEA&DP and DFFE. This requires the walk-through report as well as the identification and quantification of all listed and protected species within the development footprint. The permit is required before any search and rescue or vegetation clearance can take place. Where large numbers of listed species are affected, a site inspection and additional requirements may be imposed by Provincial Eastern Cape Department of Environmental Affairs and Development Planning (DEA&DP) and/or DFFE as part of the permit conditions. All documentation associated with this process needs to be retained and the final clearing permit must be kept at the site.
- Active daily monitoring of clearing during construction by the EO to ensure that listed species and sensitive habitats are avoided. All incidents must be recorded along with the remedial measures implemented.
- Post-construction monitoring of plants translocated during search and rescue to evaluate the success of the intervention. Monitoring for a year post-transplant should be sufficient to gauge success.

# APPENDIX F:
# TRAFFIC AND TRANSPORTATION MANAGEMENT PLAN

# PRINCIPLES FOR TRAFFIC MANAGEMENT

## 1. PURPOSE

The purpose of this Traffic Management Plan (TMP) is to address regulatory compliance, traffic management practices, and protection measures to help reduce impacts related to transportation and the construction of temporary and long-term access within the vicinity of the Aberdeen Wind Facility 1 project site. The objectives of this plan include the following:

- To ensure compliance with all legislation regulating traffic and transportation within South Africa (National, Provincial, Local & associated guidelines).
- To avoid incidents and accidents while vehicles are being driven and while transporting personnel, materials, and equipment to and from the project site.
- To raise greater safety awareness in each driver and to ensure the compliance of all safe driving provisions for all the vehicles.
- To raise awareness to ensure drivers respect and follow traffic regulations.
- To avoid the deterioration of access roads and the pollution that can be created due to noise and emissions produced by equipment, machinery, and vehicles.

## 2. TRAFFIC AND TRANSPORTATION MANAGEMENT PRINCIPLES

- Prior to the commencement of construction, the contractor must develop their own detailed Transport Management Plan (TMP) based on traffic volumes and road carry capacity outlines.
- The transport contractor must ensure that all required permits for the transportation of abnormal loads are in place prior to the transportation of equipment and project components to the project site. Specific abnormal load routes must be developed with environmental factors taken into consideration.
- Before construction commences, authorised access routes must be clearly marked in the field with signs or flagging.
  - Traffic signs used must conform to the National Road Traffic Act and South African National Standards.
  - Appropriate signs must be installed at locations as deemed necessary.
  - Signage must be placed at intersections, speed limit alterations, severe changes in road grading, where road hazards are located and where usual traffic flow changes abruptly.
  - All traffic signs must be obeyed by all staff and visitors on site, without exception.
- The EPC Contractor must review the location of the designated access and will be responsible for ensuring construction travel is limited to designated routes. The entrance of the main access road must not be constructed before a blind rise or on a bend of the public road.
- All employees must attend an environmental training program (e.g. toolbox talks) by the Environmental Officer (EO). Through this program, employees will be instructed to use only approved access roads, drive within the delineated road limits, and obey jurisdictional and posted speed limits to minimise potential impacts to the environment and other road users.
- The contractor will be responsible for making sure that their suppliers, vendors, and subcontractors strictly comply with the principles of this TMP and the contractor's TMP.
- Adjacent landowners must be notified of the construction schedule.
- Access roads and entrances to the site should be carefully planned to limit any intrusion on the neighbouring property owners and road users.

- Signs must be posted in the project area to notify landowners and others of the construction activity.
- Flagging must be provided at access points to the project site and must be maintained until construction is completed on the site.
- Speed limits must be established prior to commencement of construction and enforced for all construction traffic. The following limits are suggested for internal roads:
  - 30km/hour on site and around workshop areas, in all car parks and yards.
  - A warning system, penalties or fines must be put in place where speed limits are not adhered to.
- Speed controls and implementation of appropriate dust suppression measures must be enforced to minimise dust pollution.
- Throughout construction the contractor will be responsible for monitoring the condition of roads used by project traffic and for ensuring that roads are maintained in a condition that is comparable to the condition they were in before the construction began.
- Inspect traffic/road signs regularly for cleanliness, condition and appropriateness. Take immediate action to rectify any problems with signage.
- Drivers must have an appropriate valid driver's license and other operation licences required by applicable legislation.
- All vehicles must be maintained in good mechanical, electrical, and electronic condition, including but not limited to the brake systems, steering, tires, windshield wipers, side mirrors and rear view mirror, safety belts, signal indicators, and lenses.
- Any traffic delays attributable to construction traffic must be co-ordinated with the appropriate authorities.
- No deviation from approved transportation routes must be allowed, unless roads are closed for reasons outside the control of the contractor.
- Impacts on local communities must be minimised. Consideration should be given to limiting construction vehicles travelling on public roadways during the morning and late afternoon commute time.
- A driver must not use the vehicle's horn except on the grounds of safety.
- Drivers of vehicles must always keep to the left and must be observant of other road users.
- Drivers must follow communication procedures and shall where applicable be trained in the correct use of two-way radios.
- Ensure all staff are trained upon entering the site regarding the meaning and correct response to each traffic sign utilised on site.
- All light vehicles must be fitted with a flashing amber strobe or revolving light.
- Persons authorized to operate on site must have a legal valid appropriate code provincial driver's license and competency certificate where applicable.
- No passengers allowed in any construction vehicles. If an assistant is required, they must obtain permission
- Vehicles must be maintained at approved intervals and must be inspected daily before use to ensure safe operation.
- All vehicles must only be used within the design specifications and limits set by the manufacturer.
- All construction vehicles will be used according to the Health & Safety Plan and related Method Statements and/or Risk Assessments.
- Weather and road conditions must be sufficient to allow safe operation to proceed. Head lights must be turned on at all times.
- No vehicle will be driven with any defect that may impact on the safe operation of that vehicle.
- Two-way radios shall only be used for official/work related matters.
- The use of mobile phones while driving a vehicle is prohibited.

» All vehicles shall carry a fire extinguisher (Dry Powder); 2.5kg for light vehicles, 4.5kg for haul trucks and 9kg for machinery.

## 3. MONITORING

» The principal contractor must ensure that all vehicles adhere to the speed limits.
» A speeding register must be kept with details of the offending driver.
» Repeat offenders must be penalised.

# APPENDIX G:
# STORMWATER MANAGEMENT PLAN

# Stormwater Management Plan for the Aberdeen Wind Facility 1

**Report Prepared for**

## Aberdeen Wind Facility 1 (Pty) L

**Report Number «Report_Number»**

**Report Prepared by**

srk consulting

**January 2023**

# Stormwater Management Plan for the Aberdeen Wind Facility 1

## Aberdeen Wind Facility 1 (Pty) Ltd

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SRK Project Number590237
**January 2023**

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# Executive Summary

Aberdeen Wind Facility 1 (Pty) (Ltd) (The Client) propose developing a commercial Wind Energy Facility and associated infrastructure (known as the Aberdeen Wind Facility 1) on an undeveloped site located in the Camdeboo plains, with the Camdeboo mountains to the north in the eastern side of the Great Karoo. The site is positioned approximately 20 km to the west of the town of Aberdeen, which is situated 52 km northwest of Graaf-Reinet and 140 km east of Beaufort West in the Eastern Cape province of South Africa.

This report documents the Surface Water Specialist Study required for the proposed development. The study aims to facilitate the protection of surface water resources and covers the total proposed project development area. This report serves to support the basic assessment process and has been completed in accordance with Appendix 6 of the NEMA regulations for specialist reports.

This proposed site falls within the Mzimvubu-Tsitsikamma Water Management Area (DWAF, 2016) in quaternary catchments L23B, drained by the Gannaleegte River which confluences with the Kariega River to the west (ultimately draining to the Groot and then Gamtoos Rivers) and N14A which is drained by an unnamed tributary of the Kraai River, flowing in an easterly direction towards Aberdeen afterwhich it joins the Camdeboo River and then flows into the Indian Ocean via the Sondags River. The Mean Annual Precipitation of the area low at approximately 245 mm and the Mean Annual Evaporation is high at 2 000 mm, indicating that this is a hot, arid region (classified as Bsk by the Koppen-Gieger system). The Aberdeen South African Weather Service station, station number 0095119_W, was selected to represent the site. The MAP is higher than that of the quaternary catchment at 285 mm and thus will result in conservative estimates for the design of stormwater infrastructure. The station was selected due to its proximity to the site and its record length of 95 years.

The proposed development will require stormwater management interventions for the turbine footings and the adjacent hardstands during the construction period. Runoff is recommended to be managed by use of berms and drains, diverting the water into a sump to allow for settlement of sediments prior to release to the environment. The risk of localised erosion is to be managed using straw bales where necessary. During operation, stormwater drainage of the roads shall be required and can be managed by typical interventions such as lined V-drains, culverts, drifts and energy dissipating outlets to drainage lines. The Gannaleegte River flows through the Aberdeen Wind Facility 1. The river is perennial and only flows during storm events in the rainy season occurring in the summer months of October to March. The infrastructure for the renewable energy development does not encroach on the banks of the river, aside from one road crossing point, where the access roads join the R61 national route. At this crossing point suitable infrastructure will be required based on the magnitude of the flows in the river. It is recommended that a suitably sized culvert be constructed at this point. Other than the Gannaleegte River, the proposed facility has no identifiable permanent surface water resources. During both the construction and operational phases of the project, no pollutants will be generated and thus no impact on surface water quality is predicted.

The Stormwater Management Plan (SWMP) was created considering the findings from the analysis undertaken as part of this study and presented in this report but should be developed further for Detailed Design by conducting a detailed topographic survey and developing the stormwater layout on the information available and infrastructure layout. The conceptual designs should be developed to Detailed Design, and the final plans should incorporate any environmental specifications required during construction and operation of the facility.

All the stormwater impacts that exist can be managed in a practical and cost-effective manner on site. The moderate to low rainfall and low gradients of the area suggest that the Detailed Design should not vary significantly from the conceptual drainage infrastructure presented in the report.

It is recommended that the activity be authorised as the surface water impacts are minimal and the predicted level of change is acceptable. To avoid, manage and mitigate surface water impacts, the interventions in the SWMP should be included in the Environmental Management Program (EMPr) for the activity for both construction and operation phases.

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# Disclaimer

The opinions expressed in this Report have been based on the information supplied to SRK Consulting (South Africa) (Pty) Ltd (SRK) by «Client_Name». The opinions in this Report are provided in response to a specific request from «Client_Name» to do so. SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

# 1 Introduction

## 1.1 Project Description

Aberdeen Wind Facility 1 (Pty) Ltd is proposing the development of a commercial Wind Energy Facility (WEF) and associated infrastructure on a site located approximately 20km west of the town of Aberdeen, which is situated 52 km northwest of Graaf-Reinet and 140 km east of Beaufort West in the Eastern Cape province of South Africa. The site locality is shown in Figure 1-1. The site is located within the Dr Beyers Naude Local Municipality in the Sarah Baartman District Municipality. The project site comprises the following farm portions:

- Farm Koppieskraal 157
- Remainder of the Farm Doornpoort 93
- Portion 1 of Farm Doorn Poort 93
- Farm Kraanvogel Kuil 155

Portion 4 of Farm Sambokdoorns 92 The entire extent of the site falls within the Beaufort West Renewable Energy Development Zones (i.e. REDZ Focus Area 11). The undertaking of a basic assessment process for the project is in-line with the requirements stated in GNR 114 of 16 February 2018.

The project is planned as part of a larger cluster of renewable energy projects, which includes two adjacent up to 240MW Wind Energy Facilities (Aberdeen Wind Facility 2 and Aberdeen Wind Facility 3) also located near Aberdeen. The layout of the development area is shown in Figure 1-2.

The Aberdeen Wind Facility 1 will have a contracted capacity of up to 240 MW and comprise up to 41 wind turbines with a capacity of up to 8 MW each. The project will have a preferred project site of approximately 9 180 ha, and an estimated disturbance area of up to 62 ha. The Aberdeen Wind Facility 1 project site is proposed to accommodate the following infrastructure:

- Up to 41 wind turbines with a maximum hub height of up to 200 m, rotor diameter of up to 200 m, blade length of up to 100 m and have a rotor tip height of up to 300 m above ground. The turbine foundations and turbine crane hardstands will have a combined permanent footprint of 6 ha and 13 ha respectively;
- Medium-voltage (MV) power lines internal to the WEF will be trenched and located adjacent to internal access roads, where feasible;
- Up to 132 kV on-site facility substation up to 2 ha in extent;
- Battery Energy Storage System (BESS) with a footprint of up to 5 ha;
- A main access road of approximately 2.5 km in length and up to 10 m in width[1];
- An internal road network between project components inclusive of stormwater infrastructure. A 12 m wide road corridor may be temporarily impacted during construction and rehabilitated to 6 m wide corridor after construction;
- Gate house and security: up to 0.5 ha;
- Operation and Maintenance buildings (includes control centre, offices, warehouses, workshop, canteen, visitors centre, staff lockers, etc.): Up to 2 ha;
- Site camp up to 1 ha; and
- Construction laydown areas up to 9 ha.

[1]Access to the facility will be via an existing gravel road off the R61. The gravel road is well established (~10 m wide excluding road reserve), however it's likely that upgrades will be required at the access point off the R61 and potentially at water crossings.

The infrastructure for the proposed facility is summarised in Table 1-1.

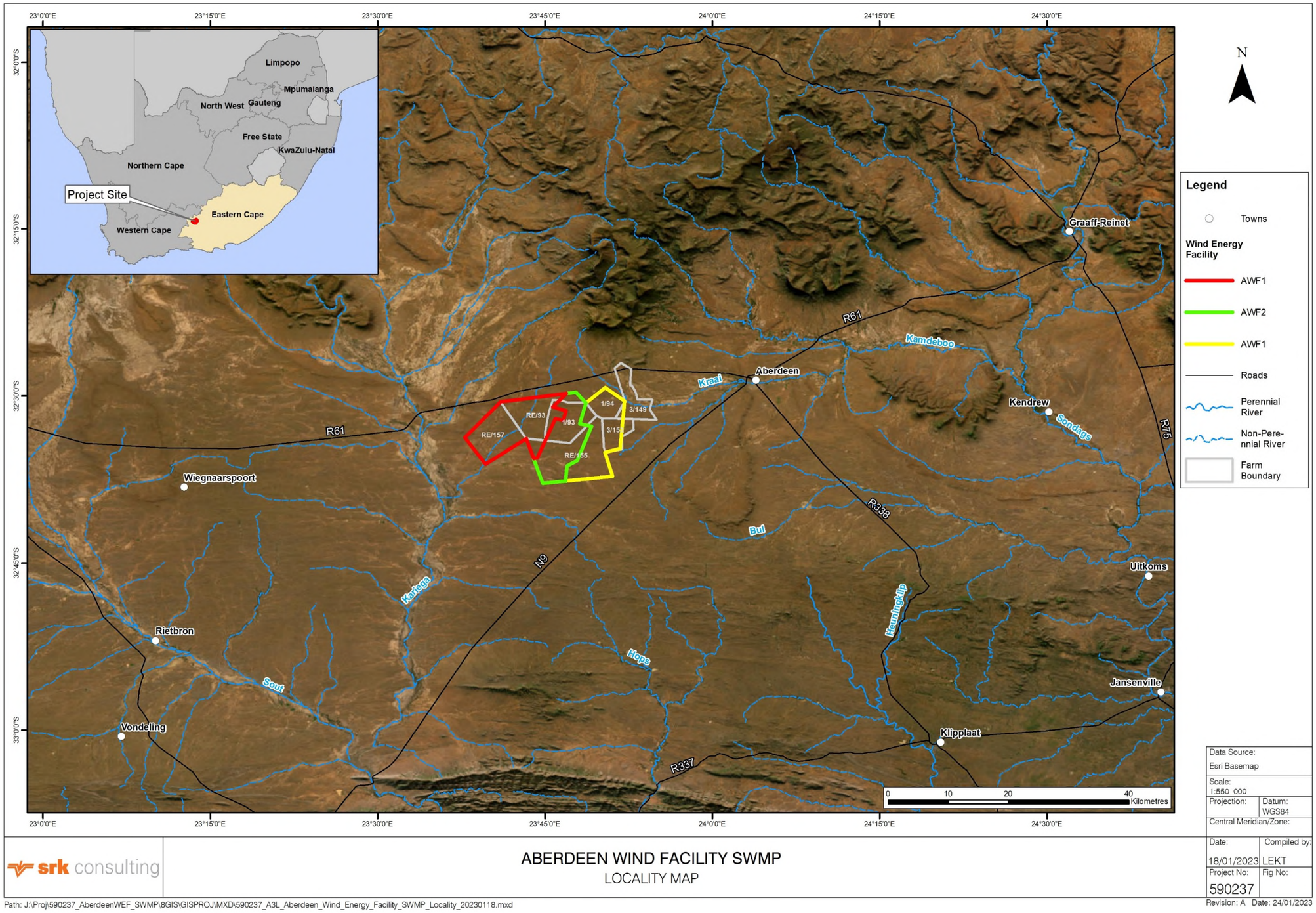



**Figure 1-1 Aberdeen Wind Facility 1 Locality**

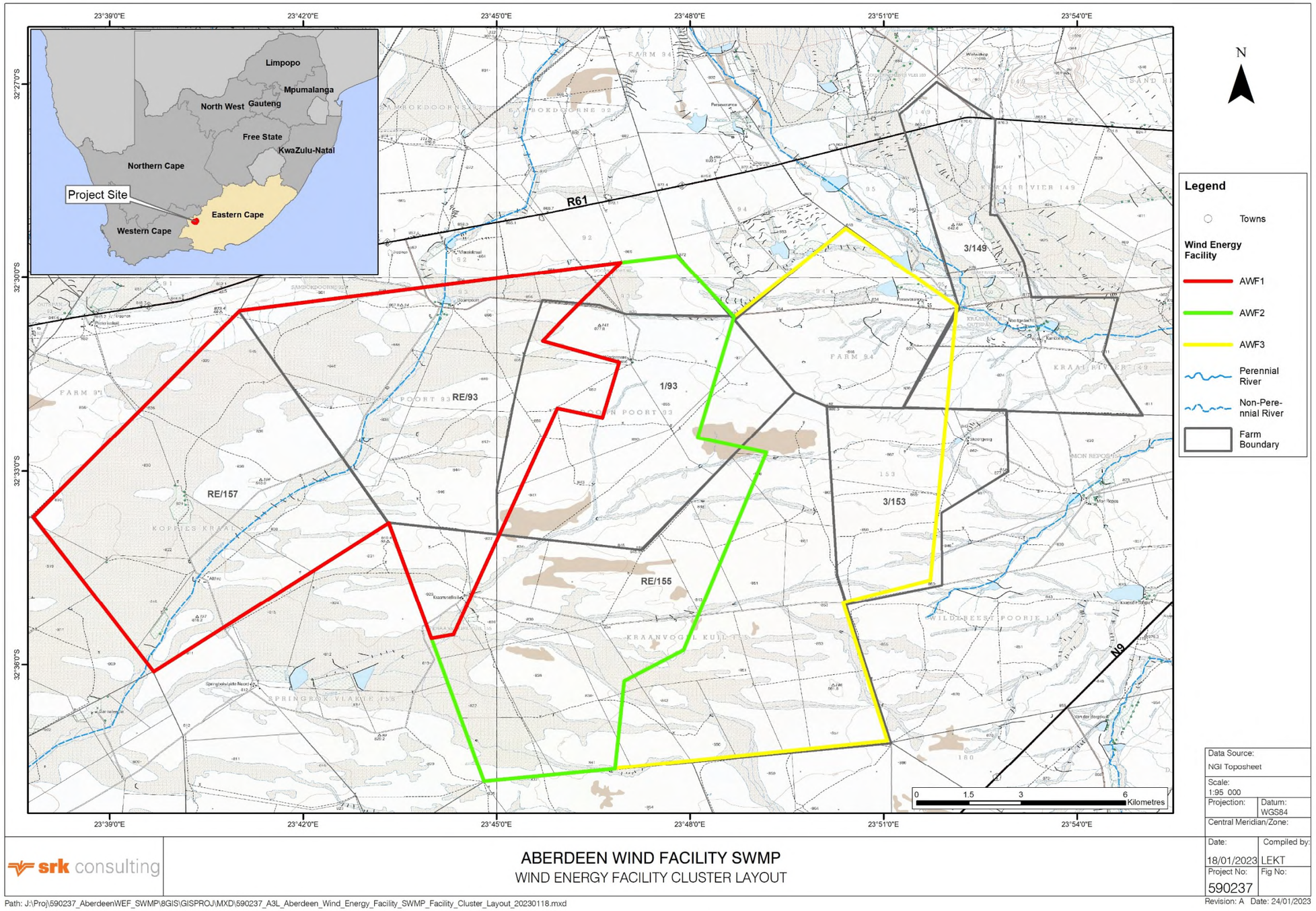



**Figure 1-2 Aberdeen Wind Facility 1 Layout**

**Table 1-1 Summary of the Aberdeen Wind Facility 1 infrastructure**

| Infrastructure | Footprint and dimensions |
|---|---|
| Number of turbines | Up to 41 turbines |
| Hub Height | Up to 200 m |
| Tower height | Up to 200 m |
| Rotor Diameter | Up to 200 m |
| Length of blade | ~100 m |
| Contracted Capacity | Up to 240 MW (individual turbines up to 8 MW in capacity each). |
| Tower Type | Full steel, full concrete, or hybrid. |
| Area occupied by the on-site substation | Main Facility Substation of 2 ha. The general height of the substation will be a maximum of 10 m, however, will include switchgear portals up to 15 m in height and lightning masts up to 25 m in height. |
| Capacity of on-site substation | 132 kV |
| Temporary infrastructure | Up to 51 ha. Temporary infrastructure, including laydown areas and hardstand, will be required during the construction phase. The construction period laydown area will be rehabilitated. The temporary hardstand area (boom erection, storage, and assembly area) will also be rehabilitated. The preference for crane hardstands would be to leave them intact for unplanned maintenance/ replacement of the blades or nacelle. |

The power generated from the project will be sold to Eskom by feeding into the national electricity grid. Ultimately, the project is intended to be a part of the renewable energy projects portfolio for South Africa, as contemplated in the Integrated Resource Plan.

## 1.2 Aims and Objectives

The aim of this report is firstly to protect surface water resources in accordance with the National Water Act (NWA) (Act 36 of 1998) and secondly to minimise impacts to the natural hydrology of the region by the proposed development by applying appropriate environmental management tools (NEMA).

The objective of this report is to develop a Stormwater Management Plan (SWMP) for the proposed Aberdeen Wind Facility 1 that protects surface water resources, manages erosion risks, and complies with the relevant regulations and guidelines (listed in Section 2.2) for the construction and operation phases of the Aberdeen Wind Facility 1.

The SWMP will inform the Environmental Management Programme (EMPr) for the basic assessment application to the Department of Forestry, Fisheries, and the Environment (DFFE). This report has been developed in compliance with Appendix 6 of the National Environmental Management Act (NEMA) (Act 107 of 1998).

## 1.3 Scope of Work

The scope of work of this project as per the Client's Request for Quotation (RFQ) (1st June 2022) and includes but is not limited to the following:

- Review available Geographical Information Systems (GIS) data and undertake site visit to identify and verify areas of interest;
- Review the Aberdeen Wind Facility 1 layout as supplied by the Client; and
- Provide recommendations and management / design criteria for the construction and operational phases of the project in consideration of:
    - Risks to watercourses;
    - Presence of natural and proposed drainage systems;
    - Surface flow across the site during low and high rainfall events;
    - Storage requirements for potentially hazardous substances;
    - General stormwater management of the site and pollution mitigation and management;
    - Erosion control; and
    - Provide input to responses raised by stakeholders relating to stormwater concerns.

The SWMP is a conceptual study at this stage, and a detailed survey and SWMP study will need to be undertaken during the design of the required infrastructure.

## 1.4 Assumptions, Limitations and Exclusions

Completion of the project will be based on the following limitations and assumptions:

- Rainfall across the catchments is homogenous temporally and spatially and aligns with the readings generated using design rainfall;
- Data obtained from site-specific literature, and previous and other professional investigations will be assumed to be valid and true;
- Publicly available topographical data will be used;
- River crossings identification or design is excluded;
- Floodlines are excluded; and
- Any detailed design and engineering drawings are excluded.

## 1.5 Legislation and Guidelines

SWMPs are generally required to support the EMPr and Water Use License Applications (WULA). The following was considered when compiling the SWMP:

- Best Practice Guideline G1 for Stormwater Management (Department Water Affairs and Forestry (DWAF), 2006); and
- Regulation 704 of the National Water Act (Department of Water Affairs and Forestry, 4 June 1999).

Municipal regulations, which may introduce specific standards for each municipality, but still adhere to the overall principles of the regulations and guidelines above, should be considered during Detailed Design (if relevant).

The International Finance Corporation (IFC) Performance Standards on Environmental and Social Sustainability (2012) were taken into consideration in the development of this report. A review of the standards revealed that they are prevalently for impacts affecting communities. As the hydrological

risks do not affect any communities in this study, the standards were found not to be directly applicable.

## 1.6 Methodology

The following methodology was proposed to meet the scope of work.

### 1.6.1 Site visit

The site visit was conducted at the onset of the project to supplement the desktop gathered data, for the site, that will be used in this study. The day-long site visit was conducted to assess the conditions in the catchment, as well as drainage conditions on-site.

Observations of the vegetation, relevant drainage features, land use as well as infrastructure within the catchment were made to characterise the catchment conditions and how the conditions impact the run-off in the catchment.

The site visit was carried out on the 16th of August 2022. This is at the end of the dry season for the Eastern Cape province. The relevance of the season does not impact the findings of this assessment. However, it did confirm that rivers and drainage lines on the site are non-perennial as no flow was observed during the site visit.

### 1.6.2 Information gathering and review

A thorough investigation of all available literature for the site was reviewed. This included the following:

- Meteorological data for the site such as rainfall, runoff and evaporation;
- Academic studies of the hydrology of the site;
- Acquirement of any existing topographical survey data of the site;
- The layout of the new development was studied and assessed; and
- National legislation applicable to the project was obtained and reviewed.

### 1.6.3 Hydrological baseline assessment

The hydrological baseline assessment makes provision for the observations made during the site assessment as well as considering the following aspects:

- Climate and hydrometeorological analysis for the area;
- Delineation of the sub-catchments up to immediately downstream of the site;
- Determination of the Mean Annual Precipitation (MAP), Mean Annual Runoff (MAR) and Mean Annual Evaporation (MAE) from historical rainfall records from South African Weather Stations (SAWS) and the Water Resources Study of South Africa 2012 (WR 2012) (Pitman and Bailey, 2015); and
- Calculation of the design rainfall depths for various return periods and event durations.

### 1.6.4 Stormwater Management Plan

A conceptual stormwater management plan (SWMP) (this document) was developed to manage surface runoff flows from the wind turbines and linear infrastructure. Guidelines and policy for the design of stormwater drainage and stormwater management were obtained from GN 704 (1999) and Best Practice Guidelines G1 (DWAF, 2006). Topographical survey data was used to model the stormwater drainage network.

### 1.6.5 Reporting

The findings of the application of the methodologies provided above are detailed in this report highlighting the key aspects as required in the scope of works.

# 2 Supporting Information

This section summarises all available information and assumptions upon which the derivation of the SWMP is based. This is done to highlight how the plan was developed: by matching regulations and guidelines to the specific needs of the project in the local natural conditions. The available information is therefore key to understanding the SWMP.

## 2.1 Site Observations

The site was visited by L. Strydom from SRK Consulting on the 16th of August 2022. The proposed site is located in the Camdeboo plains, with the Camdeboo mountains to the north in the eastern side of the Great Karoo (see Photo 2-1). The site itself lies within the plains and is therefore relatively flat. The land is used for grazing of sheep and other than scattered smallholdings and access roads, is undeveloped.

The surface of the site is sparsely vegetated by small bushes and clumps of grass. In some areas, thorn trees were observed (see Photo 2-3). Between the vegetation, the soil is sandy and strewn with rocks (see Photo 2-2). The sand was observed to be loose and it has been assumed that the sand is highly permeable and has high rates of infiltration.

The site has minor drainage lines, none of which were observed to have flow during the site visit indicating that these streams are perrenial and do not flow in the dry season (when the site visit was carried out). The drainage areas did not have defined channels. Drainage lines were identified by increased vegetation, larger shrubs and trees and greenery (see Photo 2-4).

Erosion was observed along the sand roads typical of the area (see Photo 2-5 and Photo 2-6).

**Photo 2-1 Camdeboo mountains to the north of the plains**

**Photo 2-2 The sparsely vegetated, flat plains dominating the landscape**

**Photo 2-3 Thorn trees amongst the vegetation**

**Photo 2-4 Larger trees and increased greenery indicate drainage lines**

**Photo 2-5 Erosion observed on a typical sand road**

**Photo 2-6 Erosion observed on a typical sand road**

# 3 Hydrological Baseline Assessment

## 3.1 Climate

The development lies in a semi-arid climatic region with a mean annual precipitation (MAP) of 245 mm per year. The average MAP for South Africa is 450 mm (Botai, Botai, & Adeola, 2018). In comparison, the site has a much lower rainfall than the average for South Africa, indicating that this is a dry region.

The daytime temperature in the Aberdeen town region ranges with an average high of 29.1°C in January and drops to an average low of 16.8°C in June. There are extreme temperature variances between the day and night.

The (Commission, 2012) Climate Classification (Kottek, Grieser, Beck, Rudolf, & Rubel, 2006) divides the climates into five categories: tropical, arid, temperate, continental, and polar. Based on the Koppen-Geiger Climate Classification the Aberdeen Wind Facility 1 area falls into the semi-arid, desert climate. As the site is in the interior of South Africa, the area can be further classified as a desert area.

## 3.2 Regional Drainage

The site lies within Mzimvubu-Tsitsikamma Water Management Area (WMA) (DWAF, 2016). This WMA is drained by several rivers including the Gamtoos and Sondags Rivers (which drain the site) into the Indian Ocean.

As part of the analysis, the quaternary catchment data for the site was extracted from Water Research Commission 2012. The Aberdeen Wind Facility 1 lies within the L23B quaternary catchment which is drained by the Gannaleegte River which confluences with the Kariega River to the west (ultimately draining to the Groot and then Gamtoos Rivers). The L23B quaternary catchment characteristics are as follows:

- Gross catchment area: 818 $km^2$;
- Evaporation zone: 25A;
- Mean Annual Evaporation (MAE): 2 080 mm;
- Rainfall zone: L2D;
- Mean Annual Precipitation (MAP): 235 mm; and
- Mean Annual Runoff: 6.54 million $m^3$.

The regional drainage is shown in Figure 3-1.

## 3.3 Delineation of Sub-catchments

In order to delineate the sub-basins within the site vicinity, a Digital Terrain Model (DTM) was created to use GIS techniques to determine these delineations and characterisations of the various sub-basins. No detailed survey information was available at the time of the study, so 20 metre and 5 metre contours (where available) were sourced from ngi.gov.za and compared to elevation data on Google Earth. The outlet of the sub-basins were taken as the closest likely discharge point or closest mapped water course. These sub-basins are shown in Figure 3-2 and their characteristics are summarised in Table 3-1.

**Table 3-1 Sub-basin characteristics**

| Sub-basin | Area ($km^2$) | Flow length (km) | Slope (m/m) | River |
|---|---|---|---|---|
| 1 | 1 665.9 | 117.4 | 0.009 | Gats |
| 2 | 8 221.4 | 306.3 | 0.005 | Kariega |
| 3 | 1 036.0 | 77.3 | 0.016 | Moordenaars |
| 4 | 1 901.8 | 98.1 | 0.012 | Kraai |
| 5 | 1 196.9 | 84.8 | 0.018 | Melk |
| 6 | 1 761.5 | 166.8 | 0.009 | Voel |
| 7 | 1 358.9 | 83.0 | 0.004 | Plessis |
| 8 | 710.0 | 95.9 | 0.008 | Groot |
| 9 | 3 968.1 | 235.8 | 0.004 | Sout |
| 10 | 893.7 | 85.2 | 0.010 | Sondags |
| 11 | 1 916.8 | 138.4 | 0.007 | Sout |
| 12 | 2 983.1 | 140.4 | 0.003 | Sout |
| 13 | 1 347.7 | 98.3 | 0.005 | Heuningklip |
| 14 | 197.7 | 30.8 | 0.019 | Groot |
| 15 | 1 310.8 | 101.3 | 0.011 | Sondags |
| 16 | 51.7 | 21.4 | 0.006 | Sondags |
| 17 | 4 837.0 | 226.4 | 0.003 | Sondags |
| 18 | 528.9 | 61.1 | 0.006 | Sondags |
| 19 | 1 066.4 | 61.8 | 0.011 | Sondags |
| 20 | 1 486.0 | 91.5 | 0.004 | Groot |

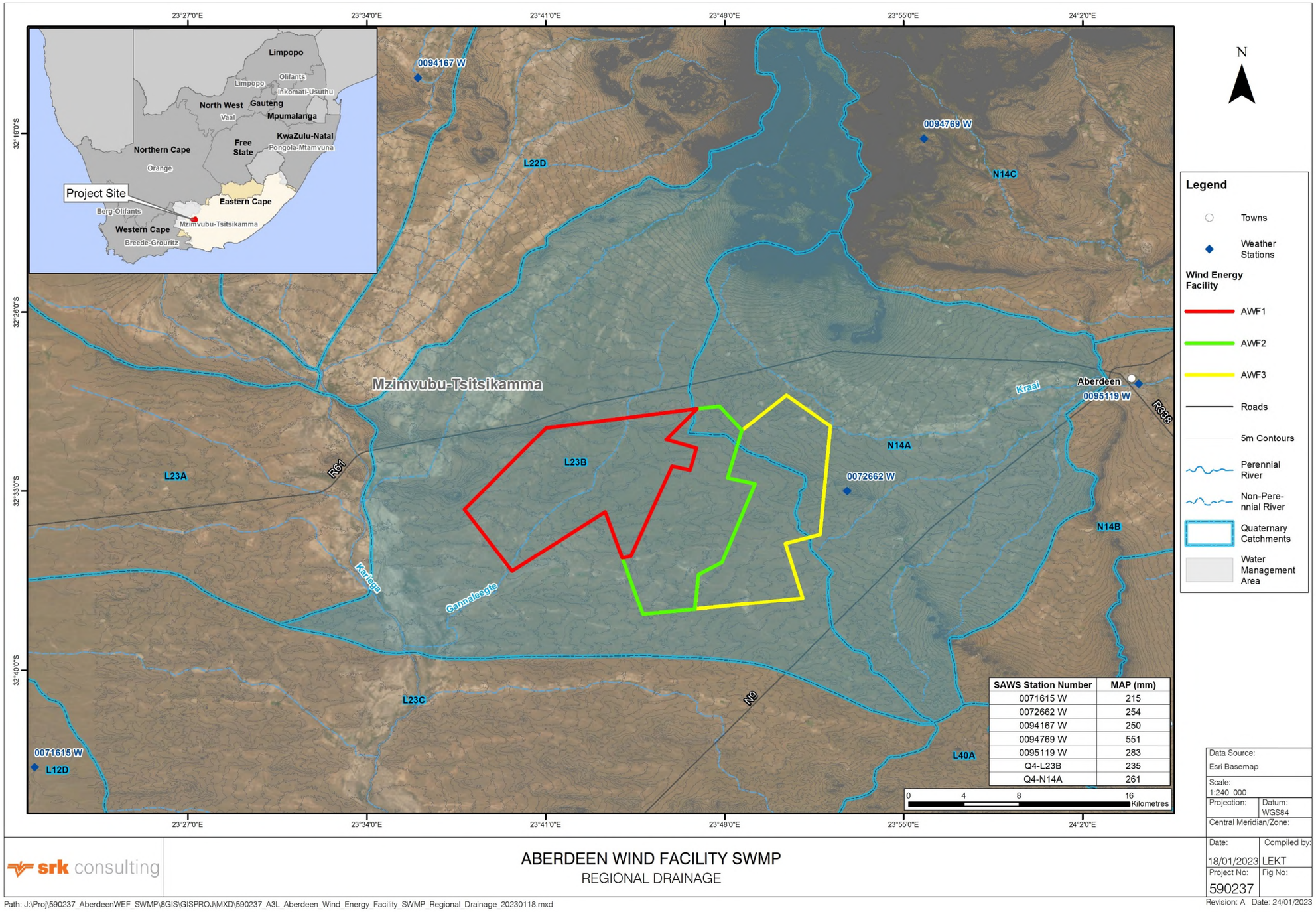



**Figure 3-1 Regional Drainage**

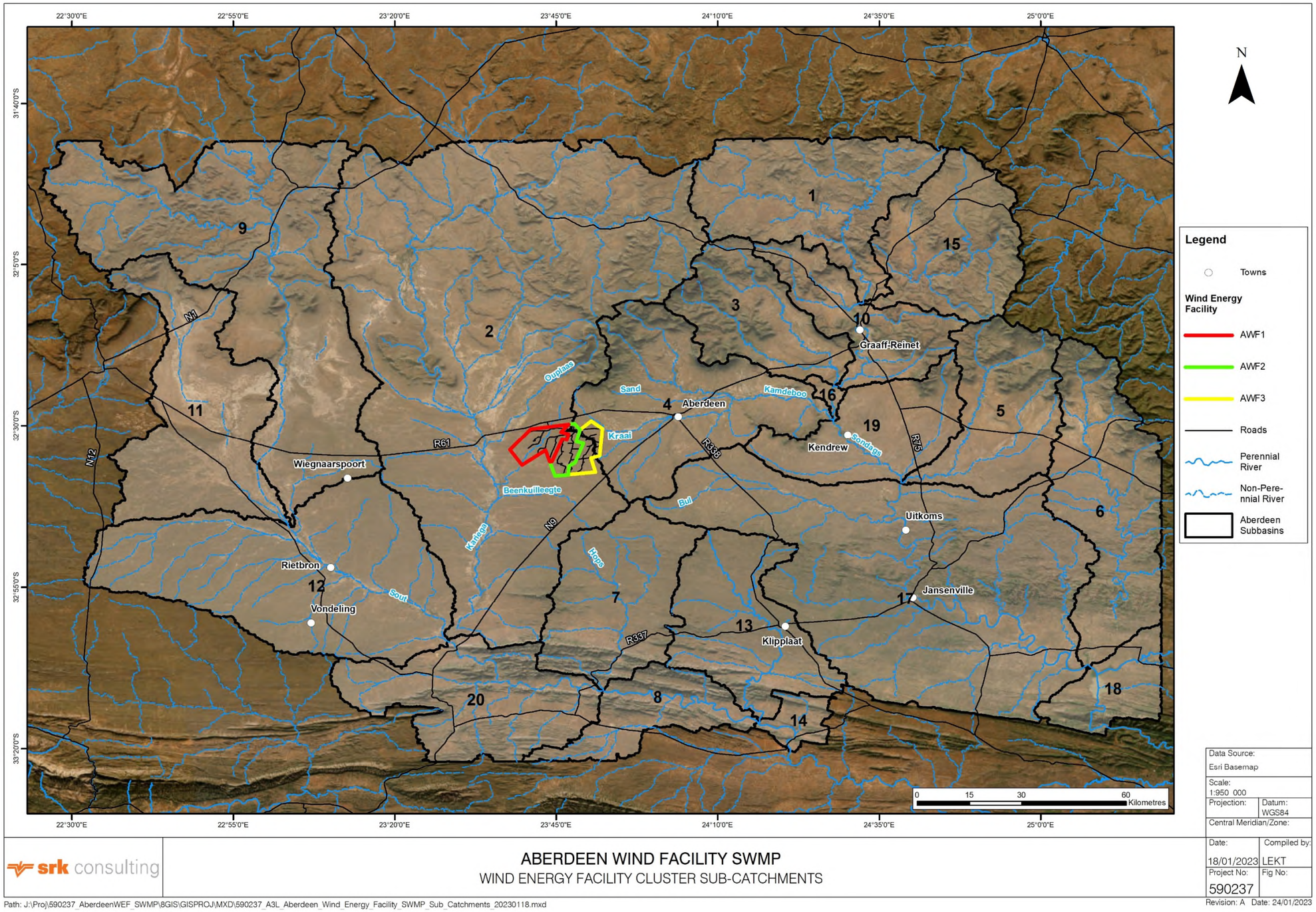



**Figure 3-2 The Aberdeen Wind Facility Sub-basins**

## 3.4 Rainfall

An analysis of the rainfall data available for the site was undertaken to determine which dataset would best represent the site rainfall. The station locations are shown in Figure 3-1 and the MAP, record length, distance and direction from the site, and the quaternary catchment of each rainfall station considered is summarized in Table 3-2. The average monthly rainfall depths as per the historical records of the selected stations is shown in Figure 3-3.

**Table 3-2 Rainfall stations in the vicinity of Aberdeen Wind Facility 1**

| SAWS station number | MAP (mm) | Start year | End year | Record length (years) | Distance (km) | Direction | Quaternary catchment |
|---|---|---|---|---|---|---|---|
| 0072662 W | 254 | 1928 | 1970 | 42 | 15 | East | N14A |
| 0095119 W | 285 | 1881 | 1976 | 95 | 32 | East | N14B |
| 0094769 W | 551 | 1964 | 1978 | 14 | 28 | Northeast | N14C |
| 0094167 W | 250 | 1927 | 1989 | 62 | 30 | North | L22C |
| 0071615 W | 215 | 1952 | 1972 | 20 | 42 | Southwest | L23C |

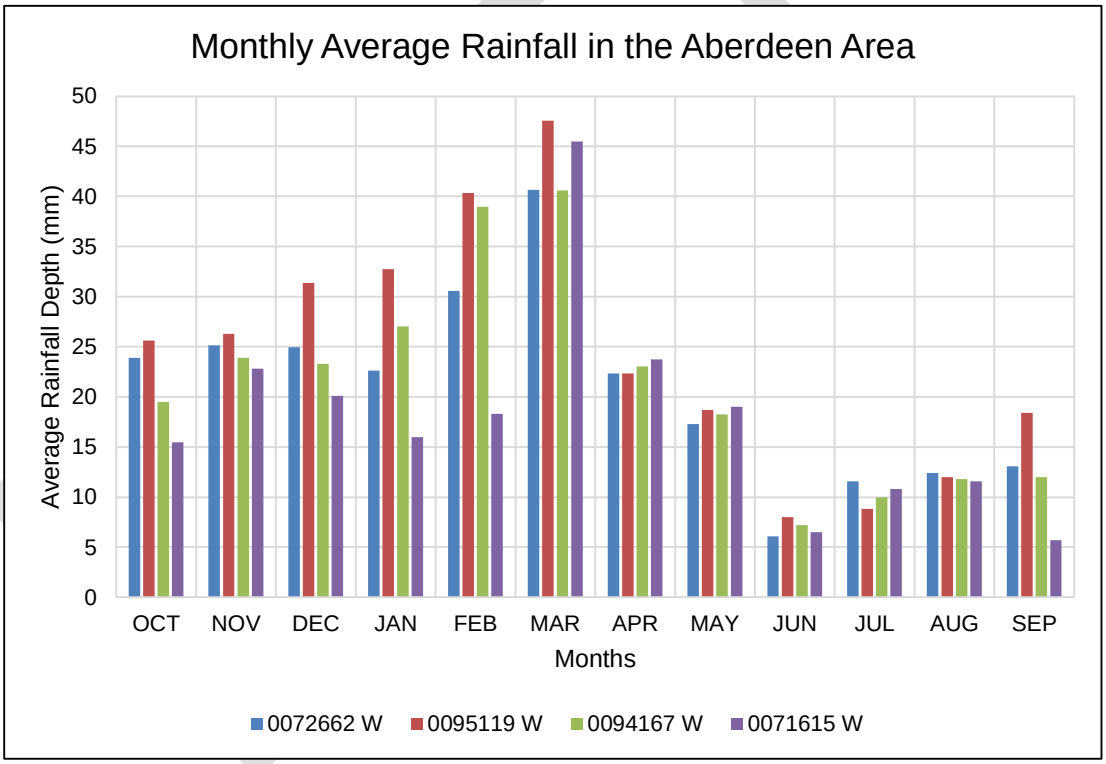



**Figure 3-3 Average monthly rainfall of stations**

All stations follow the predicted seasonal variation with the wet season occurring in the summer months of November to April and the dry season occurring in the winter months of May to October. The highest rainfall depth recorded is in March, reaching a maximum depth of between 41 and 47 mm. the lowest rainfall occurs in June and varies between 6 and 8 mm for the stations assessed.

All stations have low MAP depths of between 215 mm for 0071616_W and 285 mm for 0095119_W, with 0072662_W and 0094167_W having MAP values of 254 and 250 mm per year respectively. These are characteristics of the region and fall within the range expected based on quaternary catchment characteristics. Station number 009769_W has an MAP of 551 mm. This is

50 % higher than the MAP for the region, was recorded in the Camdeboo mountains where rainfall may be higher due to the topography and has been determined from a record of only 14 years in length. This station was therefore considered to be a poor indictor of site conditions and was disregarded.

0072662_W and 0094167_W have similar average monthly rainfall depths and MAP depths (254 and 250 mm) and lie on opposite sides of the site, indicating that these stations may be most representative of the site. An addition factor to be considered is that station 0076226_W is closest to the site at only 15 km to the east of it (towards the town of Aberdeen). However, 0094167_W is quite far from the site at 30 km to the north.

Station number 0071615_W has an MAP of 215 mm, markedly lower than the MAP, although anticipated due to the extremely low MAP of 183 mm for its quaternary catchment L23C. This site lies 42 km southwest of the site and due to it's distance and low MAP, was not chosen to represent site conditions as rainfall depths may be underestimated.

Station number 0095119 has a long rainfall record of 95 years in length, ranging from 1881 to 1976. This record was recorded at Aberdeen town and is close to the site at 32 km east of the site. The MAP value for this station is 285 mm, 20 % higher than the MAP determined for stations 0072662_W and 0094167_W.

Following the above evaluation, station 0095119_W is recommended for use as the rainfall station to represent site rainfall. The station has a long record of 95 years and is therefore likely to include large and long duration events. It is also close to the site. As this station has higher rainfall depths than 0072662_W and 0094167_W, the design of the drainage infrastructure will be more conservative and reduce the risk of flooding of the site in the event of a large storm.

## 3.5 Design Rainfall

The Daily Rainfall Extraction Utility, developed by the Institute for Commercial Forestry Research (ICFR) in conjunction with the School of Bio-resrouces and Environmental Hydrology (BEEH) at the University oif KwaZulu-Natal, Pietermaritzburg (Kunz, 2003), was used to obtain summary data for all rainfall stations within the vicinity of the site.

The design rainfall depths for the station selected to represent the site, 0095119_W), are summarised in Table 3-3. The 24-hour storm depth is the value used for SWMP modelling and infrastructure sizing. The 42-hour rainfall depth is the 1-day rainfall depth factored by 1.1.

**Table 3-3 Design Rainfall for SAWS Station Aberdeen 0095119_W**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **SAWS Station Name:** | | | | Aberdeen (TNK) | | | |
| **SAWS Station Number:** | | | | 0095119_W | | | |
| **Mean Annual Precipitation (MAP):** | | | | 285 mm | | | |
| **Record length** | | | | 95 years | | | |
| **Duration** | **Return Period (years)** | | | | | | |
| | **2** | **5** | **10** | **20** | **50** | **100** | **200** |
| 24 hours | 39.2 | 57.5 | 71.1 | 84.9 | 104.5 | 120.6 | 137.6 |
| 1 day | 35.6 | 52.3 | 64.6 | 77.2 | 95.0 | 109.6 | 125.1 |
| 2 days | 44.4 | 66.0 | 81.6 | 97.7 | 120.3 | 138.6 | 158.2 |
| 3 days | 48.3 | 72.1 | 89.1 | 106.4 | 130.4 | 149.8 | 170.1 |
| 4 days | 50.4 | 74.9 | 92.4 | 110.1 | 134.6 | 154.3 | 174.9 |
| 5 days | 51.9 | 77.2 | 95.2 | 113.3 | 138.4 | 158.4 | 179.3 |
| 6 days | 53.1 | 78.9 | 97.2 | 115.6 | 140.7 | 160.7 | 181.7 |
| 7 days | 54.7 | 81.3 | 100.0 | 118.83 | 144.6 | 165.0 | 186.4 |

## 3.6 Evaporation

The evaporation data for the site was extracted from the WRSM database (Bailey & Pitman, 2016). The average monthly results are provided in Table 3-4 below. The MAE is 2 080 mm.

**Table 3-4 Average Monthly Evaporation (mm) (WR2012)**

| Q4 | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L23B | 202 | 236 | 284 | 283 | 220 | 188 | 131 | 99 | 81 | 89 | 117 | 150 |
| N14A | 195 | 227 | 273 | 272 | 211 | 180 | 126 | 96 | 78 | 85 | 112 | 144 |

In comparison to the rainfall (see Figure 3-4) the evaporation is significantly greater over the course of the year.

The evaporation varies throughout the year, with the highest evaporation in the area observed in the month of December at 273 mm and the lowest evaporation occurring in June at 78 mm.

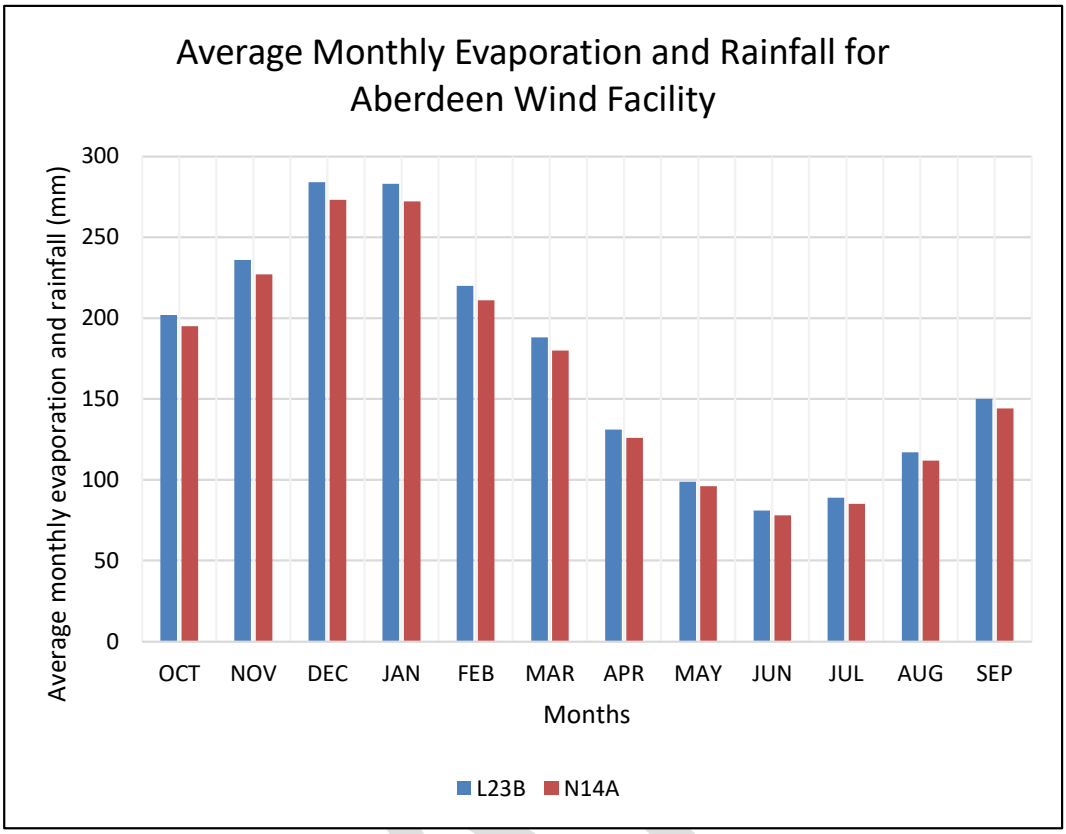



**Figure 3-4 Monthly rainfall and evaporation**

# 4 Conceptual SWMP

## 4.1 Design Criteria and Project Objectives

Government Notice 704 (*GN704*) was promulgated by the Minister of Water Affairs on 4 June 1999. Government Gazette vol. 408, No. 20119. This notice regulates the use of water for mining and related activities. Although the Aberdeen Wind Facility is not a mining activity, the SWMP uses GN 704 as a guideline for EIA purposes.

As per *Best Practice Guideline - G1: Stormwater Management* (DWAF, 2006) and GN 704 the SWMP for the site will seek to achieve certain objectives based on a philosophy of protecting the receiving environment from hydrological impacts.

- Clean and dirty water should be separated, and it should be ensured that all stormwater structures are designed to keep dirty and clean water separate and can accommodate a defined precipitation event;
- The clean water catchment area should be maximised, and clean water should be routed to a natural watercourse with minimal damage to that watercourse in terms of quantity and frequency of discharge;
- Dirty areas should be minimised, and runoff from these areas contained and either treated to an acceptable quality to discharge to the environment or removed from the site for disposal; and
- Natural watercourses and the environment should be protected from contamination by dirty areas by ensuring that the dirty water cannot enter the clean water system by spillage or seepage.

In addition to these aims, this SWMP has the following project specific objectives were developed based on the site-specific characteristics:

- Stormwater should be directed such that no water flows in an unruly fashion that may jeopardize the safety of personnel or infrastructure, or such that it is a nuisance;
- Protection of the soils by preventing erosion is also a key requirement of the SWMP;
- Minimise modification of the natural topography of the area and avoid any modification of the natural watercourses as far as possible;
- Do not impede surface or subsurface water flows unless unavoidable;
- Include a monitoring and inspection system for spills, leaks and erosion and commit to remediation where needed;
- Review and improve the SWMP regularly;
- Ensure no infrastructure, except road crossings, are built within the watercourses; and
- Do not build infrastructure, in particular infrastructure containing potential pollutants, within 300 m of natural drainage lines.

## 4.2 Delineation of Clean and Dirty Areas

The development area is divided into clean and dirty areas as follows:

Dirty areas:

- The workshop where oils and lubricants may be stored and used;
- A chemical storage area will be constructed for the operational phase of the project, which will include proper containment and bunding for all chemicals stored on site;
- The medium-voltage transformers (at the inverter stations) placed around the development area, as these will contain oil;
- Transformers at the substation, as these will contain oil;
- The conservancy tanks, as this will contain sewage; and
- Vehicle wash bay that has a hardstanding surface on which vehicles are washed, generating dirty water which drains to a sump.

Clean areas are deemed to be all areas on the site outside of those stated above as dirty areas.

Requirements for bunding of areas housing potential contaminants are specified in detail in the National Norms and Standards for the Storage of Waste (Notice 926 of 29 November 2013, Department of Environmental Affairs, National Environmental Management: Waste Act 2008, Act No.29 of 2008). The specification, which will apply to the development area, reads as follows: "*bunds having a capacity which can contain at least 110% of the maximum contents of the waste storage facility. Where more than one container or tank is stored, the bund must be capable of storing at least 110% of the largest tank or 25% of the total storage capacity, whichever is greater (in the case of drums the tray or bund size must be at least 25% of total storage capacity)*."

Bunded areas should be sized and sealed to ensure spilled contaminants cannot leak out of the bunded areas.

## 4.3 SWMP Design Philosophy for a Wind Facility

A typical wind facility is a large expanse of land, over the surface of which are located wind turbines, preferably at high points to optimise exposure to wind. The turbines are placed several hundred meters away from one another. A road network provides access to each turbine and the substation. Cables run from the turbines to the substation (it is assumed that all cables are buried). The land within the site footprint on which these components are placed is not altered in any way by the wind

facility development. Typical stormwater management interventions for each of these components during both construction and operational phases are designed in this section.

The SWMP will be guided by Low Impact Design (LID) principles. LID in land development aims to manage stormwater as close to its source as possible by simulating or enhancing natural processes. This is achieved by interception of rainfall on the catchment surface as it lands by enabling natural infiltration into the soil, increasing surface roughness using vegetation, and aiding soil stability by the establishment of vegetation. LID was selected as a suitable method for several reasons.

Firstly, LID addresses the risk of erosion and downstream sedimentation caused by concentrated flows. Concentrated flow emanating from a catchment has higher velocities and associated streamflow than overland flow. It is desirable to keep peak flow velocity below 1.5 m/s.

Secondly, by reducing concentrated flow, LID minimises alteration of the pre-development hydrograph of the catchments in terms of peak discharge and duration of runoff. This is feasible because the total surface area modified by the wind facility components is very small relative to the total surface area of the catchment (in the order of 1 %).

Finally, in terms of water quality there are no water demands, uses, or discharges from a wind facility meaning that only stormwater quality needs to be managed. Aside from the dirty areas defined above, the only water contaminant will be suspended solids from disturbed soil during the construction phase and road runoff during construction and operational phases. The LID interventions specified below will effectively reduce the particle load in the water by settling in temporary sumps during construction, and filtering with vegetation lined channels and dissipaters during operation.

## 4.4 Site Specific Considerations

### 4.4.1 Site Description

The Aberdeen Wind Facility 1 has a total surface area of 9 180 ha. The site is drained by the Gannaleegte River that flows through the centre of the site in a south-westerly direction to confluence with the Kariega River. As such, the site slopes in a south-easterly direction dropping from an elevation of approximately 860 mamsl to 810 mamsl over a distance of 13 km. There is no development within the site catchment aside from minor access roads and smallholdings. Land use is primarily for pastoral grazing (sheep farming).

### 4.4.2 Positioning of Turbines

Up to 41 wind turbines are located across the site along ridges, running parallel to the Gannaleegte River. Due to the turbines being at the higher surface elevations within the catchments, their resultant hydrological impacts, such as impedance of flow, will be minimal. The closest the turbines get to the river centreline is 785 m, which is outside the 300 m limit stipulated by legislation, within which impacts must be managed.

### 4.4.3 Access Roads

The network of access roads connecting the wind turbines and substations; laydown areas and auxiliary buildings is extensive at approximately 35 km in length in total, and therefore cumulatively will affect a small percentage of surface permeability and infiltration of the catchment.

The Aberdeen Wind Facility 1 access roads cross the Gannaleegte River in the northern part of the site. An intervention will be required at the crossing point to protect the river and its banks from erosion due to traffic. Based on the magnitude of the peak discharge of this river, either a drift or a

culvert will be required at this point. Other than this points, the roads are not predicted to have any impacts on the drainage lines of the site.

## 4.5 SWMP for Wind Turbine Footprint

The SWMP presented in this section is applicable to all turbines in the Aberdeen Wind Facility 1 for both construction and operational phases. The site drainage is shown in Figure 4-1.

### 4.5.1 Construction Phase

General principles are given to guide the planning of stormwater management during the construction period. The construction period has the greatest hydrological impact and therefore careful planning is essential.

An example of the construction of a typical wind turbine foundation is shown in Photo 4-1. The foundation of a wind turbine is buried below ground surface, typically at a depth of 3.5 – 4.0 m below natural ground elevation. Thus, earth excavation is required. In addition to the foundation works, a compacted hardstand adjacent to the foundation is required for laydown purposes.

The following interventions are required for stormwater management during construction of the wind turbine:

- Use excavated soil to form a diversion berm on the upslope of the foundation siting. This will serve to divert clean surface runoff from upstream around the works. The upstream contributing catchment area is expected to be minor because all turbines are sited on high points in the topography. It is still necessary to minimise the water entering the area of disturbed soil as this can be considered a dirty area;
- Construct a temporary sump at a low point on the boundary of the works. This will serve to collect runoff and allow for settlement of particles out of the water. Pump out to the environment once settled; and
- If localised erosion is observed, place straw bales or grass mats in the area to protect the soil or construct silt fences to capture the eroded material and place back in the erosion gullies.

**Photo 4-1 Typical Wind Turbine Foundation Construction**

### 4.5.2 Operational Phase

It is assumed that once constructed, the foundation excavation will be backfilled, topsoiled, and grassed. Gravel should be placed around the base of the wind turbine as a LID intervention to encourage infiltration of runoff from the turbine tower back into the soil. This will result in clean runoff from the site. It is recommended that runoff be allowed to free-drain back into the environment as overland flow, as opposed to concentrating the flow and introducing a risk of localised erosion at the outlet point.

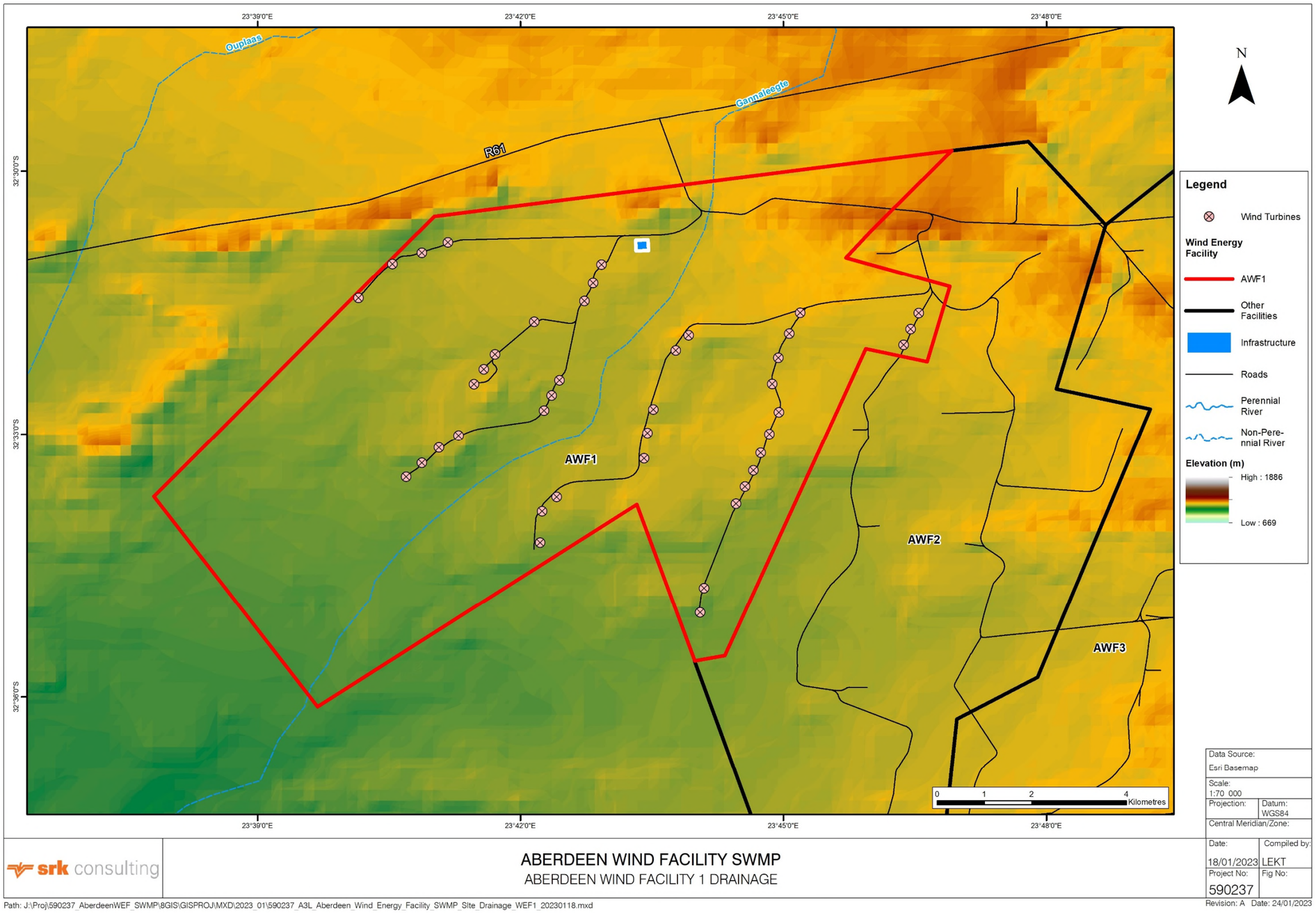



**Figure 4-1 Aberdeen Wind Facility 1 Site Drainage**

## 4.6 SWMP for Access Roads

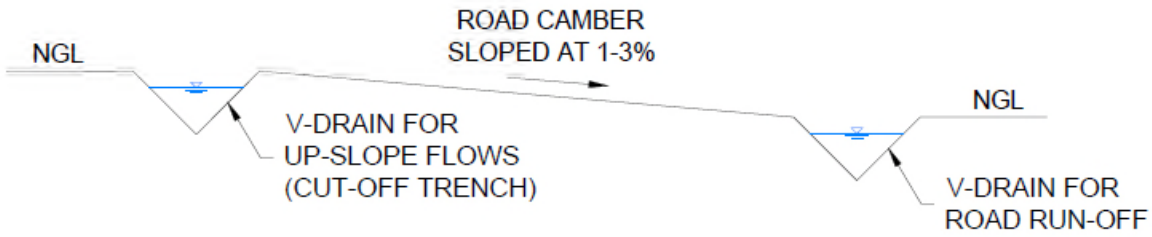
It assumed that the access roads will be gravel roads. The following interventions are recommended for stormwater management on the road:

- The roads should be cambered to drain to the downslope of the terrain;
- V-drains should be constructed along the length of the road on both sides. The upslope side should be sized to have sufficient capacity to convey runoff from the upstream contributing catchment. The v-drain on the downslope side of the road should have sufficient capacity to contain runoff from the road surface;
- Where the slope is gentle and peak velocity is less than 0.3 m/s, the v-drains shall be soil, planted with vegetation forming a permeable swale. This is a LID intervention and will facilitate infiltration of flow into the soil, protect against erosion, and allow for settling and filtration of the suspended solids and motor oil that may come from the road;
- Where the slope is steep and peak velocity is greater than 0.3 m/s, the v-drain shall be lined with riprap. This too is permeable but provides greater resistance against scour that may result from velocities of flow from steep slope;
- All v-drains should follow the natural topography of the land and drain ultimately to the nearest watercourse or drainage line;
- At the outlet of the road drains into the watercourse, an energy dissipater shall be installed. This would consist of gabion mattresses with a step down at the inlet, widening and daylighting to meet natural ground level at which point rip rap shall be placed. This will effectively diminish the flow and reintegrate it into the natural environment, and discharge into the watercourse without causing erosion.;
- At a shallow road crossing with a watercourse, a drift shall be constructed for traffic. The drift shall be constructed of concrete on compacted soil. The downslope of the drift shall be lined with gabion mattresses and rip rap to dissipate flow over the drift prior to release into the watercourse; and
- At deeper road crossings with watercourses, culverts shall be constructed, Culverts are recommended to be concrete, with wing walls and gabion mattresses and rip rap on the downstream side to dissipate the energy of water flowing through the culvert. Number of culvert opening should be maximised to distribute flow as much as possible.

Typical generic conceptual designs, based on the above discussions, were compiled as shown in Figure 4-2.

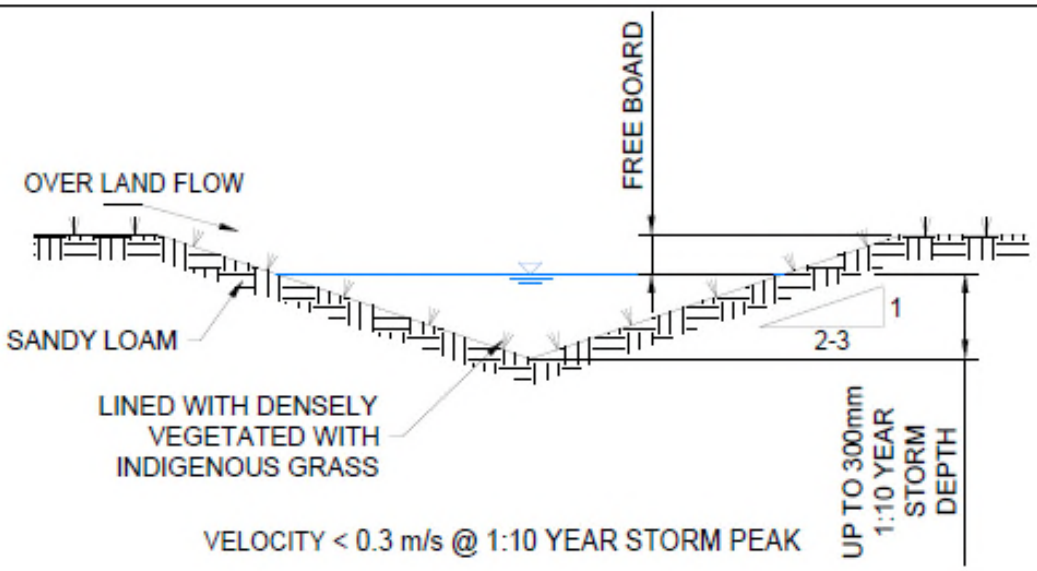
## 4.7 SWMP for Substation and Auxiliary Buildings

The stormwater runoff from the substations and auxiliary building will be clean. It is recommended that at outlet point from downpipes, energy dissipation features be installed after which the stormwater can be discharged into the environment.

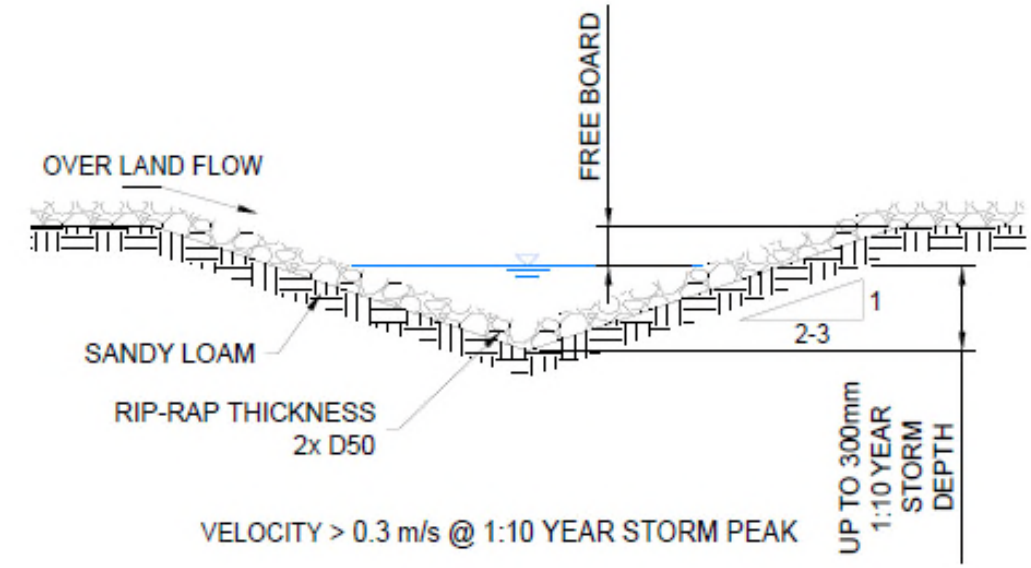



# TYPICAL DETAIL
## ROAD CROSS SECTION FOR DRAINAGE
SCALE 1:50

| | | |
|---|---|---|
| srk consulting | ABERDEEN WEF SWMP<br>TYPICAL CONCEPTUAL DESIGNS OF STORMWATER INFRASTRUCTURE | Data Source:<br>Scale: AS SHOWN<br>Date: 18/01/2023<br>Compiled by: PRJU<br>Project No. 590237<br>Fig No. 6-2a |

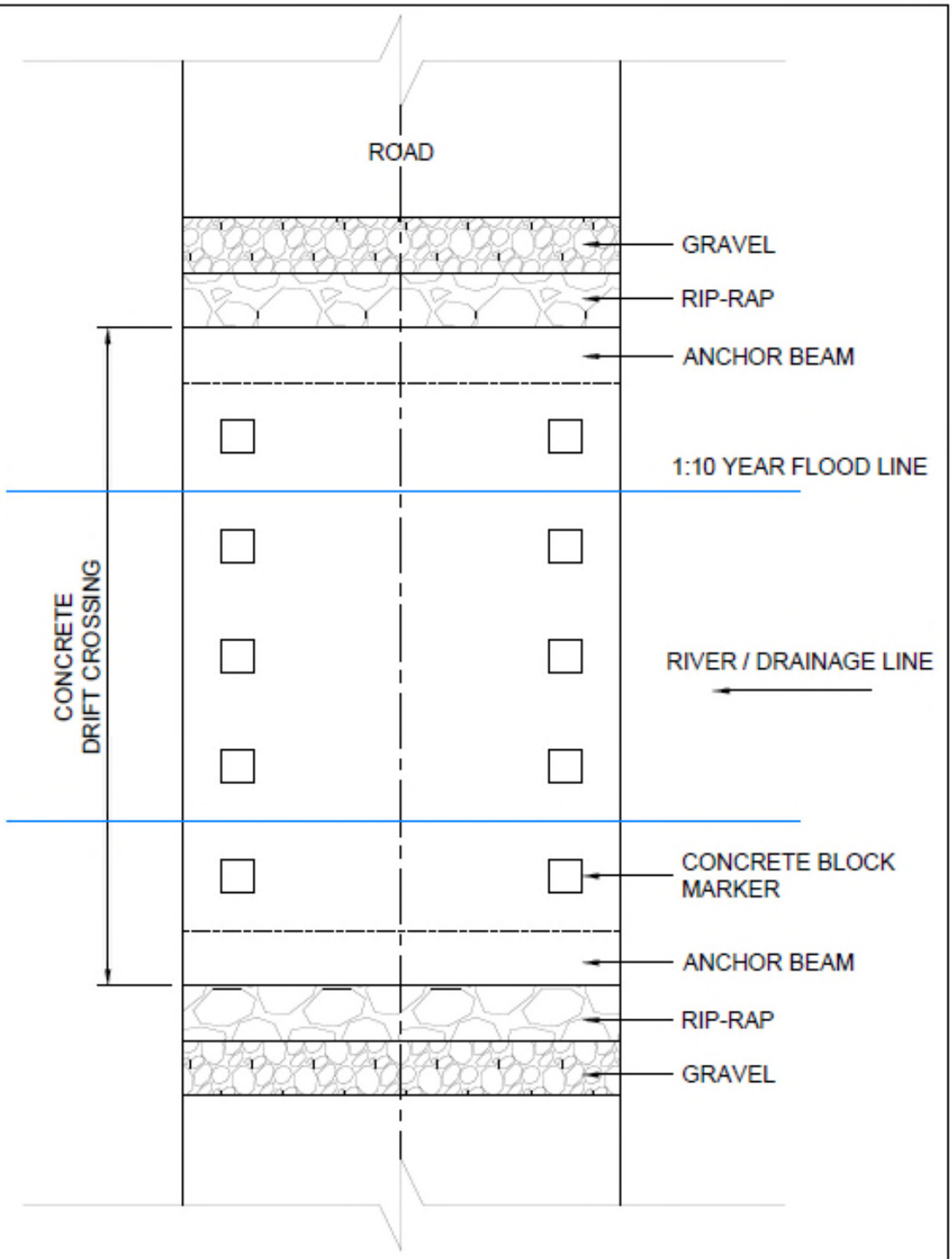



# TYPICAL DETAIL
## VEGETATED LINED V-DRAIN CROSS SECTION
SCALE 1:50




# TYPICAL DETAIL
## RIP-RAP LINED V-DRAIN CROSS SECTION
SCALE 1:50

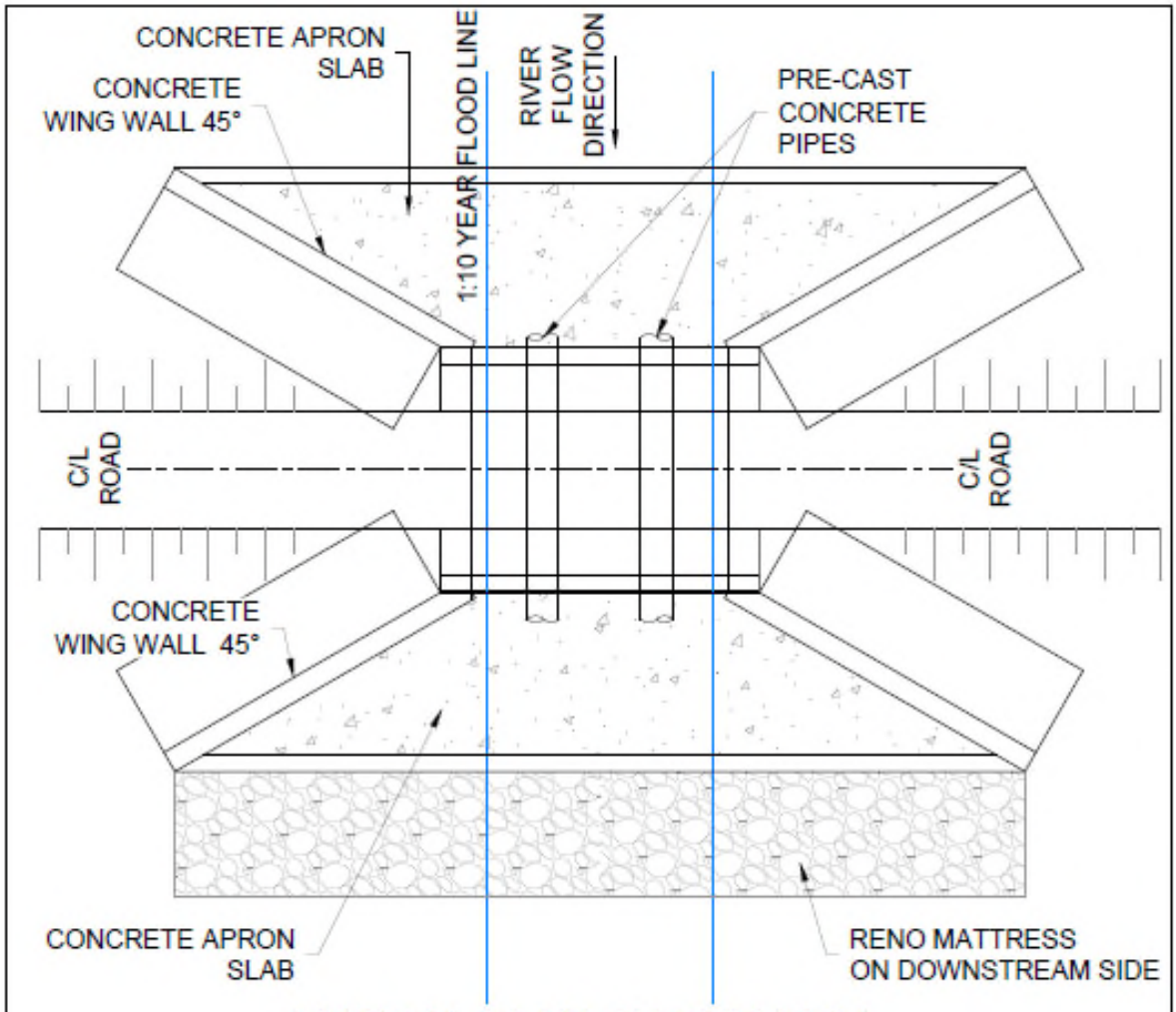
| | | | |
|---|---|---|---|
| | | Data Source: | |
| | | Scale: AS SHOWN | |
| srk consulting | ABERDEEN WEF SWMP<br>TYPICAL CONCEPTUAL DESIGNS OF STORMWATER INFRASTRUCTURE | Date: 18/01/2023 | Compiled by: PRJU |
| | | Project No. 590237 | Fig No. 6-2b |



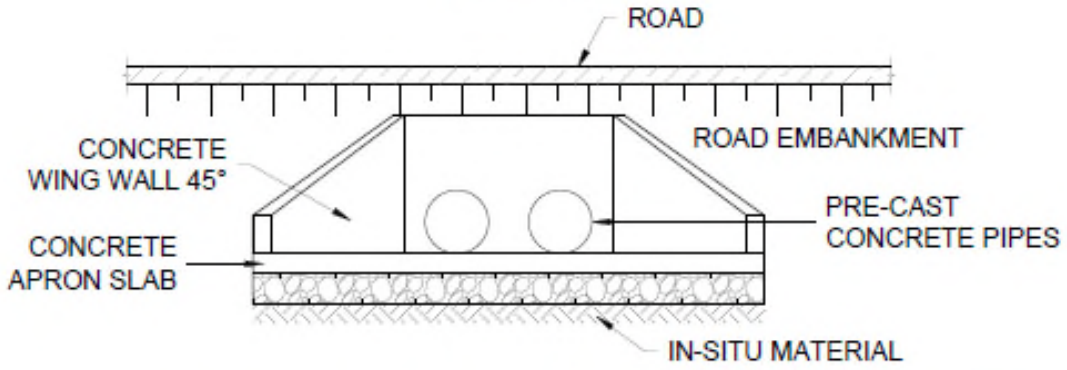

TYPICAL PLAN OF DRIFT CROSSING

SCALE 1:50

| | | | |
|---|---|---|---|
| srk consulting | ABERDEEN WEF SWMP<br>TYPICAL CONCEPTUAL DESIGNS<br>OF STORMWATER INFRASTRUCTURE | Data Source: | |
| | | Scale: AS SHOWN | |
| | | Date: 18/01/2023 | Compiled by: PRJU |
| | | Project No. 590237 | Fig No. 6-2c |




TYPICAL PLAN OF CULVERT
SCALE 1:100




TYPICAL ELEVATION OF CULVERT
SCALE 1:50

| | | | |
|---|---|---|---|
| srk consulting | ABERDEEN WEF SWMP<br>TYPICAL CONCEPTUAL DESIGNS OF STORMWATER INFRASTRUCTURE | Data Source: | |
| | | Scale: AS SHOWN | |
| | | Date: 18/01/2023 | Compiled by: PRJU |
| | | Project No. 590237 | Fig No. 6-2d |

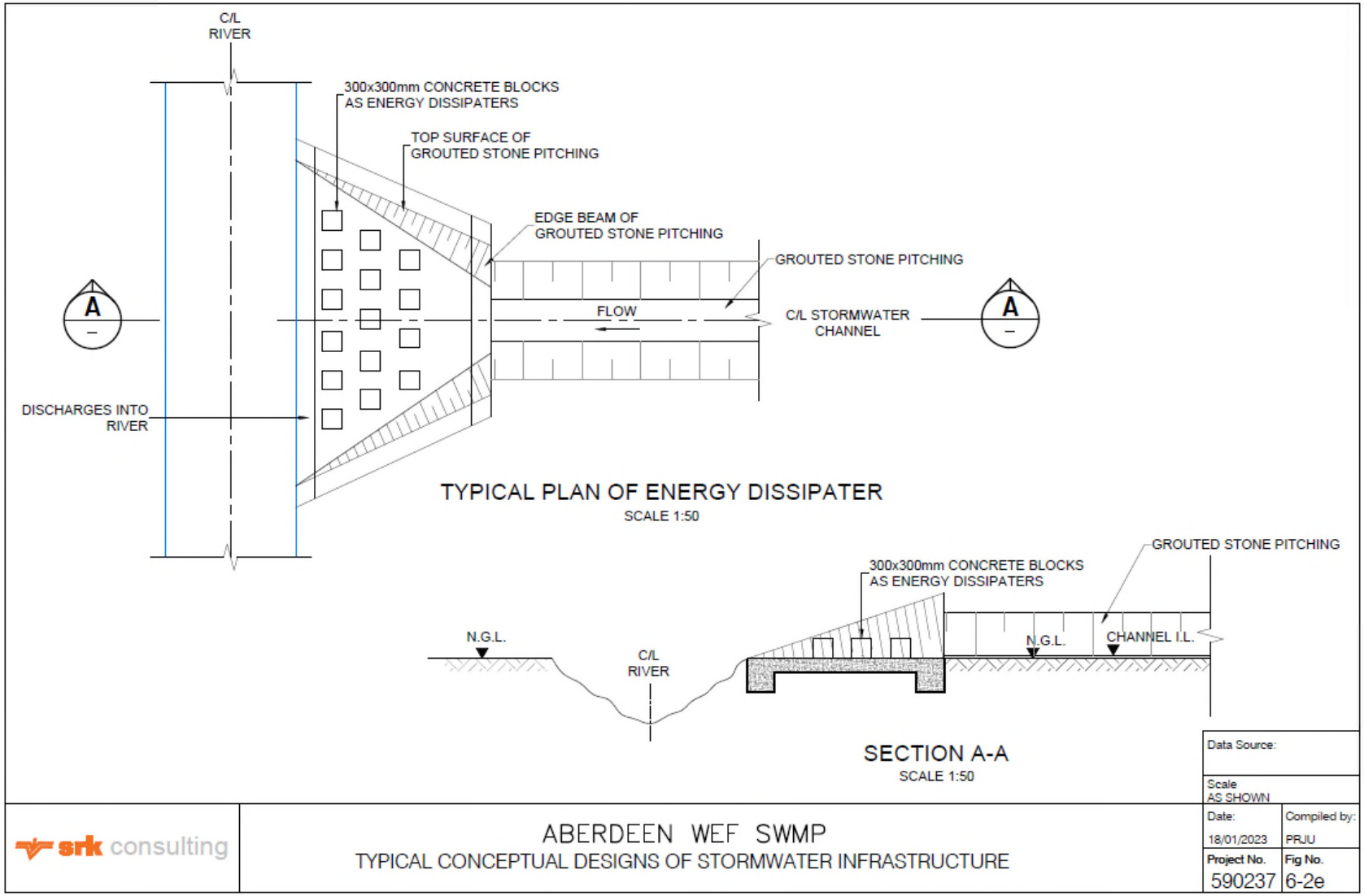



**Figure 4-2 Typical conceptual designs of stormwater infrastructure**

# 5 Waste and Wastewater Management

Waste will be disposed of at a registered landfill site and domestic wastewater at a licensed wastewater treatment plant (i.e., waste will be treated off site), hence, the SWMP only focuses on temporary storage on site.

Domestic waste should be stored out of the rain and wind, collected regularly, and disposed of as is currently proposed for the development.

The conceptual design of the wastewater (sewage) conservancy tank was not within the scope of this report; however, the current conceptual plan was evaluated in terms of the risks that this may pose to surface water. Poor management of the tank is the main risk because the system could fail if the tank is not emptied regularly resulting in overflows. Consequently, a float switch controlled alert system is recommended.

Oil and lubricants in the workshop, and oil from the transformers must be bunded as per legal requirements and hence, this was recommended without any alternatives.

# 6 Erosion and Sediment Transport

In general, the main erosion risks on a solar facility are channel outlets, roads, road crossings and stockpiles. However, based on the site visit, erosion on roads is excluded as a risk as this is unlikely as long as the roads have no significant camber.

In the case of stockpiles, temporary stockpiles should have diversion berms or silt fences. One permanent stockpile is planned for the topsoil that is to be used in decommissioning of the facility. This stockpile will be placed within the perimeter fence of the facility. The stockpile, if possible, should have gentle slopes of 1 in 5 or less to encourage revegetation and limit erosion. The stockpile should be bunded until it revegetates. The gentler slopes will necessitate a stockpile with a larger surface area. This is considered the lower impact option as it limits erosion even though it disturbs more surface area.

Sometimes, material excavated during construction of the turbine foundations might be significant (cumulative volume). If that is the case, the material should be removed from and disposed of off-site responsibly (e.g., use as cover material on a landfill site).

# 7 SWMP Monitoring and Management

Monitoring and management are key to the success of a SWMP. The following are therefore included as a key aspect of SWMP:

- Frequent inspections until the success of the design and any unexpected problems are resolved / confirmed and maintenance frequency is determined;
- Review of the plan after a few years to improve, where possible, its practicality, cost-effectiveness or efficacy; and
- Alerts that do not rely on a full-time environmental manager on site (which may not be feasible) including:
    - Automatic alert systems for the wastewater conservancy tank (e.g. a float driven switch alert system);
    - Brief, annual refresher training on stormwater protection that should not take more than fifteen minutes for each staff member; and
    - Well placed signs that remind staff members of reporting of incident / issues, as soon as possible and reduce the likelihood that forgetfulness or confusion will prevent reporting.

# 8 Surface Water Findings, Impacts and Mitigations

The site is undeveloped aside from pastoral farming activities. During the site inspections, the only impacts observed were the development of gravel roads and smallholdings. The extent of this development, or modified environment, is a small fraction of the total surface area of the site of approximately 9 180 ha (in the order of less than 2 %) and thus can be assumed to have negligible surface water impacts, aside from localised flows on the small holdings themselves such as outflow from a downpipe. No overgrazing was observed, so it can be inferred that the pastoral grazing activities do not significantly alter the vegetation or soil characteristics of the area. Therefore, the site is not considered to be modified from its natural condition and thus, no existing hydrological impacts exist.

The cumulative impacts refer to the combined impact on the environment due to past, current, and future anthropogenic activities. As the site is undeveloped and has no existing hydrological impacts, there are no existing impacts that will exacerbate those resulting from the construction and operation of the wind turbines. Therefore the 'cumulative' impacts will be the hydrological impacts associated with the establishment of the wind turbines and associated infrastructure.

In terms of the level of acceptable change, this could be defined as the extent of modification which does not alter hydrological flow regimes or introduce erosion or soil sedimentation to the environment and watercourses. As the Aberdeen Wind Facility 1 is comprised of isolated turbines, interconnected by access roads, the catchment characteristics will electively only experience minor change (as opposed to a site with a large surface area of development) and thus are not anticipated to alter the hydrology of the catchment significantly or to push it beyond an acceptable level of change.

In this section is a matrix listing each surface water finding from this study that is required to protect surface water resources from impacts from the proposed activity. An aim, as presented in GN 704 and the Best Practice Guidelines for Stormwater Management (DWAF, 2006) is identified followed by the specific objectives that will achieve this aim. Risk of the impacts is addressed by either avoidance, prevention or mitigation by site practices and planning. Interventions are recommended in detail, in terms of when the risk occurs, which party's responsibility it is to manage, and examples of the practical means of addressing the risk.

These methods of managing the surface water risk introduced by the proposed activity are recommended to be included in the EMPr.

The SWMP, including wastewater management, is summarised in Table 8-1.

**Table 8-1 Construction and Operations / Maintenance SWMP**

| General Principle | Specific Outcomes | When | Ref No. | Focus Area | Action | Responsible Party |
|---|---|---|---|---|---|---|
| Separate clean - and dirty water to ensure clean water remains uncontaminated | Temporary containments and diversion (designed for a 1 in 5-year event) | During contractors site establishment | 1 | • Stockpiles;<br>• Laydown areas;<br>• Workshops; and<br>• Any other area likely to generate sediment during a storm event or contain contaminants that can be disbursed. | Clean water diversions or bunds: Construct stormwater drains or bunds to divert clean runoff around dirty areas. The diversion should be sized for 1 in 5-year event. Typical design will be an excavated earth channel or berms. For the permanent topsoil stockpile, berms and channels to remain in place until stockpile revegetates. | Construction contractor's onsite environmental officer/representative |
| | Permanent containments and diversions (designed for a 1 in 50-year event) | Constructed prior to operation | 2 | • The workshop and chemical stores;<br>• Transformers, inverters and substations (if not bunded); and<br>• Wastewater conservancy tank. | Clean water diversions or bunds: Construct stormwater drains or bunds to divert clean runoff around the workshop, chemical stores, transformers, inverters, substations and wastewater conservancy tank. The diversion should be designed for a 1 in 50-year event. | Included in detailed designs of design engineer and carried out by contractor appointed for construction |
| Collect and, where required, treat dirty water or runoff from any dirty areas. | Dirty water should not have the potential to spill into clean water systems more than once every fifty years (where influenced by stormwater) | Before stockpiles are deposited | 3 | Stockpiles | Construct silt fences or berms: to prevent the sediment transport into rivers. All stockpiles to be removed after construction phase ends except permanent topsoil stockpile for decommissioning. Berms to remain around topsoil stockpile until it revegetates. | Included in detailed designs of design engineer and carried out by contractor appointed for construction |
| | | Throughout construction | 4 | Waste | Dispose of landfill, oils and other contaminants offsite | |
| | | During site establishment | 5 | Sewage | Supply chemical toilets | |
| | | Constructed prior to operation | 6 | Workshop | Workshop collection drain with oil and grease trap: Construct a small concrete drain collecting all water, potentially containing oils and lubricants, from workshop floor and directing it through an oil and grease trap before discharge (or removing to offsite facility). Floor to be sloped such that all water will collect in drains. | |
| | | Inspect every 3 months for first 2 years and then revise | 7 | Workshop | The oil and grease traps are to be inspected and, when necessary, cleaned and waste taken to a registered offsite facility | Workshop manager and assurance by environmental manager |
| | | As required when the tank is full | 8 | Transformers | Dispose of any spent oil, removed from transformers during maintenance, to a registered offsite facility | |
| | | As required when the tank is full | 9 | The sewage conservancy tank | Regularly collect sewage in the conservancy tank and disposed of at a licensed municipal sewage treatment plant. | |
| | Bund any hazardous substance or pollutant storage areas (including any oils), as per regulations | Throughout construction | 10 | General | Construct temporary bunds for any chemicals such as oils or fuel stored on sited during construction. Bunds must contain at least 100% of the volume of the container. If all containers are stored together the bund must store at least 110% of the largest container or 25% of the total storage capacity, whichever is greater. Suitability of the material of bund must be investigated whenever a new substance is added to the bund | Included in detailed designs of design engineer and carried out by contractor appointed for construction |
| | | Constructed prior to operation | 11 | Transformers | All transformers will be bunded with bund capacity of at least 110% of the maximum volume of oil in the transformer. Transformers and bund will be protected from rainfall by small covers or roof or housed in containers, as applicable. | |
| | | | 12 | The sewage conservancy tank | The sewage conservancy tank will be a closed tank with an automatic alert system. | |
| | | During operation: as and when containers are purchased | 13 | Workshop | Small trays for workshop chemicals: Bund any containers with oils and lubricants by placing them in plastic trays that is at least 100% of the volume of the container. If all containers are stored together the bund needs to store at least 110% of the largest container or 25% of the total storage capacity, whichever is greater. Suitability of the bund must be investigated whenever a new substance is added to the bund. | Workshop manager and assurance by environmental manager |

| General Principle | Specific Outcomes | When | Ref No. | Focus Area | Action | Responsible Party |
|---|---|---|---|---|---|---|
| Do not impede surface and subsurface flow along drainage lines | Minimise dirty areas such that surface and subsurface movement of water along the drainage lines is not impeded | Constructed prior to operation | 14 | The workshop, transformers, wastewater conservancy tank | Place diversion channels directly upstream of dirty areas such that dirty area catchments are minimised in footprint | Included in detailed designs of design engineer and carried out by contractor appointed for construction |
| | | Throughout construction | 15 | • Laydown areas; and<br>• Stockpiles | Minimise laydown areas and stockpiles. The permanent topsoil stockpile is excluded from this as it will be the natural topsoil from the area and gentler slopes are recommended which will necessitate a larger area. | |
| | Ensure any engineered clean stormwater drainage directs water to the closest naturally receiving drainage line | | 16 | All drains | Ensure that any temporary stormwater drains or diversion berms direct water towards the drainage line to which it would naturally flow | |
| | | Constructed prior to operation | 17 | The workshop, transformers, wastewater conservancy tank | Drains to follow natural topography, Ensure outlets drain towards the natural drainage line that would originally have received flow from that area | |
| Control, monitor and manage erosion | Prevent erosion in general | Constructed prior to operation | 18 | All areas | Do not disturb the natural topography or vegetation between the wind turbine installations | Included in detailed designs of design engineer and carried out by contractor appointed for construction |
| | | During operation | 19 | | No stockpiles if possible except for the permanent topsoil stockpile. | Environmental manager |
| | Minimize erosion in large storm event of 1 in 50- years or greater | Constructed prior to operation | 20 | All drains | Drains sloped and sized such that velocities do no exceed 1 m/s | Included in detailed designs of design engineer and carried out by contractor appointed for construction |
| | | | 21 | Road crossings | Line all major drifts on road crossings with material sufficient to prevent erosion during high flow (e.g. gravel or concrete). If concrete is used, place a section of riprap (larger rocks) underlain by gravel and with gravel on either side to facilitate a smooth flow transition. Detailed modelling and design of road crossings such that erosion is controlled to be a feature of the detailed design. | |
| | Dissipate stormwater at all drainage outlets to velocities unlikely to cause erosion in natural soils for a 1 in 50-year storm event | | 22 | All drains | Dissipaters: At drain outlets widen the channel and use riprap (can be sourced from spoil during construction) or reno mattresses to dissipate stormwater flows | |
| | | | 23 | Road crossings | Dissipation at road crossings: Detailed modelling and design of road crossings including riprap (can potentially be sourced from spoil during construction) or reno-mattresses. | |
| | Prevent erosion in general | Throughout construction | 24 | All | Maintain natural topography and vegetation: Do not disturb the natural topography or vegetation where possible | Construction contractors' onsite environmental officer/representative |
| | Minimize erosion in large storm event of 1 in 5-years or greater | | 25 | All drains | Engineer low velocity temporary drains: Drains sloped and sized such that velocities do no exceed 1 m/s in a 1 in 5-year event | |
| | | Early in construction | 26 | Road crossings | Engineered temporary drifts: Build roads and road crossings before other infrastructure. | |
| | Ensure that any chronic erosion is detected and rehabilitated within 6 months | Every 3 months for the first 2 years and annually thereafter | 27 | • Drains;<br>• Outlet of all Drains; and<br>• All-natural drainage lines that cross the access road. | Inspect all focus areas for erosion. If erosion is found, remediate and redesign the drainage in the area. If erosion is found in a natural drainage line, conduct an assessment and determine the cause. Develop a plan to prevent future erosion. | Environmental manager or hydrologist/engineer/environmental scientist appointed by the environmental manager |
| | Ensure that any acute erosion due to large storm events is detected within 2 weeks. | Install prior to operation | 28 | Main office | Install a rain gauge that can measure greater than 150 mm. | Included in detailed designs of design engineer and carried out by contractor appointed for construction |
| | | After a rain event of greater than 150 mm in one day (a 10 year - 24-hour rain event) or when staff notice flood damage. | 29 | All-natural drainage lines that run through the site | Inspect and remediate acute erosion: Inspect all focus areas for erosion. If erosion is found remediate and redesign the drainage in the area. If erosion is found in a natural drainage line conduct and assessment and determine the cause and develop a plan to prevent future erosion. | Environmental manager or hydrologist/engineer/environmental scientist appointed by the environmental manager |

| General Principle | Specific Outcomes | When | Ref No. | Focus Area | Action | Responsible Party |
|---|---|---|---|---|---|---|
| | | Design and development prior to operation | 30 | All | Set up rain data system: Build or buy a basic rain program, preferably electronic, that allows site staff to enter rain data from the rain gauge. Ideally the system should let the environmental manager and site manager when a rainfall event more than 150 mm. | |
| | | Daily | 31 | Main office | Record rain data: Read and record rain gauge daily; | Onsite staff member tasked by the Environmental manager |
| | | Update annually in case of staff change | 32 | | Signs at main office to aid problem reporting: Ensure that a sign providing the following is posed in the reception area, the control room, on each transformer and in the workshop:<br>The name, telephone number and email address of the environmental manager. The sign should state: “If you notice any leaks or spills or erosion anywhere on the property please contact the Environmental Manager by one of these methods...” | Environmental manager |
| | Training | Annually | 33 | All | Training: Provide a short briefing to all construction staff on the dynamics of erosion and leaks that covers at least:<br>• How to identify erosion;<br>• How to identify a leak, including car leaks; and<br>• Where to find contact details of the environmental officer/representative in case of leaks or erosion. | Environmental manager or hydrologist/engineer/environmental scientist appointed by the environmental manager |
| | Ensure that any erosion is detected and rehabilitated | After rain events | 34 | | Inspect the site for erosion after rain events. If erosion is found, remediate and redesign the drainage in the area. If erosion is found in a natural drainage line, conduct an assessment to determine the cause and develop a plan to prevent future erosion. | Contractors’ environmental officer/representative |
| | | During site establishment | 35 | | Install a rain gauge that can measure greater than 150 mm. This rain gauge will also be used during operation. | |
| Monitor and manage stormwater system | Include a monitoring system for spills and leaks such that they are detected as soon as possible. | Once every 2 weeks during Construction | 36 | All | Leak inspection: regularly check for leaks and for any breaches or evidence of spills or any other problems not in adherence to this SWMP. All cars should also be checked for oil leaks and any leaks found should be stopped immediately, the cause of the leak identified, the problem remediated such that no further leaks occur, and any contaminated soil or water assessed and remediated. | Contractors’ environmental officer/representative |
| | Include a monitoring system for spills and leaks such that they are detected as soon as possible. | Every 3 months for the first 2 years and annually thereafter (Operation) | 37 | | Leak inspection: regularly check for leaks and for any breaches or evidence of spills or any other problems that would indicate that it is not in adherence to this plan. All cars should also be checked for oil leaks during the inspection. Any leaks found should be stopped immediately, the cause of the leak sought, the problem remediated such that no further leaks occur, and any contaminated soil or water assessed and remediated. | Environmental manager or hydrologist/engineer/environmental scientist appointed by the environmental manager |
| | | Continuous | 38 | | Data capture, training and signs: see 32, 33, 34, 35, 36, & 37 | Environmental manager and staff in general |
| | | Construct prior to operation | 39 | The sewage conservancy tank | Sewage conservancy tank alert system: Install a float switch-controlled alarm that will alert the control room when the conservancy tank has less than 2 weeks of capacity remaining. | Included in detailed designs of design engineer and carried out by contractor appointed for construction |
| | | | 40 | Transformers | Signs at transformers: Post a sign on transformers stating “If you notice any leaks or spills or erosion anywhere on the property, please contact reception via one of the following methods ……and report it” | |
| General | Do not build infrastructure within near to watercourses | Detailed design | 41 | All | Ensure no infrastructure except roads with appropriate hydraulic infrastructure are built within 300 m of a water course. In particular, ensure no dirty areas, that may contain pollutants, are within 300 m of the water course | Design engineer or engineer appointed by the design engineer |
| | Do not build infrastructure containing potential pollutants in any of the natural drainage lines. | | 42 | | Ensure that final infrastructure plans do not propose any potentially polluting infrastructure, such as transformers, workshops or conservancy tanks in the natural drainage lines (currently none are proposed) | |

| General Principle | Specific Outcomes | When | Ref No. | Focus Area | Action | Responsible Party |
|---|---|---|---|---|---|---|
| | Review and improve stormwater management plan regularly. | Once every 5 years | 43 | | Review and improve the stormwater plan | Environmental manager or engineer appointed by the environmental manager |
| | Review and inspect | Once every 2 months during construction depending on schedule | 44 | | Inspect the site to ensure adherence to the stormwater management plan | Clients' environmental representative or engineer |
| | Do not place stockpiles or other potentially polluting construction items within 300 m of the watercourse | Detailed design and throughout construction | 45 | | Do not place laydown areas, stockpiles within 300 m of the watercourse | Design engineer or engineer appointed by the design engineer |
| | General | Detailed design | 46 | | Develop a specific environmental specification for any construction including, but not limited to, the actions in this stormwater management plan and its principles | Clients' environmental representative or specialist |
| | Prepare for spills | Construction and Operation | 47 | | Procure spill kits and place in areas where fuel or oils are transferred (e.g. workshops) | Environmental manager |

# 9 Conclusion and Recommendations

A specialist surface water study was carried by SRK to support the EA application for the Aberdeen Wind Facility 1 development in the Eastern Cape province. It was found that the layout of the wind facility consists of discrete points where the turbines are erected, interconnected by linear infrastructure (access roads), as well as minor auxiliary buildings and substations. The development is spread over a large area of approximately 9 210 ha meaning that the gross surface area occupied by the components mentioned is small in comparison to the footprint of the wind facility (estimated to be less than 2 %). As hydrology is controlled by sub-catchment surface area characteristics, and the alteration of the surface characteristics is minimal (less than 2 % area modified), it can be concluded that the net impact of the development on hydrology is minor. However, local management of surface runoff is required at the turbine positions (turbine foundation and adjacent hardstand) and along the roads. Interventions to avoid, manage and mitigate potential impacts during both the construction phase and the operational phase are specified in Section 8: SWMP. It was found that the most impacts and risk to surface water resources occurs during the construction phase at the excavation for the turbine foundation.

It is recommended that the proposed activity and all associated infrastructure be authorised as it has been found that surface water impacts resulting from the activity are minimal and within an acceptable level of change. These impacts are summarised below:

- Level of change to runoff regime is minimal, i.e., frequency and magnitude of peak discharges from sub-catchments is not expected to be changed and baseflow is not expected to be impacted;
- Erosion and sedimentation is a risk at the locations of the wind turbines and along the access roads and thus would only occur a localised points which can be prevented;
- As all turbines are positioned at high elevations, it is unlikely that their zone of influence will extend to the watercourses within the site footprint;
- It was found that no turbines are positioned within watercourses and therefore no risk of impact to the riverbeds or banks exists; and
- The only constituent of concern that may pollute waterways is suspended solids from disturbed soils. These solids can be managed and allowed to settle out of surface runoff prior to release to the environment. Therefore, the resultant impact on surface water quality will be negligible.

As well as the impacts being minimal, all impacts can be avoided, managed, and mitigated by implementing the SWMP presented in this report. In order to achieve this, all SWMP interventions should be included in the EMPr (not repeated here).

It is recommended that the SWMP be developed further during the Detailed Design by:

- Conducting a detailed topographic survey;
- Developing a stormwater layout and designs based on the above information and infrastructure layout plan;
- Sizing the culverts or drifts associated with the proposed road crossings such that they can handle at least the 1:2-year flood event, or a minimum of 600 mm diameter or height (for maintenance purposes);
- Developing conceptual designs into detailed designs with sufficient detail to support construction; and
- The plan should be incorporated into an environmental specification for use during construction and incorporated into the operational environmental management of the site.

In conclusion:

- The proposed facility will have an intrinsically low impact on surface water resources;
- The potential stormwater impacts that do exist can be managed in a practical and cost-effective way; and
- The plan is conceptual, because no detailed contour data is available and only conceptual infrastructure layouts were made available at the time of the study – that said, moderate to low rainfall and low flow gradients characteristic of the area suggest that detailed design should not vary considerably from the concepts presented in this report.

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All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

# Appendices

# Appendix A: Specialist CVs

# Appendix B: Specialist Declaration

# Appendix C: Checklist for Appendix 6 of GN 326 EIA Regulations (2017) – Specialist Reports

| Requirements from Appendix 6 of GN 326 EIA Regulation 2017 | Chapter |
|---|---|
| (a) Details of -<br>(i) The specialist who prepare the report; and<br>(ii) The expertise of that specialist to compile a specialist report including a curriculum vitae. | Appendix A |
| (b) A declaration that the specialist is independent in a form as may be specified by the competent authority. | Appendix B |
| (c) An indication of the scope of, and purpose for which, the report was prepared. | Section 1. |
| (cA) An indication of the quality and age of base data used for the specialist report. | Section 2. and 4. |
| (cB) A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change. | Section 8. |
| (d) The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment. | Section 2. |
| (e) A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used. | Section 2. |
| (f) Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives. | Section 3 and 4. |
| (g) An identification of any areas to be avoided, including buffers. | Section 4. |
| (h) A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers. | Section 4. |
| (i) A description of any assumptions made and uncertainties or gaps in knowledge. | Section 1. |
| (j) A description of the findings and potential implications of such findings on the impact of the proposed activity or activities. | Section 8. |
| (k) Any mitigation measures for inclusion in the EMPr. | Section 8. |
| (l) Any conditions for inclusion in the environmental authorisation. | Section 8. |
| (m) Any monitoring requirements for inclusion in the EMPr or environmental authorisation. | Section 7. |
| (n) A reasoned opinion –<br>(i) as to whether the proposed activity, activities or portions thereof should be authorised.<br>(iA) regarding the acceptability of the proposed activity or activities; and<br>(ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management, and mitigation measures that should be included in the EMPr, and where applicable, the closure plan. | Section 9. |
| *(o) Description of any consultation process that was undertaken during preparing the specialist report* | *None required.* |
| *(p) A summary and copies of any comments received during any consultation process and where applicable all responses thereto* | *None required.* |
| *(q) Any other information requested by the competent authority* | *None required.* |

# APPENDIX H:
# WASTE MANAGEMENT PLAN

# WASTE MANAGEMENT PLAN

## 1. PURPOSE

A Waste Management Plan (WMP) plays a key role in achieving sustainable waste management throughout all phases of the project. The plan prescribes measures for the collection, temporary storage and safe disposal of the various waste streams associated with the project and includes provisions for the recovery, re-use and recycling of waste. The purpose of this plan is therefore to ensure that effective procedures are implemented for the handling, storage, transportation and disposal of waste generated from the project activities on site.

This WMP has been compiled as part of the project EMPr and is based on waste stream information available at the time of compilation. Construction and operation activities must be assessed on an ongoing basis in order to determine the efficacy of the plan and whether further revision of the plan is required. This plan should be updated should further detail regarding waste quantities and categorisation become available, during the construction and/or operation stages.

## 2. RELEVANT ASPECTS OF THE SITE

It is expected that the development of the Aberdeen Wind Facility 1 will generate construction solid waste, general waste and hazardous waste during the lifetime of the wind energy facility.

Waste generated on site, originates from various sources, including but not limited to:

- Concrete waste generated from spoil and excess concrete.
- Contaminated water, soil, rocks and vegetation due to hydrocarbon spills.
- Hazardous waste from vehicle, equipment and machinery parts and servicing, fluorescent tubes, used hydrocarbon containers, and waste ink cartridges.
- Recyclable waste in the form of paper, glass, steel, aluminium, wood/ wood pallets, plastic (PET bottles, PVC, LDPE) and cardboard.
- Organic waste from food waste as well as alien and endemic vegetation removal.
- Sewage from portable toilets and septic tanks.
- Inert waste from spoil material from site clearance and trenching works.

## 3. LEGISLATIVE REQUIREMENTS

Waste in South Africa is currently governed by several regulations, including:

- National Environmental Management: Waste Act (NEM:WA), 2008 (Act 59 of 2008);
- National Environmental Management: Waste Amendment Act, 2014 (Act 26 of 2014);
- The South African Constitution (Act 108 of 1996);
- Hazardous Substances Act (Act 5 of 1973);
- Health Act (Act 63 of 1977);
- Environment Conservation Act (Act 73 of 1989);
- Occupational Health and Safety Act (Act 85 of 1993);
- National Water Act (Act 36 of 1998);
- The National Environmental Management Act (Act 107 of 1998) (as amended);

- Municipal Structures Act (Act 117 of 1998);
- Municipal Systems Act (Act 32 of 2000);
- Mineral and Petroleum Resources Development Act (Act 28 of 2002); and
- Air Quality Act (Act 39 of 2004).

Storage of waste must be conducted in accordance with the National Norms and Standards for the Storage of Waste, published in GNR 926.

## 4. WASTE MANAGEMENT PRINCIPLES

An integrated approach to waste management is needed on site. Such an approach is illustrated in **Figure 1**.

It is important to ensure that waste is managed with the following objectives in mind during all phases of the project:

- Reducing volumes of waste is the greatest priority;
- If reduction is not feasible, the maximum amount of waste is to be recycled; and
- Waste that cannot be recycled is to be disposed of in the most environmentally responsible manner.

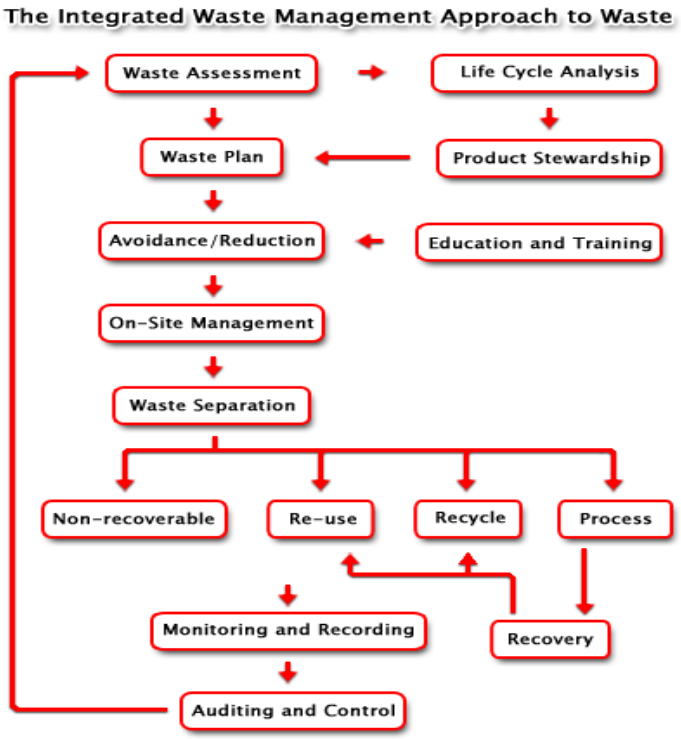


**Figure 1: Integrated Waste Management Flow Diagram**
(Source: http://www.enviroserv.co.za/pages/content.asp?SectionId=496)

## 4.1. Construction phase

A plan for the management of waste during the construction phase is detailed below. A Method Statement detailing specific waste management practices during construction should be prepared by the Contractor prior to the commencement of construction, for approval by the Resident Engineer and/or ECO.

### *4.1.1. Waste Assessment / Inventory*

- The Environmental Officer (EO), or designated staff member, must develop, implement and maintain a waste inventory reflecting all waste generated during construction for both general and hazardous waste streams.
- Construction methods and materials should be carefully considered in view of waste reduction, re-use, and recycling opportunities, to be pro-actively implemented.
- Once a waste inventory has been established, targets for the recovery of waste (minimisation, re-use, recycling) should be set.
- The EO must conduct waste classification and rating in terms of SANS 10288 and Government Notice 634 published under the NEM: WA.

### *4.1.2. Waste collection, handling and storage*

- It is the responsibility of the EO to ensure that each subcontractor implements their own waste recycling system, i.e. separate bins for food waste, plastics, paper, wood, glass cardboard, metals, etc. Such practises must be made contractually binding upon appointment of the subcontractors.
- Waste manifests and waste acceptance approvals (i.e. receipts) from designated waste facilities must be kept on file at the site office, in order to record and prove continual compliance for future auditing.
- Septic tanks and portable toilets must be monitored by the EO or responsible subcontractor and maintained regularly. Below ground storage of septic tanks must withstand the external forces of the surrounding environment. The area above the tank must be demarcated to prevent any vehicles or heavy machinery from moving around in the surrounding area.
- Waste collection bins and hazardous waste containers must be provided by the principal contractor and subcontractors and placed at strategic locations around the site for the storage of organic, recyclable and hazardous waste.
- A dedicated waste area must be established on site for the storage of all waste streams before removal from site. The storage period must not trigger listed waste activities as per the NEMWA, GN 921 of November 2013.
- Signage/ colour coding must be used to differentiate disposal areas for the various waste streams (i.e. paper, cardboard, metals, food waste, glass etc.).
- Hazardous waste must be stored within a bunded area constructed according to SABS requirements, and must ensure complete containment of the spilled material in the event of a breach. As such, appropriate bunding material, design, capacity and type must be utilised to ensure that no contamination of the surrounding environment will occur despite a containment breach. The net capacity of a bunded compound in a storage facility should be at least 120% of the net capacity of the largest tank.
- Take into consideration the capacity displaced by other tanks within the same bunded area and any foundations.

- Treat interconnected tanks as a single tank of equivalent total volume for the purposes of the bund design criteria
- The location of all temporary waste storage areas must aim to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage, and vermin control, while being reasonably placed in terms of centrality and accessibility on site. Where required, an additional temporary waste storage area may be designated, provided identical controls are exercised for these locations.
- Waste storage shall be in accordance with all Regulations and best-practice guidelines and under no circumstances may waste be burnt on site.
- A dedicated waste management team must be appointed by the principal contractors' SHE Officer, who will be responsible for ensuring the continuous sorting of waste and maintenance of the area. The waste management team must be trained in all areas of waste management and monitored by the SHE Officer.
- All waste removed from site must be done by a registered/ licensed subcontractor, who must supply information regarding how waste recycling/ disposal will be achieved. The registered subcontractor must provide waste manifests for all removals at least once a month or for every disposal made, records of which must be kept on file at the site camp for the duration of the construction period.

### *4.1.3. Management of waste storage areas*

- The position of all waste storage areas must be located so as to ensure minimal degradation to the environment. The main waste storage area must have a suitable stormwater system separating clean and contaminated stormwater.
- Collection bins placed around the site and at subcontractors' camps (if at a different location than the main site camp) must be maintained and emptied on a regular basis by the principal contractor to avoid overflowing receptacles.
- Inspections and maintenance of the main waste storage area must be undertaken daily. Skips and storage containers must be clearly marked or colour coded and well-maintained. Monitor for rodents and take corrective action if they become a problem.
- Waste must be stored in designated containers and not on the ground.
- Inspections and maintenance of bunds must be undertaken regularly. Bunds must be inspected for leaks or cracks in the foundation and walls.
- It is assumed that any rainwater collected inside the bund is contaminated and must be treated by oil/water separation (or similar method) prior to dewatering, or removed and stored as hazardous waste, and not released into the environment.
- If any leaks occur in the bund, these must be removed immediately.
- Bund systems must be designed to avoid dewatering of contaminated water, but to rather separate oil and hydrocarbons from water prior to dewatering.
- Following rainfall event bunds must always be dewatered in order to maintain a sufficient storage capacity in the event of a breach.
- No mixing of hazardous and general waste is allowed.

### *4.1.4. Disposal*

- Waste generated on site must be removed on a regular basis. This frequency may change during construction depending on waste volumes generated at different stages of the construction process,

however removal must occur prior to the storage capacity being reached to avoid overflow of containers and poor waste storage.
» Waste must be removed by a suitably qualified contractor and disposed of at an appropriately licensed landfill site. Proof of appropriate disposal must be provided by the contractor to the EO and ECO.

### *4.1.5. Record keeping*

The success of the Waste Management Plan is determined by measuring criteria such as waste volumes, cost recovery from recycling and cost of disposal. Recorded data can indicate the effect of training and education, or the need for education. It will provide trends and benchmarks for setting goals and standards. It will provide clear evidence of the success or otherwise of the plan.

» Documentation (waste manifest, certificate of issue or safe disposal) must be kept detailing the quantity, nature, and fate of any regulated waste for audit purposes.
» Waste management must form part of the monthly reporting requirements in terms of volumes generated, types, storage and final disposal.

### *4.1.6. Training*

Training and awareness regarding waste management shall be provided to all employees and contractors as part of the toolbox talks or on-site awareness sessions with the EO and at the frequency as set out by the ECO.

## 4.2. Operation phase

It is expected that the operation phase will result in the production of limited amounts of general waste consisting mostly of cardboard, paper, plastic, tins, metals and a variety of synthetic compounds. Hazardous wastes (including grease, oils) will also be generated. All waste generated will be required to be temporarily stored at the facility in appropriate sealed containers prior to disposal at a permitted landfill site or other facilities.

The following waste management principles apply during the operation phase:

» The SHE Manager must develop, implement and maintain a waste inventory reflecting all waste generated during operation for both general and hazardous waste streams.
» Adequate waste collection bins at site must be supplied. Separate bins should be provided for general and hazardous waste.
» Recyclable waste must be removed from the waste stream and stored separately.
» All waste must be stored in appropriate temporary storage containers (separated between different operation wastes, and contaminated or wet waste).
» Waste storage shall be in accordance with all best-practice guidelines and under no circumstances may waste be burnt on site.
» Waste generated on site must be removed on a regular basis throughout the operation phase.
» Waste must be removed by a suitably qualified contractor and disposed at an appropriately licensed landfill site. Proof of appropriate disposal must be provided by the contractor and kept on site.

## 5. Monitoring of Waste Management Activities

Records must be kept of the volumes/ mass of the different waste streams that are collected from the site throughout the life of the project. The appointed waste contractor is to provide monthly reports to the operator containing the following information:

- Monthly volumes/ mass of the different waste streams collected;
- Monthly volumes/ mass of the waste that is disposed of at a landfill site;
- Monthly volumes/ mass of the waste that is recycled;
- Data illustrating progress compared to previous months.

This report will aid in monitoring the progress and relevance of the waste management procedures that are in place. If it is found that the implemented procedures are not as effective as required, this WMP is to be reviewed and amended accordingly. This report must from part of the EO's reports to the ECO on a monthly basis.

# APPENDIX I:
# EMERGENCY PREPARDENESS, RESPONSE AND FIRE MANAGEMENT PLAN

# EMERGENCY PREPAREDNESS, RESPONSE AND FIRE MANAGEMENT PLAN

## 1. PURPOSE

The purpose of the Emergency Preparedness and Response Plan is:

- To assist contractor personnel to prepare for and respond quickly and safely to emergency incidents, and to establish a state of readiness which will enable prompt and effective responses to possible events.
- To control or limit any effect that an emergency or potential emergency may have on site or on neighbouring areas.
- To facilitate emergency responses and to provide such assistance on the site as is appropriate to the occasion.
- To ensure communication of all vital information as soon as possible.
- To facilitate the reorganisation and reconstruction activities so that normal operations can be resumed.
- To provide for training so that a high level of preparedness can be continually maintained.

This plan outlines response actions for potential incidents of any size. It details response procedures that will minimise potential health and safety hazards, environmental damage, and clean-up efforts. The plan has been prepared to ensure quick access to all the information required in responding to an emergency event. The plan will enable an effective, comprehensive response to prevent injury or damage to the construction personnel, public, and environment during the project. Contractors are expected to comply with all procedures described in this document. A Method Statement should be prepared at the commencement of construction detailing how this plan is to be implemented as well as details of relevant responsible parties for the implementation. The method statement must also reflect conditions of the IFC Performance Standard 1 and include the following:

- Identification of areas where accidents and emergency situations may occur;
- Communities and individuals that may be impacted;
- Response procedure;
- Provisions of equipment and resources;
- Designation of responsibilities;
- Communication; and
- Periodic training to ensure effective response to potentially affected communities.

## 2. PROJECT-SPECIFIC DETAILS

Aberdeen Wind Facility 1 (Pty) Ltd, a Special Purpose Vehicle (SPV), proposes the development of a commercial wind energy facility and associated infrastructure, on a site located approximately 20km west of the town of Aberdeen in the Eastern Cape Province. The site is located within the Dr Beyers Naude Local Municipality in the greater Sarah Baartman District Municipality. The Aberdeen Wind Facility 1 will include a maximum of 41 wind turbines with a contracted capacity of up to 240MW and associated infrastructure to be constructed over an area of approximately 9800ha in extent, known as the project site.

Due to the scale and nature of this development, it is anticipated that the following risks could potentially arises during the construction and operation phases:

» Fires;
» Leakage of hazardous substances;
» Storage of flammable materials and substances;
» Flood events;
» Accidents; and
» Natural disasters.

## 3. EMERGENCY RESPONSE PLAN

There are three levels of emergency as follows:

» Local Emergency: An alert confined to a specific locality.
» Site Emergency: An alert that cannot be localised and which presents danger to other areas within the site boundary or outside the site boundary.
» Evacuation: An alert when all personnel are required to leave the affected area and assemble in a safe location.

If there is any doubt as to whether any hazardous situation constitutes an emergency, then it must be treated as an Evacuation.

Every effort must be made to control, reduce or stop the cause of any emergency provided it is safe to do so. For example, in the event of a fire, isolate the fuel supply and limit the propagation of the fire by cooling the adjacent areas. Then confine and extinguish the fire (where appropriate) making sure that re-ignition cannot occur.

### 3.1. Emergency Scenario Contingency Planning

#### *3.1.1. Scenario: Spill which would result in the contamination of land, surface or groundwater*

#### i. Spill Prevention Measures

Preventing spills must be the top priority at all operations which have the potential of endangering the environment. The responsibility to effectively prevent and mitigate any scenario lies with the Contractor and the ECO. In order to reduce the risk of spills and associated contamination, the following principles should be considered during construction and operation activities:

» All equipment refuelling, servicing and maintenance activities should only be undertaken within appropriately sealed/contained or bunded designated areas.
» All maintenance materials, oils, grease, lubricants, etc. should be stored in a designated area in an appropriate storage container.
» No refuelling, storage, servicing, or maintenance of equipment should take place within sensitive environmental resources in order to reduce the risk of contamination by spills.
» No refuelling or servicing should be undertaken without absorbent material or drip pans properly placed to contain spilled fuel.

- Any fluids drained from the machinery during servicing should be collected in leak-proof containers and taken to an appropriate disposal or recycling facility.
- If these activities result in damage or accumulation of product on the soil, the contaminated soil must be disposed of as hazardous waste. Under no circumstances shall contaminated soil be added to a spoils pile and transported to a regular disposal site.
- Chemical toilets used during construction must be regularly cleaned. Chemicals used in toilets are also hazardous to the environment and must be controlled. Portable chemical toilets could overflow if not pumped regularly or they could spill if dropped or overturned during moving. Care and due diligence should be taken at all times.
- Contact details of emergency services and HazMat Response Contractors are to be clearly displayed on the site. All staff are to be made aware of these details and must be familiar with the procedures for notification in the event of an emergency.

**ii. Procedures**

The following action plan is proposed in the event of a spill:

1. Spill or release identified.
2. Assess person safety, safety of others and environment.
3. Stop the spill if safely possible.
4. Contain the spill to limit entering surrounding areas.
5. Identify the substance spilled.
6. Quantify the spill (under or over guideline/threshold levels).
7. Notify the Site Manager and emergency response crew and authorities (in the event of major spill).
8. Inform users (and downstream users) of the potential risk.
9. Clean up of the spill using spill kit or by HazMat team.
10. Record of the spill incident on company database.

***a) Procedures for containing and controlling the spill (i.e. on land or in water)***

Measures can be taken to prepare for quick and effective containment of any potential spills. Each contractor must keep sufficient supplies of spill containment equipment at the construction sites, at all times during and after the construction phase. These should include specialised spill kits or spill containment equipment. Other spill containment measures include using drip pans underneath vehicles and equipment every time refuelling, servicing, or maintenance activities are undertaken.

Specific spill containment methods for land and water contamination are outlined below.

**Containment of Spills on Land**

Spills on land include spills on rock, gravel, soil and/or vegetation. It is important to note that soil is a natural sorbent, and therefore spills on soil are generally less serious than spills on water as contaminated soil can be more easily recovered. It is important that all measures be undertaken to avoid spills reaching open water bodies. The following methods could be used:

- *Dykes* - Dykes can be created using soil surrounding a spill on land. These dykes are constructed around the perimeter or down slope of the spilled substance. A dyke needs to be built up to a size that will

ensure containment of the maximum quantity of contaminant that may reach it. A plastic tarp can be placed on and at the base of the dyke such that the contaminant can pool up and subsequently be removed with sorbent materials or by pump into barrels or bags. If the spill is migrating very slowly, a dyke may not be necessary and sorbents can be used to soak up contaminants before they migrate away from the source of the spill.

» *Trenches* - Trenches can be dug out to contain spills. Spades, pick axes or a front-end loader can be used depending on the size of the trench required. Spilled substances can then be recovered using a pump or sorbent materials.

***b) Procedures for transferring, storing, and managing spill related wastes***

Used sorbent materials are to be placed in plastic bags for future disposal. All materials mentioned in this section are to be available in the spill kits. Following clean up, any tools or equipment used must be properly washed and decontaminated, or replaced if this is not possible.

Spilled substances and materials used for containment must be placed into empty waste oil containers and sealed for proper disposal at an approved disposal facility.

***c) Procedures for restoring affected areas***

Criteria that may be considered include natural biodegradation of oil, replacement of soil and revegetation. Once a spill of reportable size has been contained, the ECO and the relevant Authority must be consulted to confirm that the appropriate clean up levels are met.

### *3.1.2. Scenario: Fire (and fire water handling)*

#### i. Action Plan

The following action plan is proposed in the event of a fire:

1. Quantify risk.
2. Assess person safety, safety of others and environment.
3. If safe – attempt to extinguish the fire using appropriate equipment.
4. If not safe to extinguish, contain fire.
5. Notify Site Manager and emergency response crew and authorities.
6. Inform users of the potential risk of fire.
7. Record the incident on the company database or filing register.

#### ii. Procedures

Because large scale fires may spread very fast in the environment it is most advisable that the employee/contractor not put his/her life in danger in the case of an uncontrolled fire.

Portable firefighting equipment must be provided at strategic locations throughout the site, in line with the Building Code of South Africa and the relevant provincial building code. All emergency equipment including portable

fire extinguisher, hose reels and hydrants must be maintained and inspected by a qualified contractor in accordance with the relevant legislation and national standards.

Current evacuation signs and diagrams for the building or site that are compliant to relevant state legislation must be provided in a conspicuous position, on each evacuation route. Contact details for the relevant emergency services should be clearly displayed on site and all employees should be aware of procedures to follow in the case of an emergency.

***a) Procedures for initial actions***

Persons should not fight the fire if any of the following conditions exist:

» They have not been trained or instructed in the use of a fire extinguisher.
» They do not know what is burning.
» The fire is spreading rapidly.
» They do not have the proper equipment.
» They cannot do so without a means of escape.
» They may inhale toxic smoke.

***b) Reporting procedures***

In terms of the requirements of NEMA, the responsible person must, within 14 days of the incident, report to the Director General, provincial head of department and municipality.

» Report fire immediately to the site manager, who will determine if it is to be reported to the relevant emergency services and authorities.
» The site manager must have copies of the Report form to be completed.

**SUMMARY: RESPONSE PROCEDURE**

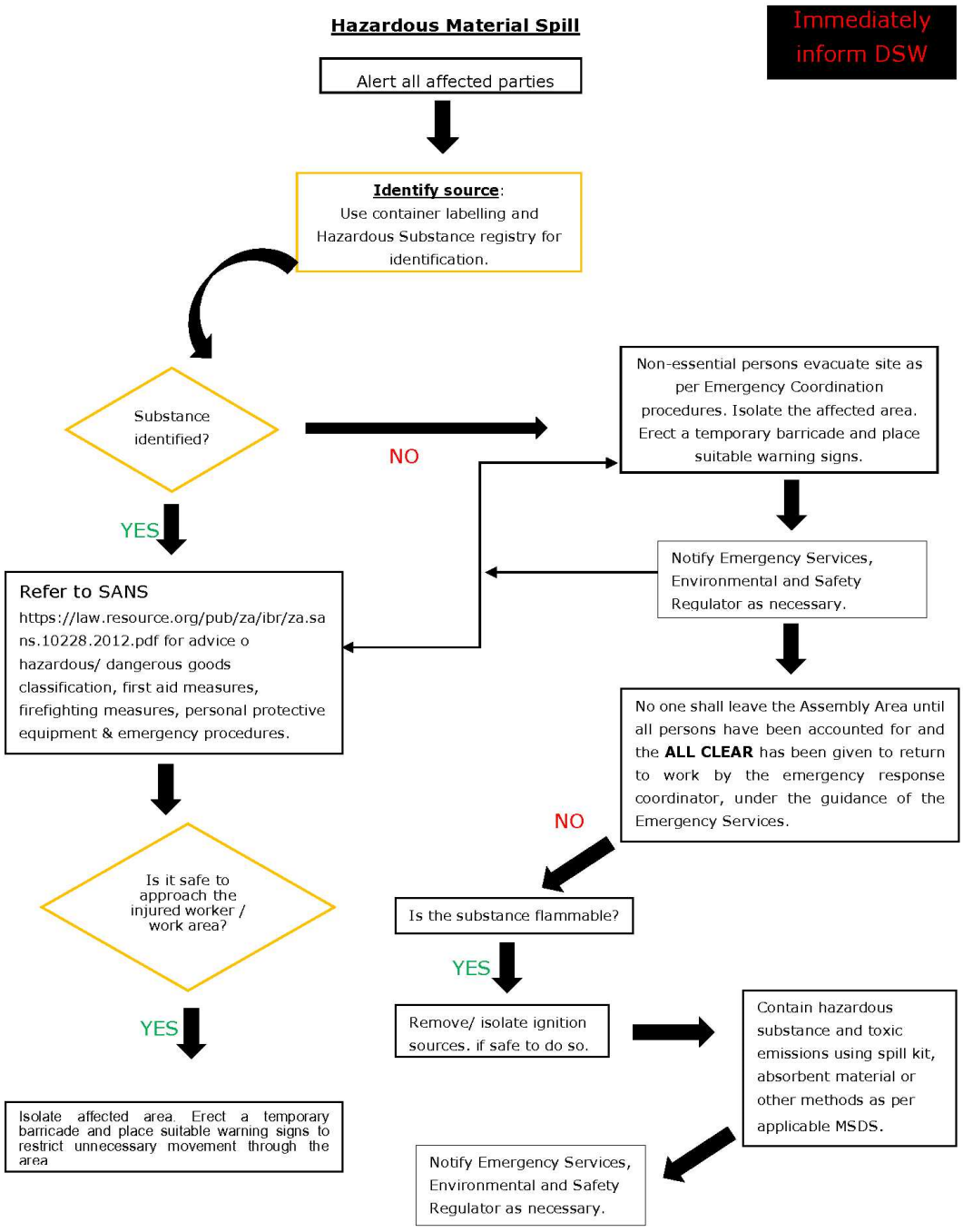


**Figure 1:** Hazardous Material Spill

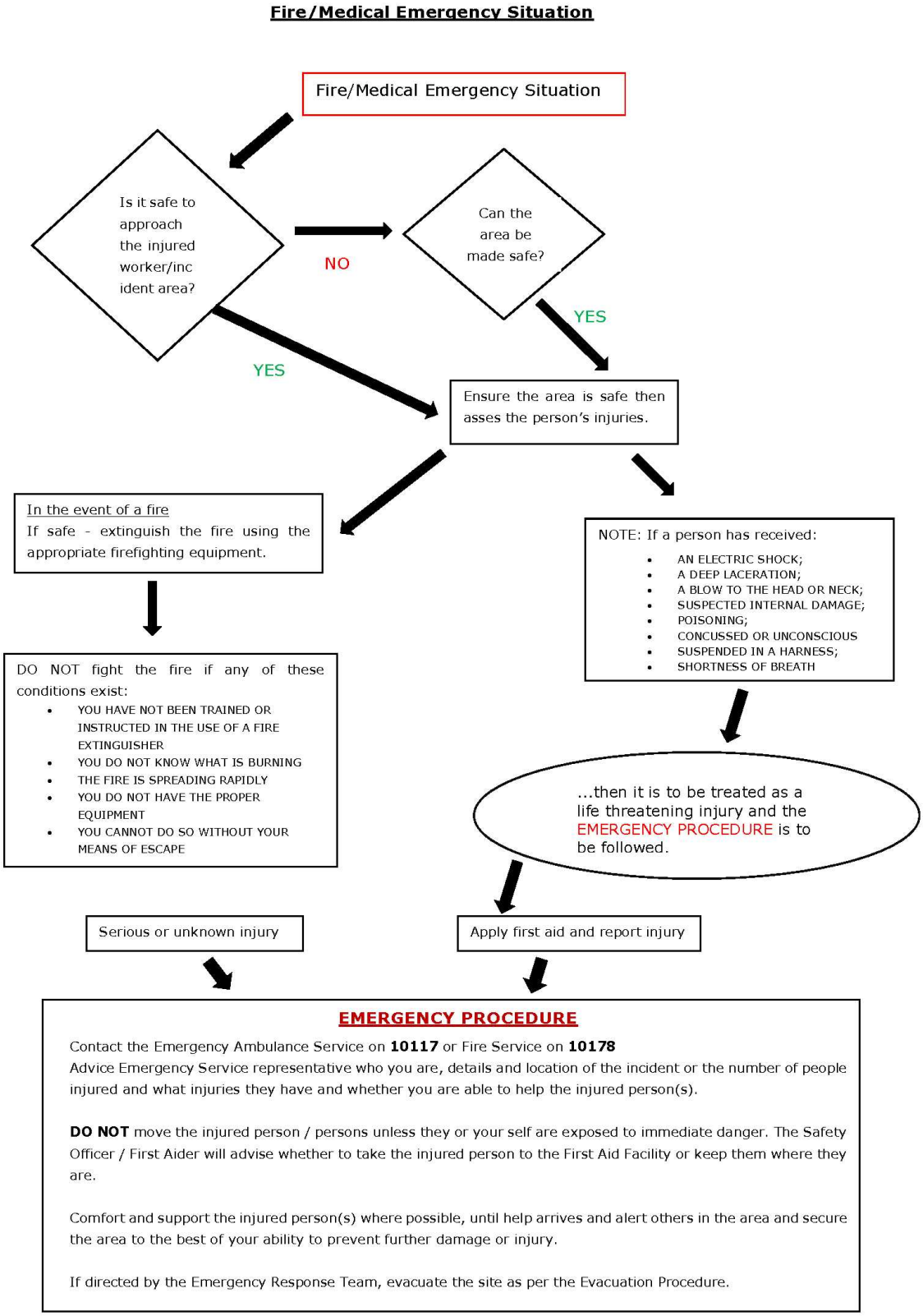


**Figure 2:** Emergency Fire/Medical

## 4. PROCEDURE RESPONSIBILITY

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.

The local authorities will provide their assistance when deemed necessary, or when it has been requested and/or indicated in Section 30 (8) of NEMA. The provincial authority will provide assistance and guidance where required and conduct awareness programmes.

# APPENDIX J:
# CURRICULCUM VITAE OF THE PROJECT TEAM

savannah environmental

1st Floor, Block 2, 5 Woodlands Drive Office Park
Woodlands Drive, Woodmead
Johannesburg, South Africa

Email: joanne@savannahsa.com
Tel: +27 (11) 656 3237

# CURRICULUM VITAE OF KAREN JODAS

| | |
|---|---|
| **Profession:** | Environmental Management and Compliance Consultant; Environmental Assessment Practitioner.<br>Professional Natural Scientist: Environmental Science since 1999. |
| **Specialisation:** | Strategic environmental assessment and advice; development of plans and guidelines; environmental compliance advise and monitoring; Environmental Impact Assessment; environmental management; project management and co-ordination of environmental projects; peer review; policy, strategy and guideline formulation; renewable energy projects; water resources management. |
| **Years work experience:** | 25 years (in the field since 1997) |

## VOCATIONAL EXPERIENCE

Provide technical input for projects in the environmental management field, specialising in strategic evaluation, Environmental Impact Assessment studies, environmental management plans, programmes and guidelines, integrated environmental management, environmental compliance monitoring; peer review of EIA reports and processes, strategy and guideline development, and public participation. Key focus on overall Project Management, integration of environmental studies and environmental processes into larger engineering-based projects, strategic assessment, and the identification of environmental management solutions and mitigation/risk minimising measures.

Excellent working knowledge of environmental legislation, strategies, guidelines and policies. Compilation of the reports for environmental studies are in accordance with the all relevant environmental legislation under the National Environmental Management Act. Due consideration of Equator Principles and compliance with IFC performance standards is now a part of all projects.

## SKILLS BASE AND CORE COMPETENCIES

Provide technical input for projects in the environmental management field, specialising in strategic evaluation, Environmental Impact Assessment studies, environmental management plans, programmes and guidelines, integrated environmental management, environmental compliance monitoring; peer review of EIA reports and processes, strategy and guideline development, and public participation. Key focus on overall Project Management, integration of environmental studies and environmental processes into larger engineering-based projects, strategic assessment, and the identification of environmental management solutions and mitigation/risk minimising measures.
Excellent working knowledge of environmental legislation, strategies, guidelines and policies. Compilation of the reports for environmental studies are in accordance with the all relevant environmental legislation under the National Environmental Management Act. Due consideration of Equator Principles and compliance with IFC performance standards is now a part of all projects.

## SKILLS BASE AND CORE COMPETENCIES

- Twenty five years (25) of experience in the environmental management, environmental permitting, impact assessment and compliance fields
- Twenty three (23) years of experience in Project Management of large environmental assessment and environmental management projects
- Strategic and compliance advise for all aspects of environmental assessment and management

- Wide range of experience for public and private sector projects
- Key experience in the assessment of impacts associated with renewable energy projects
- Experienced in assessments for both linear developments and nodal developments
- Experienced consultant in projects in Sub-Saharan Africa
- Experienced in environmental compliance advice, monitoring and reporting for construction and operation projects
- Due diligence auditing and reporting
- External and peer review of environmental assessment and compliance reporting as well as EIA processes
- Working knowledge of environmental planning policies, regulatory frameworks and legislation
- Input and review of Environmental Management Plans and Programmes, including Invasive Species Monitoring, Control and Eradication Plans
- Identification and assessment of potential environmental impacts and benefits
- Development of practical and achievable mitigation measures and management plans and evaluation of risk to project execution
- Compilation and review of the reports in accordance with all relevant environmental legislation
- Public participation/involvement and stakeholder consultation
- Environmental strategy, policy and guidelines development.

## EDUCATION AND PROFESSIONAL STATUS

**Degrees:**

- B.Sc Earth Sciences, majoring in Geography and Zoology, Rhodes University, Grahamstown, 1993
- B.Sc Honours in Geography (in Environmental Water Management), Rhodes University, Grahamstown, 1994. Major subjects included Water Resources Management, Streams Ecology, Fluvial Geomorphology and Geographic Information Systems.
- M.Sc in Geography (Geomorphology), Rhodes University, Grahamstown, 1996

**Short Courses:**

- Environmental and Social Risk Management (ESRM), International Finance Corporation, 2018
- Integrated Water Resource Management, the National Water Act, and Water Use Authorisations, CSBSS, 2017
- WindFarmer Wind Farm Design course, Garrad Hassan, 2009
- Environmental Law Course, Aldo Leopold Institute, 2002
- Water Quality Management, Potchefstroom University, 1998

**Professional Society Affiliations:**

- Registered EAP with the Environmental Assessment Practitioners Association of South Africa (EAPASA) (2022/5499)
- Registered with the South African Council for Natural Scientific Professions as a Professional Natural Scientist: Environmental Science (400106/99)
- Registered with the International Associated for Impact Assessment South Africa (IAIAsa): 5888

**Other Relevant Skills:**

- Xtrack Extreme – Advanced Off-Road Driving Course

## EMPLOYMENT

| Date | Company | Roles and Responsibilities |
|---|---|---|
| **2006 - Current:** | Savannah Environmental (Pty) Ltd | Director<br>*Independent specialist environmental consultant, Environmental Assessment Practitioner (EAP) and advisor*<br>Tasks include:<br>• *Project management.* |

| Date | Company | Roles and Responsibilities |
|---|---|---|
| | | • *Environmental screening assessments, environmental permitting and environmental authorisation applications.*<br>• *Due Diligence reporting*<br>• *Water use authorisation applications on the e-WULAA system.*<br>• *EA amendment applications.*<br>• *Environmental compliance audits.*<br>• *Efficient and quality reporting in line with the requirements of the National Environmental Management Act, EIA Regulations, and other relevant environmental legislation.*<br>• *Execution of the public participation process.*<br>• *Professional client liaison.* |
| **1997 – 2005:** | Bohlweki Environmental (Pty) Ltd (later known as Royal Haskoning DHV; or RHDHV) | Associate<br>*Environmental Management Unit: Manager; Principle Environmental Scientist focussing on Environmental Management and Project Management* |

**PROJECT EXPERIENCE**

Proven track record of successfully consulting on a range of development projects in all nine Provinces of South Africa, as well as in neighbouring southern African countries.

Her experience includes projects in the energy generation and transmission sector, as well as wastewater treatment facilities, mining and prospecting activities, property development, national roads, as well as strategy and guidelines development.

Karen Jodas has played a significant role in the energy sector since 2007, specifically in the roll-out of renewable energy projects throughout southern Africa. She has provided consulting services to over 400 renewable and baseload energy applications submitted by Independent Power Producers (IPPs) to the Department of Forestry, Fisheries and the Environment in South Africa for authorisation, as well as to Eskom on their renewable energy and gas-to-energy projects. In addition, she has concluded the environmental permitting and/or due diligence auditing for the development and implementation of 42 projects selected as preferred bidders by the Department of Energy under the Renewable Energy Independent Power Producers Procurement (REIPPP) Programme (small- and large-scale projects).

**GRID INFRASTRUCTURE PROJECTS**

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

| Project Name & Location | Client Name | Role |
|---|---|---|
| Kyalami/Midrand Substation and 3 Transmission Lines, Gauteng | Eskom Transmission | Project Manager & EAP |
| Steelpoort Integration Project, Limpopo | Eskom Transmission | Project Manager & EAP |

***Basic Assessments***

| Project Name & Location | Client Name | Role |
|---|---|---|
| Amakhala Emoyeni Power Line & Kopleegte Substation, Eastern Cape | Cennergi | Project Manager & EAP |
| Bon Espirange Substation & Overhead Power Line for the Roggeveld Wind Farm, Northern Cape | Building Energy (G7 Renewable Energies) | Project Manager & EAP |
| Castle WEF Powerline, Northern Cape | Juwi Renewable Energies | Project Manager & EAP |
| Cuprum-Burchell; Burchell-Mooidraai Power Line, Nothern Cape | Eskom | Project Manager & EAP |

| | | |
|---|---|---|
| Expansion of the Komsberg Main Transmission Substation, Northern Cape | Enel Green Power | Project Manager & EAP |
| Garob-Kronos Power Line, Northern Cape | Juwi Renewable Energies | Project Manager & EAP |
| Golden Valley Dx-Poseidon Power Line Substation & Golden Valley-Kopleegte Power Line, Eastern Cape | BioTherm Energy | Project Manager & EAP |
| Gunstfontein Switching Station, Power Line & Ancillary Infrastructure, Northern Cape | African Clean Energy Developments (ACED) | Project Manager & EAP |
| Ilanga Lethemba-Hydra, Northern Cape | Solar Capital | Project Manager & EAP |
| Iziduli Emoyeni WEF on-site substation, Power Line & Switching station, Access Roads & Watercourse Crossings, Eastern Cape | Windlab | Project Manager & EAP |
| Khai-Ma WEF Power Line, Northern Cape | Mainstream Renewable | Project Manager & EAP |
| Korana WEF Power Line, Northern Cape | Mainstream Renewable | Project Manager & EAP |
| Korana SEF Power Line, Northern Cape | Mainstream Renewable | Project Manager & EAP |
| Nobelsfontein WEF Power Line & Substation, Northern Cape | Coria / SARGE | Project Manager & EAP |
| Nojoli WEF Substation & Power Line Grid Connection, Eastern Cape | African Clean Energy Developments (ACED) | Project Manager & EAP |
| Olifantshoek Substation & Powerline, Northern Cape | Eskom Holdings | Project Manager & EAP |
| Poortjies WEF Power Line, Northern Cape | Mainstream Renewable | Project Manager & EAP |
| Power Line & Substation for the Blackwood WEF, Northern Cape | VentuSA Energy | Project Manager & EAP |
| Power Line & Substation for the Khobab WEF in Loeriesfontein, Northern Cape | Mainstream Renewable | Project Manager & EAP |
| Power Line Connecting the Sishen SEF to the Ferrum MTS-UMTU Klip Kop Power Line, Northern Cape | Acciona (Windfall 59 Properties) | Project Manager & EAP |
| Power Line for the Grid Connection of the 2 SEF's near Kath and Dibeng, Northern Cape | VentuSA Energy | Project Manager & EAP |
| Power Line for the Rheboksfontein WEF, Western Cape | Moyeng Energy | Project Manager & EAP |
| Power Line from Aggeneys Solar One to Aggeneis MTS Substation, Northern Cape | BlueWave | Project Manager & EAP |
| Re-alignment of 3 Eskom Power Line Servitudes within the Hopefield WEF, Western Cape | Umoya Energy | Project Manager & EAP |
| Re-alignment of the Power Line & Watercourse Crossings for the Loeriesfontein 2 WEF, Northern Cape | Mainstream Renewable | Project Manager & EAP |
| Re-alignment of the Power Line from Loeriesfontein 1 WEF to the Helios Substation, Northern Cape | Mainstream Renewable | Project Manager & EAP |
| Re-alignment of the Power Line from Loeriesfontein 3 WEF to the Helios Substation, Northern Cape | Mainstream Renewable | Project Manager & EAP |
| Substation for the Aggeneys PV SEF, Northern Cape | BioTherm Energy | Project Manager & EAP |
| Substation, Power Line & Watercourse Crossings for the Springfontein WEF, Free State | Mainstream Renewable | Project Manager & EAP |
| Wesley-Peddie (Riverbank Phase 2) Power Line for the Uncedo Lwethu WEF, Eastern Cape | Just Energy | Project Manager & EAP |

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

| **Project Name & Location** | **Client Name** | **Role** |
|---|---|---|
| EO for the construction of the Neptune-Vuyani Transmission Line, Western Cape | Trans-Africa Projects on behalf of Eskom | Project Manager |

**RENEWABLE POWER GENERATION PROJECTS: PHOTOVOLTAIC SOLAR ENERGY FACILITIES**

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

| Project Name & Location | Client Name | Role |
|---|---|---|
| Aggeneys PV Plant, Northern Cape | Solar Capital | Project Manager & EAP |
| Blackwood PV SEF, Free State | VentuSA Energy | Project Manager & EAP |
| Bloemsmond PV 1 & PV 2 SEF's, Northern Cape | Atlantic Energy Partners | Project Manager & EAP |
| Bosjesmansberg PV SEF, Northern Cape | Networx | Project Manager & EAP |
| Boundary PV SEF, Northern Cape | VentuSA Energy | Project Manager & EAP |
| Buffels PV 1 & PV 2 SEF's, North West | Kabi Energy | Project Manager & EAP |
| De Aar PV SEF, Northern Cape | African Clean Energy Developments (ACED) | Project Manager & EAP |
| De Aar PV Solar Energy Plant, Northern Cape | Solar Capital | Project Manager & EAP |
| Gihon& Kison PV SEF's, Limpopo | Networx | Project Manager & EAP |
| Gunstfontein PV SEF, Northern Cape | Networx / Prana Energy | Project Manager & EAP |
| Harmony Eland, Nyala & Tshepong PV SEF's, Free State | BEEEntropie Renewable Innovation | Project Manager & EAP |
| Hibernia SEF, North West | EA Energy | Project Manager & EAP |
| Iziko PV SEF, Mpumalanga | VentuSA Energy | Project Manager & EAP |
| Kabi Kimberley PV Facility at DeBeers, Northern Cape | Kabi Solar | Project Manager & EAP |
| Karoo Renewables PV SEF, Northern Cape | SARGE | Project Manager & EAP |
| Kheis Phase 1, 2 & 3 PV SEF, Northern Cape | GeStamp Solar | Project Manager & EAP |
| Klipgat PV SEF, Northern Cape | Terra Solar | Project Manager & EAP |
| Loeriesfontein/Helios PV SEF, Northern Cape | Solar Capital | Project Manager & EAP |
| Naauwpoort PV SEF , Northern Cape | Terra Solar | Project Manager & EAP |
| Orkney PV SEF, North West | Genesis Eco-Energy | Project Manager & EAP |
| Pofadder SEF, Northern Cape | Mainstream Renewable | Project Manager & EAP |
| Prieska North PV SEF, Northern Cape | VentuSA Energy | Project Manager & EAP |
| Prieska PV SEF, Northern Cape | VentuSA Energy | Project Manager & EAP |
| Ritchie PV SEF, Northern Cape | Solar Capital | Project Manager & EAP |
| San Solar PV SEF, Northern Cape | VentuSA Energy | Project Manager & EAP |
| Sirius (Tungston Lodge) PV Solar Plants (x2, Northern Cape | Aurora Power Solutions | Project Manager & EAP |
| Sol Invictus x4 PV Developments, Northern Cape | Building Energy | Project Manager & EAP |
| Solar Plant at Kathu (Wincanton), Northern Cape | REISA | Project Manager & EAP |
| Solar Plant at Sishen (Wincanton), Northern Cape | VentuSA Energy | Project Manager & EAP |
| *Solar Plant at Sishen (Wincanton), Northern Cape* | *VentuSA Energy* | Project Manager & EAP |
| *SolarReserve Kotulo Tsatsi PV1 SEF, Northern Cape* | *Kotulo Tsatsi Energy and SolarReserve South Africa* | Project Manager & EAP |
| SolarReserve Kotulo Tsatsi PV2 Facility, Northern Cape province | *Kotulo Tsatsi Energy and SolarReserve South Africa* | Project Manager & EAP |
| Stormberg Solar PV SEF, Eastern Cape | Networx / Prana Energy | Project Manager & EAP |
| Tewa Isitha (Grootdrink/Albany) PV SEF, Northern Cape | Africoast Engineers | Project Manager & EAP |
| Tiger Kloof PV SEF near Vryburg, North West | Kabi Energy | Project Manager & EAP |
| Tiger Solar PV SEF, Northern Cape | Kabi Energy | Project Manager & EAP |
| Vaalkop and Witkop PV SEF's, North West | Kabi Solar | Project Manager & EAP |
| Wagnbietjiespan PV SEF, Free State | VentuSA | Project Manager & EAP |

| Project Name & Location | Client Name | Role |
|---|---|---|
| Wolmaransstad Municipality PV SEF, North West | BlueWave | Project Manager & EAP |
| Woodhouse PV 1 & PV 2 SEFs, North West | Genesis Eco-Energy | Project Manager & EAP |
| Zuurwater PV SEFs (x4), Northern Cape | Solafrica / BlueWave | Project Manager & EAP |
| Lichtenburg 1, 2 & 3 PV Facilities, North West | Atlantic Energy Partners & ABO Wind | Project Manager & EAP |
| Allepad PV One, Two, Three and Four PV SEFs | ILEnergy Development | Project Manager & EAP |

***Basic Assessments***

| Project Name & Location | Client Name | Role |
|---|---|---|
| Amandla Welanga & Dida PV SEFs near Noupoort, Northern Cape | Terra Solar | Project Manager & EAP |
| Carolusberg PV SEF, Northern Cape | Ilio Energy (SARGE) | Project Manager & EAP |
| Gosforth Park and Kynoch Rooftop PV SEF's Northern Cape | Building Energy | Project Manager & EAP |
| Hennenman PV SEF, Free State | BlueWave | Project Manager & EAP |
| Hibernia PV SEF near Lichtenburg, North West | EA Energy | Project Manager & EAP |
| Inkulukelo PV SEF, Northern Cape | Terra Solar | Project Manager & EAP |
| Kabi Kimberley PV SEF, Northern Cape | Kabi Energy | Project Manager & EAP |
| Kokerboom & Boabab PV Solar Energy Plants, Northern Cape | Brax Energy | Project Manager & EAP |
| Middelburg PV SEF, Mpumalanga | African Clean Energy Developments (ACED) | Project Manager & EAP |
| Nigramoep PV Solar Energy Plant, Northern Cape | SARGE | Project Manager & EAP |
| Noupoort (Kleinfontein and Toitdale) CPV, Northern Cape | Terra Power | Project Manager & EAP |
| O'Kiep 1 PV Solar Energy Plant, Northern Cape | Ilio Energy (SARGE) | Project Manager & EAP |
| O'Kiep 2 PV Solar Energy Plant, Northern Cape | BluePort Trade 118 (SARGE) | Project Manager & EAP |
| O'Kiep 3 PV Solar Energy Plant, Northern Cape | Ilio Energy (SARGE) | Project Manager & EAP |
| Rodicon PV SEF, Mpumalanga | VentuSA Energy | |
| Slurry PV SEF, North West | PPC | Project Manager & EAP |
| Small projects for PV SEF's, North West | BlueWave | Project Manager & EAP |
| Son Sitrus Rooftop PV Installation, Eastern Cape | Building Energy | Project Manager & EAP |
| Tollie PV SEF, Northern Cape | Terra Solar | Project Manager & EAP |
| x2 Southern Farms PV Solar Energy Plants, Northern Cape | Southern Farms | Project Manager & EAP |
| Moeding Solar PV Facility (BA in terms of REDZ regs), North West | Kabi Energy | Project Manager & EAP |

***Screening Studies***

| Project Name & Location | Client Name | Role |
|---|---|---|
| Allemans, Wonderheuwel, Damfontein & Dida PV SEF's, Northern Cape | Terra Solar | Project Manager & EAP |
| Amandla Welang, Gillmer & Inkululeko PV SEF's, Northern Cape | GeoSolar/ TerraSolar | Project Manager & EAP |
| Blouputs PV, Onseepkans PV, Hoogelegen PV & Boegoeberg PV projects, Northern Cape | Engineering Development Industrial Projects (EDIP) | Project Manager & EAP |
| Bobididi PV SEF, Limpopo | Root 60Four Energy | Project Manager & EAP |
| Boshof-Les Marais / Buitenfontein SEF, Free State | Bluewave Capital | Project Manager & EAP |
| Bosjesmansberg PV SEF, Northern Cape | Networx | Project Manager & EAP |

| Project Name & Location | Client Name | Role |
|---|---|---|
| Class 2 & Class 3 Road Networks in the vicinity of the proposed Tambo Springs Freight Hub, Gauteng | SMEC South Africa (on behalf of Gauteng Department of Roads & Transport) | Project Manager & EAP |
| Hibernia SEF, North West | EA Energy | Project Manager & EAP |
| Lephalale PV SEF, Limpopo | Exxaro | Project Manager & EAP |
| Prieska PV SEF, Northern Cape | Terra SOlar | Project Manager & EAP |
| Solar Project near Vryburg, North West province | ABO Wind | Project Manager & EAP |
| PV SEF's (x15) for the projects for the REIPP small scale BID, Nationwide | Building Energy | Project Manager & EAP |
| Senekal 1 & 2, Pongola & Newcastle PV SEF's, Kwa-Zulu-Natal | Building Energy | Project Manager & EAP |
| Small scale PV SEF project - 2nd Stage One | Bluewave Capital | Project Manager & EAP |
| Small scale PV SEF project - 2nd Stage One | Building Energy | Project Manager & EAP |
| Stella Helpmekaar SEF, North West | Bluewave Capital | Project Manager & EAP |
| Wolmaransstad Municipality SEF, North West | Bluewave Capital | Project Manager & EAP |
| Solar Project near Beaufort West, Western Cape | ABO Wind | Project Manager & EAP |
| Solar Project near Lichtenburg, Western Cape | ABO Wind | Project Manager & EAP |
| Solar Project near Hotazel, Western Cape | ABO Wind | Project Manager & EAP |
| Small-scale solar PV development site in Ekurhuleni Metropolitan Municipality, Gauteng | Genesis Eco-Energy Developments | Project Manager & EAP |

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

| Project Name & Location | Client Name | Role |
|---|---|---|
| ECO for the Contraction of the De Aar & Prieska PV Facilities, Northern Cape | GeStamp | Project Manager |
| ECO for the Construction of the Kathu PV Facility, Northern Cape | REISA / Building Energy | Project Manager |

***Compliance Advice and ESAP Reporting***

| Project Name & Location | Client Name | Role |
|---|---|---|
| ACWA Power SolarReserve Redstone Solar Plant, Northern Cape | SolarReserve | Environmental Advisor |
| Bokpoort PV SEF, Northern Cape | Solafrica | Environmental Advisor |
| Boshof PV SEF, Free State | BlueWave | Environmental Advisor |
| Hennenman PV SEF, Free State | BlueWave | Environmental Advisor |
| Kathu II SEF, Northern Cape | Building Energy | Environmental Advisor |
| Kathu PV SEF, Northern Cape | Building Energy / REISA | Environmental Advisor |
| Prieska PV SEF, Northern Cape | VentuSA | Environmental Advisor |
| San Solar SEF, Northern Cape | VentuSA / Acciona | Environmental Advisor |
| Sishen PV SEF Phase 1, Northern Cape | Aveng / Acciona | Environmental Advisor |
| Wolmaransstad Municipality Solar PV SEF, North West | BlueWave | Environmental Advisor |
| ESAP reporting for the opertaion phase of the Mulilo Solar PV De Aar and Mililo Solar PV Prieska | Mulilo and X-Elio | Environmental Advisor |

***Due Diligence Reporting***

| Project Name & Location | Client Name | Role |
|---|---|---|
| Kabi Kimberley PV Plant, Northern Cape | Enertis Solar | Environmental Advisor |
| Sishen Solar Farm, Northern Cape | Acciona (Windfall 59 Properties) | Environmental Advisor |
| Vaal River Solar 1 PV plant, North West | Enertis Solar | Environmental Advisor |

***Environmental Permitting & Water Use License (WUL) Applications***

| Project Name & Location | Client Name | Role |
|---|---|---|
| Permitting for the Kathu PV SEF, Northern Cape | Abengoa Solar | Project Manager & EAP |
| S53 application for Kabi Kimberley De Beers PV Plant, Northern Cape | Kabi Energy | Project Manager & EAP |
| S53 application for the Blackwood PV SEF, Free State | VentuSA Energy | Project Manager & EAP |
| S53 application for the Boundary PV SEF, Northern Cape | VentuSA Energy | Project Manager & EAP |
| S53 application for Vaalkop & Witkop PV SEF's, North West | Kabi Energy | Project Manager & EAP |
| S53 applications for various projects (Amandla Welang, Didar, Inkululeko, Kleinfontein, Klip Gat, Naau Poort, Toitdale & Tollie PV SEF's), Northern Cape | Terra Solar | Project Manager & EAP |
| WUL application for the Woodhouse PV1 & PV2 SEF's, North West | Genesis Eco-Energy | Project Manager & EAP |

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

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

| Project Name & Location | Client Name | Role |
|---|---|---|
| De Aar CSP Energy facility, Northern Cape | African Clean Energy Developments (ACED) | Project Manager & EAP |
| Khi Solar One CSP facility, Northern Cape | Abengoa Solar | Project Manager & EAP |
| Noupoort CSP facility, Northern Cape | Cresco | Project Manager & EAP |
| Paulputs CSP facility, Northern Cape | Abengoa Solar | Project Manager & EAP |
| Pofadder & Upington CSP facilities, Northern Cape | Abengoa Solar | Project Manager & EAP |
| SolarReserve Kotulo Tsatsi CSP facility, Northern Cape province | SolarReserve | Project Manager & EAP |
| SolarReserve Kotulo Tsatsi CSP1 facility, Northern Cape | Kotulo Tsatsi Energy and SolarReserve South Africa | Project Manager & EAP |
| SolarReserve Kotulo Tsatsi CSP2 facility, Northern Cape | Kotulo Tsatsi Energy and SolarReserve South Africa | Project Manager & EAP |
| SolarReserve Kotulo Tsatsi CSP3 facility, Northern Cape | Kotulo Tsatsi Energy and SolarReserve South Africa | Project Manager & EAP |
| Upington 2 CSP facility, Northern Cape | Abengoa Solar | Project Manager & EAP |
| Upington 3 CSP facility, Northern Cape | Abengoa Solar | Project Manager & EAP |
| Xina Solar One CSP facility, Northern Cape | Abengoa Solar | Project Manager & EAP |

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

| Project Name & Location | Client Name | Role |
|---|---|---|
| KaXu Solar One facility, Northern Cape | Abengoa Solar | Project Manager |
| Khi Solar One facility, Northern Cape | Abengoa Solar | Project Manager |
| Xina Solar One facility, Northern Cape | Abengoa Solar | Project Manager |

***Screening Studies***

| Project Name & Location | Client Name | Role |
|---|---|---|
| Site Identification Tool for Proposed CSP Projects, Limpopo | Exxaro | Environmental Advisor |

***Compliance Advice and ESAP reporting***

| Project Name & Location | Client Name | Role |
|---|---|---|
| *Kaxu Solar One CSP facility, Northern Cape* | *Abengoa Solar* | Environmental Advisor |
| *Khi Solar One CSP facility, Northern Cape* | *Abengoa Solar* | Environmental Advisor |
| SolarReserve Kotulo Tsatsi CSP facility, Northern Cape province | SolarReserve | Environmental Advisor |
| Xina One CSP facility, Northern Cape | Abengoa Solar | Environmental Advisor |

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

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

| Project Name & Location | Client Name | Role |
|---|---|---|
| ABs WEF near Indwe, Eastern Cape | Rainmaker Energy | Project Manager & EAP |
| Amakhala Emoyeni WEF, Eastern Cape | Windlab Developments | Project Manager & EAP |
| Amatole (2 phases) WEF, Eastern Cape | Genesis ECO-Energy | Project Manager & EAP |
| Boulders Wind Farm, Western Cape | IPD Power | Project Manager & EAP |
| Britannia Bay WEF, Western Cape | Terra Power Solutions | Project Manager & EAP |
| Castle WEF in De Aar, Northern Cape | Juwi Renewable Energies | Project Manager & EAP |
| Cookhouse WEF, Eastern Cape | African Clean Energy Developments (ACED) & Tertia Waters | Project Manager & EAP |
| Deep River Wind Energy Facility, Eastern Cape | VentuSA Energy | Project Manager & EAP |
| Dorper Phase 1 WEF, Eastern Cape | Rainmaker Energy | Project Manager & EAP |
| Elliot WEF, Eastern Cape | Rainmaker Energy | Project Manager & EAP |
| Garob WEF, Northern Cape | Juwi Renewable Energies | Project Manager & EAP |
| Gouda WEF, Western Cape | VentuSA Energy | Project Manager & EAP |
| Great Karoo WEF, Northern Cape | African Clean Energy Developments (ACED) | Project Manager & EAP |
| Gunstfontein WEF, Northern Cape | African Clean Energy Developments (ACED) | Project Manager & EAP |
| Happy Valley WEF, Eastern Cape | REISA | Project Manager & EAP |
| Hidden Valley WEF, Northern Cape | African Clean Energy Developments (ACED) | Project Manager & EAP |
| Hopefield WEF, Western Cape | Umoya Energy | Project Manager & EAP |
| Karoo Renewable Energy Facility, Northern & Western Cape | SARGE | Project Manager & EAP |
| Karreebosch Wind Farm (Roggeveld Phase 2), Northern Cape & Western Cape | G7 Renewable Energies | Project Manager & EAP |
| Karusa Wind Farm, Northern Cape | African Clean Energy Development | Project Manager & EAP |
| Klipheuwel / Dassiesfontein WEF, Western Cape | BioTherm Energy | Project Manager & EAP |
| Nojoli WEF , Eastern Cape | African Clean Energy Developments | Project Manager & EAP |
| Nxuba WEF , Eastern Cape | African Clean Energy Developments | Project Manager & EAP |
| Olifants River WEF, Western Cape | SARGE | Project Manager & EAP |

| Project Name & Location | Client Name | Role |
|---|---|---|
| Oyster Bay WEF, Eastern Cape | RES | Environmental Advisor |
| Pofadder x3 WEF's, Northern Cape | Mainstream Renewable | Project Manager & EAP |
| Project Blue WEF, Northern Cape | Windy World | Project Manager & EAP |
| Rheboksfontein WEF, Western Cape | Moyeng Energy | Project Manager & EAP |
| Riverbank WEF near Wesley, Eastern Cape | Just Energy | Project Manager & EAP |
| Sere WEF, Western Cape | Eskom Generation | Project Manager & EAP |
| Soetwater Wind Farm, Northern Cape | African Clean Energy Development | Project Manager & EAP |
| Springfontein WEF, Northern Cape | Mainstream Renewable | Project Manager & EAP |
| Stormberg WEF, Eastern Cape | Networx / Prana Energy | Project Manager & EAP |
| Suurplaat WEF, Western & Northern Cape | Moyeng Energy | Project Manager & EAP |
| Uiekraal WEF, Western Cape | Crenersol | Project Manager & EAP |
| West Coast One WEF, Western Cape | Moyeng Energy | Project Manager & EAP |
| West Coast WEF, Western Cape | Exxaro | Project Manager & EAP |
| Zen WEF near Gouda, Western Cape | VentuSA Energy | Project Manager & EAP |

***Basic Assessments***

| Project Name & Location | Client Name | Role |
|---|---|---|
| Britannia Bay Wind Monitoring Mast, Western Cape | Terra Power Solutions | Project Manager & EAP |
| Caledon, Worcester & Tulbach Wind Monitoring Masts, Western Cape | SAGIT | Project Manager & EAP |
| Deep River Wind monitoring Mast, Eastern Cape | VentuSA Energy | Project Manager & EAP |
| Denhami Wind Farm, Western Cape | Richard Young | Project Manager & EAP |
| Dorper, Abs & Dobos Wind Monitoring Masts, Eastern Cape | Rainmaker Energy | Project Manager & EAP |
| Hopefield Wind Monitoring Mast, Western Cape | Umoya Energy | Project Manager & EAP |
| Klawer Wind Energy Facility, Western Cape | Vendiwell | Project Manager & EAP |
| Klipheuwel / Dassiesfontein Wind Monitoring Mast, Western Cape | BioTherm Energy | Project Manager & EAP |
| Riverbank Wind Monitoring Mast, Eastern Cape | Just Energy | Project Manager & EAP |
| Wind Monitoring Masts near Suurplaat, Western Cape | Investec Bank | Project Manager & EAP |
| Wind Monitoring Masts on the West Coast & Darling, Western Cape | Investec Bank | Project Manager & EAP |

***Screening Studies***

| Project Name & Location | Client Name | Role |
|---|---|---|
| Cookhouse WEF, Eastern Cape | African Clean Energy Developments (ACED) | Project Manager & EAP |
| De Aar WEF, Northern Cape | African Clean Energy Developments (ACED) | Project Manager & EAP |
| Developments within identified areas in the Overberg, Western Cape | BioTherm Energy | Project Manager & EAP |
| Hopefield WEF, Western Cape | African Clean Energy Developments (ACED) | Project Manager & EAP |
| Juno WEF, Western Cape | AMDA Developments | Project Manager & EAP |
| Lambert's Bat WEF, Western Cape | Vaayu Energy SA | Project Manager & EAP |
| Wind 500 – Eskom's investigation for new sites | Eskom Holdings | Project Manager & EAP |
| Struisbaai area WEF, Western Cape | Richard Young | Project Manager & EAP |
| Suurplaat WEF, Western Cape | Investec Bank | Project Manager & EAP |
| Theewaterskloof Municipality WEF, Western Cape | Theewaterskloof Municipality | Project Manager & EAP |

| Project Name & Location | Client Name | Role |
|---|---|---|
| WEF's on x2 site on the West Coast, Western Cape | Investec Bank | Project Manager & EAP |
| Various WEF's in the Western Cape | Department of Environmental Affairs & Development Planning (DEA&DP) | Project Manager & EAP |
| Van Reenens WEF, Kwa-Zulu Natal & Free State | 4GREEN Development Africa | Project Manager & EAP |
| WEF Development within the Sandveld area, Western Cape | Kovacs Investments (Nick Prium) | Project Manager & EAP |

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

| Project Name & Location | Client Name | Role |
|---|---|---|
| ECO for the Construction of the Dorper Phase 1 WEF, Eastern Cape | Rainmaker Energy | Project Manager |
| ECO for the Construction of the Gouda Wind Farm, Western Cape | Blue Falcon Trading | Project Manager |
| EO for the Construction of the Dassiesklip WEF, Western Cape | Group Five | Project Manager |

***Compliance Advice & ESAP Reporting***

| Project Name & Location | Client Name | Role |
|---|---|---|
| Amakhala Emoyeni WEF, Eastern Cape | Windlab Developments | Environmental Advisor |
| Cookhouse II WEF, Eastern Cape | African Clean Energy Developments | Environmental Advisor |
| Cookhouse WEF, Eastern Cape | African Clean Energy Developments | Environmental Advisor |
| Dorper Phase 1 WEF, Eastern Cape | Rainmaker Energy | Environmental Advisor |
| Garob WEF, Northern Cape | Juwi Renewable Energies | Environmental Advisor |
| Gouda WEF, Western Cape | Aveng / Acciona | Environmental Advisor |
| Happy Valley WEF, Eastern Cape | VentuSA Energy / EDPR | Environmental Advisor |
| Hidden Valley WEF, Northern Cape | African Clean Energy Developments (ACED) | Environmental Advisor |
| Hopefield WEF, Western Cape | Umoya Energy | Environmental Advisor |
| Karusa Wind Farm, Northern Cape | African Clean Energy Development | Environmental Advisor |
| Loperberg WEF, Eastern Cape | Rainmaker Energy | Environmental Advisor |
| Nobelsfontein WEF, Northern Cape | Coria / SARGE | Environmental Advisor |
| Nojoli WEF , Eastern Cape | African Clean Energy Developments (ACED) | Environmental Advisor |
| Nxuba WEF , Eastern Cape | African Clean Energy Developments | Environmental Advisor |
| Oyster Bay WEF, Eastern Cape | RES | Environmental Advisor |
| Riverbank Wind WEF, Eastern Cape | InnoWind | Environmental Advisor |
| Roggeveld Phase 1 WEF, Northern Cape | Building Energy | Environmental Advisor |
| Soetwater Wind Farm, Northern Cape | African Clean Energy Development | Environmental Advisor |
| Springfontein WEF, Northern Cape | Mainstream Renewable | Environmental Advisor |
| Zen WEF, Western Cape | VentuSA Energy | Environmental Advisor |

***Due Diligence Reporting***

| Project Name & Location | Client Name | Role |
|---|---|---|
| Gouda WEF, Western Cape | Blue Falcon Trading | Environmental Advisor |

| Project Name & Location | Client Name | Role |
|---|---|---|
| Loeriesfontein, Khobab & Noupoort WEF's, Northern Cape | Actis | Environmental Advisor |
| Roggeveld Wind Farm, Northern Cape | Building Energy | Environmental Advisor |

***Environmental Permitting & WUL Applications***

| Project Name & Location | Client Name | Role |
|---|---|---|
| Permitting for the Cookhouse WEF, Eastern Cape | African Clean Energy Developments (ACED) | Project Manager & EAP |
| Permitting for the Karusa Wind Farm, Northern Cape | African Clean Energy Development | Project Manager & EAP |
| Permitting for the Sere WEF, Western Cape | Eskom | Project Manager & EAP |
| Permitting for the Soetwater Wind Farm, Northern Cape | African Clean Energy Development | Project Manager & EAP |
| Permitting Riverbank WEF, Eastern Cape | Electrawinds | Project Manager & EAP |
| S24G for the Klipheuwel / Dassiesfontein WEF, Western Cape | | Project Manager & EAP |
| S53 application for the Nxuba Wind Farm, Eastern Cape | African Clean Energy Developments (ACED) | Project Manager & EAP |
| S53 Application for the Zen WEF, Western Cape | VentuSA Energy | Project Manager & EAP |
| WUL application for the Oyster Bay WEF, Eastern Cape | RES | Project Manager & EAP |

**CONVENTIONAL POWER GENERATION PROJECTS (COAL)**

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

| Project Name & Location | Client Name | Role |
|---|---|---|
| H2 Energy Power Station, Mpumalanga | H2 Energy | Project Manager & EAP |

***Screening Studies***

| Project Name & Location | Client Name | Role |
|---|---|---|
| Coal fired power station in the Bethal area, Mpumalanga | ISS Global | Project Manager & EAP |
| Indwe Power Station, Eastern Cape | IPSA | Project Manager & EAP |
| IPP Base Load Power Station Development in Lephalale, Limpopo | Exxaro | Project Manager & EAP |

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

| Project Name & Location | Client Name | Role |
|---|---|---|
| ISO 14001:2015 Audit for the Hendrina Power Station, Mpumalanga | Eskom Holdings | Project Manager |

**GAS to POWER GENERATION PROJECTS**

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

| Project Name & Location | Client Name | Role |
|---|---|---|
| Ankerlig OCGT to CCGT Conversion project & the Transmission Power Line between Ankerlig and the Omega Substation, Western Cape | Eskom Generation | Project Manager & EAP |
| Gourikwa OCGT to CCGT Conversion project & the Transmission Power Line between Gourikwa and the | Eskom Generation | Project Manager & EAP |

| | | |
|---|---|---|
| Proteus Substation, Western Cape | | |
| *Neopak Combined Heat and Power (CHP) Plant, Rosslyn, Gauteng* | Neopak | Project Manager & EAP |
| Richards Bay Combined Cycle Gas Turbine (CCGT) Power Plant, Kwa-Zulu Natal | Eskom | Project Manager & EAP |

***Screening Studies***

| Project Name & Location | Client Name | Role |
|---|---|---|
| Environmental Analysis for Gas Transmission Pipelines in the Clayville, Nigel and Wadeville areas, Gauteng | Energy Group | Project Manager |

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

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

| Project Name & Location | Client Name | Role |
|---|---|---|
| Afguns Road Realignment Project, Limpopo | Eskom Holdings | Project Manager & EAP |
| Expansion of the existing Welgedacht Water Care Works, Gauteng | ERWAT | Project Manager & EAP |
| Industrial Metals Cluster, Northern Cape | Northern Cape Department of Economic Development and Tourism | Project Manager & EAP |
| Modification of the existing Hartebeestfontein Water Care Works, Gauteng | ERWAT | Project Manager & EAP |

***Basic Assessments***

| Project Name & Location | Client Name | Role |
|---|---|---|
| New Raw Water Reservoir & Pipeline for the Medupi Power Station, Limpopo | Eskom Holdings | Project Manager & EAP |
| Msenge Emoyeni WEF Watercourse Crossings, Eastern Cape | Windlab | Project Manager & EAP |
| Dilokong Transport Facility, Limpopo | South African National Roads Agency Limited (SANRAL) | Project Manager & EAP |
| Neopak Water Tratment Plant, Gauteng | Neopak | Project Manager & EAP |
| Realignment of MR73 Road for the Construction of the Paulputs CSP Facility, Northern Cape | Abengoa Solar | Project Manager & EAP |
| Biomass Storage Area in Support of the Mkuze Biomass Power Station, KwaZulu-Natal | Building Energy | Project Manager & EAP |
| Wastewater Dam & Pipeline in Support of the Mkuze Biomass Power Station, Kwa-Zulu Natal | Building Energy | Project Manager & EAP |
| Watercourse Crossings for the Klawer Wind Energy Facility, Western Cape | Vendiwell | Project Manager & EAP |

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

| Project Name & Location | Client Name | Role |
|---|---|---|
| ECO for the Construction of the Tiffindell Ski Resort, Eastern Cape | Tiffindell Ski | ECO |
| ECO for the Distribution centre & warehouse at Lords View Industrial Estate, Gauteng | Oliver & Partners | Project Manager |
| ECO for the Upgrade of the Waterval Wastewater Treatment Works, Gauteng | BCP Palace (on behalf of ERWAT) | Project Manager |

***Compliance Advice and reporting***

| Project Name & Location | Client Name | Role |
|---|---|---|
| Mkuze Biomass Plant, Kwa-Zulu Natal | Building Energy | Environmental Advisor |
| Tiffindell Ski, Eastern Cape | Tiffindell Ski | Environmental Advisor |

***Environmental Permitting & WUL Applications***

| Project Name & Location | Client Name | Role |
|---|---|---|
| Permitting, S53 & WULA for the Mkuze Biomass Plant, Kwa-Zulu Natal | Building Energy | Project Manager & EAP |
| WULA for the Visserhok Waste Tyre Depot, Western Cape | REDISA | Project Manager & EAP |
| WULA for the Witbank Waste Tyre Depot, Mpumalanga | REDISA | Project Manager & EAP |

**MINING**

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

| Project Name & Location | Client Name | Role |
|---|---|---|
| Compliance Audit for the Palesa Coal Mine WML, Mpumalanga province | HCI Coal | Project Manager |
| Compliance Audit Waste Use Licene for the Mbali Coal Mine, Mpumalanga province | HCI Coal | Project Manager |

**ENVIRONMENTAL MANAGEMENT TOOLS**

| Project Name & Location | Client Name | Role |
|---|---|---|
| Review the effectiveness & efficiency of the environmental impact management (EIA) system in South Africa, and formulate an environmental impact management strategy and action plan | National Department of Environmental Affairs | Environmental Advisor |
| Drafting a Position Paper: Project Financing and Environmental Risk Management (considering IFC Performance Standards & Equator Principles) | Standard Bank Group | Environmental Advisor |
| EMP for the Phase 1 of the Elitheni Coal Mine Project, Eastern Cape | Elitheni Coal | Environmental Advisor |
| Gap Analysis of Environmental Management Systems (EMS) with ISO 14001:2004 | Venture Diversified Products | Environmental Advisor |
| Development of Provincial Guidelines for 4x4 routes | Western Cape Department of Environmental Affairs & Development Planning | Environmental Advisor |
| Permitting Study on the Status of Renewable Energy Projects in South Africa | E.ON | Environmental Advisor |
| Practical review of EGI SEA | CSIR | Environmental Advisor |
| Development & Implementation of the Environmental Management Systems (EMS) with ISO 14001:2004 for the UBS Office in Sandton, Gauteng | UBS AG | Environmental Advisor |

| | | |
|---|---|---|
| Resource & Efficiency Plans for the operation phase of the Mulilo Solar PV De Aar and Mililo Solar PV Prieska | Mulilo and X-Elio | Environmental Advisor |

**TRAINING**

| Project Name & Location | Client Name | Role |
|---|---|---|
| Hendrina Power Station Environmental Law Training | Eskom Holding | Project Manager |
| Radar Training for NCC Biologists | EchoTracks | Project Manager |

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**CURRICULUM VITAE OF NKHENSANI MASONDO**

**Profession :** Senior Environmental Consultant

**Specialisation:** Environmental Management, Environmental Impact Assessments, Report Writing, Project Management, Stakeholder Engagement, Environmental Auditing

**Work Experience:** 6 years in the Environmental Management Consulting Field

## VOCATIONAL EXPERIENCE

Nkhensani is an EAPASA Registered Environmental Assessment Practitioner with over 6 years of experience in the environmental field. She holds a BSocSCi (Hons) in Environmental Management and Analysis and a BA (Own Choice) specialising in Geography and Archaeology, both from the University of Pretoria (UP). She is currently pursuing her MSc in Environmental Management at the University of South Africa (UNISA).

She has been involved in residential, commercial, institutional, industrial, and mixed-use development within South Africa. She has been involved in mine closure strategies and implementation plans on behalf of Mining partners. Her main responsibilities include compilation of environmental reports, stakeholder engagement, and project management.

## SKILLS BASE AND CORE COMPETENCIES

- Environmental Planning
- Compilation of Environmental Impact Assessments, Basic Assessments, Water Use Licenses, NEMA Queries, GPEMF Applications, General Authorisations, Schedule 1 and Existing Lawful Use Applications
- Compilation and Implementation of Environmental Programmes
- Undertaking Environmental Audits for residential, commercial, and industrial developments
- Project Management of various projects
- Review of Specialists reports
- Undertaking Stakeholder Engagements for a variety of projects

## EDUCATION AND PROFESSIONAL STATUS

**Degrees:**

- Master of Science in Environmental Management (current), University of South Africa
- BSocSci (Hons) Environmental Analysis and Management (2014), University of Pretoria
- BA (Own Choice) Specialising in Geography and Archaeology (2013), University of Pretoria

**Short Courses:**

- Geographical Information Systems Training (ESRI) 2016
- ISO 14001: 2004 Lead Environmental Auditor Training: Environmental Management Systems (SGS) 2015

**Professional Society Affiliations:**

- Environmental Assessment Practitioners Association of South Africa – Environmental Assessment Practitioner

| **EMPLOYMENT** | | |
|---|---|---|
| **Date** | **Company** | **Roles and Responsibilities** |
| **01 June 2022 - Current:** | Savannah Environmental (Pty) Ltd | Senior Environmental Consultant<br><br><u>Tasks include</u>:<br>• Play a lead role in environmental permitting, environmental authorisation applications, and compliance and advice and assurance.<br>• Project management, execute draft, review and/or further develop and manage the delivery of environmental impact assessments (EIA) reports and EMPrs in line with the requirements of NEMA and the EIA regulations.<br>• Environmental Permitting (including WULA), environmental authorisation applications and associated stakeholder engagement and public participation.<br>• Manage the delivery of specialist environmental consultants and their reporting, as may be required. Manage any third parties or sub-consultants to which functions have been outsourced.<br>• Project-related GIS mapping.<br>• New business development and the preparation of proposals. |
| **August 2017 – May 2022** | LEAP: Landscape Architects and Environmental Planners (Imbrillinx CC) | Environmental Assessment Practitioner<br><br><u>Task included:</u><br>• Compiling Scoping Reports, Integrated Wastewater<br>• Management Plans, Water Use License Applications, General<br>• Authorisations, Schedule 1 Borehole Registrations, Basic<br>• Assessment Reports, Environmental Management Programmes,<br>• Section 24G Applications and Appeals, conducting site inspections.<br>• Compiling Water Quality Monitoring, compiling wetland rehabilitation<br>• and management reports.<br>• • Stakeholder Engagement.<br>• • Project Management<br>• • Act as a liaison officer for the company with State Departments. |
| **May 2015 – December 2016** | LEAP: Landscape Architects and Environmental Planners (Imbrillinx CC) | *Environmental Control Officer*<br><u>Tasks Included</u><br>• Formulated and implemented long-range plans for environmental programs. |

| | | |
|---|---|---|
| | | • Performed inspections, groundwater sampling and soil sampling.<br>• Performed environmental site assessments and provided remediation recommendations.<br>• Inspected sites to ensure adherence to environmental regulations.<br>• Training of contractors of appropriate environmental practices.<br>• Attending site meetings with contractors.<br>• Liaison with state departments.<br>• Act as a public participation assistant as and when required. |

**PROJECT EXPERIENCE**

**INFRASTRUCTURE DEVELOPMENT PROJECTS (PIPELINES, WATER RESOURCES AND INDUSTRIAL**

**Basic Assessment and Environmental Programmes**

| Project | Client Name | Role |
|---|---|---|
| Lombardy East Stream Flow Reduction Activities | Johannesburg Road Agency | Project Manager & EAP |
| The Whisken K54 Road development | Balwin Properties Limited on behalf of Gautrans | Public Participation Assistant |

**Part 1 Amendment**

| Project | Client Name | Role |
|---|---|---|
| Malibongwe Pipeline | Codevco | Project Manager & EAP |

**Water Use License Applications and Environmental Programmes**

| Project | Client Name | Role |
|---|---|---|
| Crowthorne Leogem Sewer Pipeline | Leogem Property Projects (Pty) Ltd on behalf of | Project Manager & EAP |
| Diepsloot Klevebank Sewer pipeline | Eris Property Group (Pty) Limited | Project Manager & EAP |
| Kyalami Heights X4 Sewer Pipeline | Church of Scientology | Project Manager & EAP |
| Lombardy East Stream Flow Reduction Activities | Johannesburg Road Agency | Project Manager & EAP |

**General Authorisation**

| Project | Client Name | Role |
|---|---|---|
| Alinta Extension 4 Stormwater Infrastructure | Balwin Properties | Project Manager & EAP |
| Celtisdal Stormwater Infrastructure | Cosmopolitan Projects (Tshwane) Pty Ltd | Project Manager and EAP |
| Erasmus Estate – Road Crossing | Erasmus Estate Trust | EAP |
| Olivedale Retirement Village Stormwater Infrastructure | Olivedale Retirement Village NPO | EAP |
| Gem Valley Mixed Use Development Stormwater Culvert | Central Developments (Pty) Ltd | Project Manager & EAP |

**Environmental Compliance**

| Project | Client Name | Role |
|---|---|---|
| Diepsloot Porcupine Park Avenue | Valumax Northern Farms (Pty) Ltd | ECO |

**HOUSING AND URBAN PROJECTS**

**Environmental Impact Assessments and Environmental Management Programmes (EMPr)**

| Project | Client Name | Role |
|---|---|---|
| Dersley Springs Mixed Used Development | Royal Albatross (Pty) Ltd | EAP |
| Green Valley Residential Development | Balwin Properties Limited | Project Manager & EAP |
| Irene Ridge Mixed Use Development | M&T Developments | EAP |
| Onderstepoort Extension 42 Mixed Use Development | Power Developments (Pty) Ltd | EAP |
| Reigerpark X10 Mixed Use Development | Living Africa (Pty) Ltd | EAP |
| Sammy Marks Mixed Use Development | Abland | EAP |
| Swaziland | | |

**Basic Assessments and Environmental Management Programmes**

| Project | Client Name | Role |
|---|---|---|
| Atteridgeville X47 Light Industrial Development | JT Group (Pty) Ltd | Project Manager |
| Erasmus Estate Mixed Use Development | Erasmus Estate Trust | EAP |
| Germiston Cemetery | Living Africa (Pty) Ltd | Project Manager & EAP |
| Homes Haven X24 | Central Developments (Pty) Ltd | EAP |
| Leeuwfontein Shopping Centre | McCormick Property Group | Project Manager & EAP |
| Lewende Woord Bronkhorstspruit Church and Rehabilitation Centre | Lewende Woord Church and Rehabilitation Centre | EAP |
| Spes Magte | South African Special Forces | EAP |
| Waterfall Polofields | Balwin Properties | EAP |
| Willaway Residential Development | 3V Projects | EAP |
| Waterkloof Marina Retirement Village | Central Development Projects | EAP |

**Part 2 Amendments**

| | | |
|---|---|---|
| Gem Valley Hauptfleish | Gem Valley Hauptfleisch (Pty) Ltd | Project Manager & EAP |
| Greenlee Residential Develop | Balwin Properties Limited | EAP |
| Heidelberg X25 Mixed Use Development | Mantracare (Pty) Ltd | Project Manager & EAP |
| The Reid Montesorri School | Balwin Properties | EAP |

**Part 1 Amendments**

| | | |
|---|---|---|
| Apex X10 Industrial Development | Moolman Group | EAP |
| Amberfield X47 | Central Developments (Pty) Ltd | Project Manager |
| Clayville X50 and X71 Mixed Use Development | Valumax Midrand (Pty) Ltd | Project Manager & EAP |
| Klerksoord Mixed Use Development | SafDev (Pty) Ltd | Project Manager & EAP |
| Mooikloof Mega City | Balwin Properties Limited | EAP |
| Riverside View X30 – X35 | Valumax Northern Farms (Pty) Ltd | Project Manager & EAP |

**GPEMF**

| Project | Client Name | Role |
|---|---|---|
| Krugerus X9 Residential Development | Moolman Group | Project Manager & EAP |
| Linbro Park Klulee Residential Development | Balwin Properties Limited | Project Manager &EAP |
| Theresa Park X66 & X67 | Social Housing Regulatory Authority | Project Manager & EAP |

**NEMA Query**

| Project | Client Name | Role |
|---|---|---|
| Kwa-Mhlanga Crossing | Top Spot (Pty) Ltd | Project Manager & EAP |
| Waterfall Polofields Show block | Balwin Properties Limited | EAP |

**24G Rectification Application**

| Project | Client Name | Role |
|---|---|---|
| Dekenah Street | Alrode CC | EAP |
| Mopane Grootvlei | RuaCon | Project Manager |

**Water Use License Applications**

| Project Name | Client Name | Role |
|---|---|---|
| Botesdal X15 Light Industrial Development | Open Energy (Pty) Ltd | Project Manager & EAP |
| Clayville X45 Mixed Use Development | Valumax Midrand (Pty) Ltd | Project Manager & EAP |
| Ermelo Shopping Centre | Moolman Group | Project Manager & EAP |
| Gem Valley Hauptfleisch Mixed Use Development | Gem Valley Hauptfliesch (Pty) Ltd | Project Manager & EAP |
| Lewende Woord Bronkhorstspruit Church and Rehabilitation | Lewende Woord Bronkhorstspruit | Project Manager & EAP |
| Matsamo Mall Shopping Centre | Moolman Group | Project Manager & EAP |
| Miracle Meadow Water Bottling Facility | Mr Pieter du Randt Pretorius | Project Manager & EAP |
| Reigerpark Extension 10 and Comet X18 Mixed Use Development | Living Africa 2 (Pty) Ltd | Project Manager & EAP |
| Norton Park X8 Residential Development | SSI Group | Project Manager & EAP |
| Onderstepoort X42 Mixed Use Development | Power Developments (Pty) Ltd | Project Manager & EAP |
| The Whisken | Balwin Properties Limited | Project Manager & EAP |
| Zwartkop 187 Mixed Use Development | Moolman Group | Project Manager & EAP |
| Zuurfontein Ptn 221 Residential Development | M&T Developments | Project Manager & EAP |

**General Authorisations**

| Project | Client Name | Role |
|---|---|---|
| Thokoza Park Recreational Park | City of Ekurhuleni | Project Manager & EAP |

**Schedule 1 Authorisations**

| Project | Client Name | Role |
|---|---|---|
| Builders Warehouse Midrand | Massmart (Pty) Ltd | Project Manager |
| Greenlee Borehole Registration | Balwin Properties Limited | Project Manager & EAP |
| Willway Residential Development | 3V projects (Pty) Ltd | Project Manager & EAP |

**Environmental Auditing**

| Project | Client Name | Role |
|---|---|---|
| Amberfield Estate | Central Developments (Pty) Ltd | Environmental Control Officer |
| Blue Hills Equestrian Estate | Century Property Development | Environmental Control Officer |
| Chuma Mall | Eris Property Group | Environmental Control Officer |
| Diepsloot Ptn 1 Mixed Use Development | Valumax Northern Farms (Pty) Ltd | Environmental Control Officer |
| Kyalami Hills | Balwin Properties Limited | Environmental Control Officer |
| Kyalami Ridge Mall | Kyalami Retail Africa | Environmental Control Officer |
| South Hills Mixed Use Estate | Calgro M3 | Environmental Control Officer |
| Waterfall Estate | Century Property Developments | Environmental Control Officer |

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# CURRICULUM VITAE OF Matthew Ellero

Comprehensive CV

**Profession :** Environmental Consultant

**Specialisation:** Environmental reporting, water use licensing and cartography (GIS),

**Work Experience:** 1 year

## VOCATIONAL EXPERIENCE

Matthew is an Environmental Consultant with 1 year of experience in the environmental field. He holds a MSc in Environmental Sciences from the University of the KwaZulu-Natal. He also holds a BSc Hons (cum laude) in Environmental Science and a BSc in Environmental Science.

Matthew's experience includes contributing to Environmental Authorisations (Basic Assessments and Scoping and Environmental Impact Assessments) and Water Use Authorisations. He therefore has a wide ranging experience with various legislation including the National Environmental Management Act (NEMA), National Heritage Resources Act (NHRA), National Environmental Management Waste Management Act (NEM:WA), National Environmental Management Biodiversity Act (NEM:BA), the Mineral and Petroleum Resources Development Act (MPRDA), National Environmental Management Air Quality Act (NEM:WA), and the National Water Act (NWA), having applied them for numerous small, medium and large-scale projects across various industries. Matthew also has experience in conducting specialist work and has contributed to noise impact assessments, air quality monitoring and air quality impact assessment, and biodiversity monitoring. He has contributed towards reporting for mine closure plans and costings.

## SKILLS BASE AND CORE COMPETENCIES

- Environmental management and environmental permitting
- Project management
- Public participation and stakeholder engagement
- Field work skills
- Adaptability and ability to handle pressure
- Organisational skills
- MS Office Package (Word, PowerPoint and Excel)
- Google Earth
- ArcGIS and remote sensing

## EDUCATION AND PROFESSIONAL STATUS

**Degrees:**

- Masters of Science (MSc) in Environmental Science
- Bachelor of Science (BScHons) in Environmental Science
- Bachelor of Science in Environmental Science

## EMPLOYMENT

| Date | Company | Roles and Responsibilities |
|---|---|---|
| **2022 - Current:** | Savannah Environmental (Pty) Ltd | *Environmental Consultant*<br>Tasks include:<br>• *Undertake environmental screening assessments, environmental permitting and environmental authorisation applications.*<br>• *Undertake water use authorisation applications on the e-WULAA system.*<br>• *Efficient and quality report writing to execute and manage the delivery of environmental impact assessment (EIA) reports and Environmental Management Programmes in line with the requirements of the National Environmental Management Act and EIA Regulations.*<br>• *Liaison with relevant environmental authorities.*<br>• *Execution of the public participation process.*<br>• *Professional client liaison.*<br>• *Project management.*<br>• *Manage third parties or sub-consultants to which functions have been outsourced.*<br>• *Preparation of proposals and budgets* |

| Date | Company | Roles and Responsibilities |
|---|---|---|
| **2019 - 2020:** | Golder Associates Africa (Pty) Ltd | *Junior Environmental Consultant*<br>Tasks included:<br>• *Providing assistance on local environmental and social impact assessments.*<br>• *Contributing towards water use license applications.*<br>• *Undertaking rehabilitation and implementation strategies*<br>• *Conducting annual integrated water and waste management plan updates.*<br>• *Conducting annual air quality monitoring*<br>• *Conducting annual noise monitoring*<br>• *Preparing project proposal documents and budgets.*<br>• *Assisting in the compilation mine closure plans and costing.*<br>• *Undertaking field work and the installation of air quality monitoring and noise monitoring machines.*<br>• *Liaising with clients and regulatory authorities.*<br>• *Providing administrative support to project managers.*<br>• *Limited project management* |

**PROJECT EXPERIENCE**

| ***Project Name & Location*** | ***Client Name*** | ***Role*** |
|---|---|---|
| *Kathu substation dust fallout monitoring, Kathu* | *Eskom* | Junior Environmental Consultant |
| *Cartonville pipeline basic assessment, Cartonville* | *AngloGold Ashanti* | Junior Environmental Consultant |
| *Klipspruit discard dump expansion, Ogies* | *South32* | Junior Environmental Consultant |
| *Zibulo discard dump expansion, Ogies* | *Anglo American* | Junior Environmental Consultant |
| *Rehabilitation strategy and implementation plan, Thubatse* | *Thubatse Samancore Chrome* | Junior Environmental Consultant |
| *Rehabilitation strategy and implementation plan, Hendrina* | *Mbuyelo Coal* | Junior Environmental Consultant |
| *Noise monitoring report, Vanderbijlpark* | *Seriti* | Junior Environmental Consultant |
| *Mzimmkhulwana and Mzimkhulu biomonitoring, Port Shepstone* | *Idwala* | Junior Environmental Consultant |
| *Hartbeespoort dam biomonitoring, Hartebeestpoort* | *Water research council* | Junior Environmental Consultant |
| *Glencore mines water use license consolidation, various* | *Glencore* | Junior Environmental Consultant. |

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|---|---|---|
| *Cullinan crack survey* | *Petra Diamonds* | Junior Environmental Consultant. |
| *Marikana and Karee desktop pre-feasibility screening study* | *Sibanye Stillwater* | Junior Environmental Consultant. |
| *Aberdeen Wind Energy Farm basic assessment* | *Acciona* | Junior Environmental Consultant. |
| *Castle wind energy farm split amendment* | *ACED* | Junior Environmental Consultant. |
| *Engie part 1 contact person and EA holder amendments* | *Engie* | Junior Environmental Consultant. |

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# CURRICULUM VITAE OF NICOLENE VENTER

**Profession :** Public Participation and Social Consultant

**Specialisation:** Public participation process; stakeholder engagement; facilitation (workshops, focus group and public meetings; public open days; steering committees); monitoring and evaluation of public participation and stakeholder engagement processes

**Work Experience:** 23 years' experience as a Public Participation Practitioner and Stakeholder Consultant

## VOCATIONAL EXPERIENCE

Over the past 23 years Nicolene established herself as an experienced and well recognised public participation practitioner, facilitator and strategic reviewer of public participation processes. She has experience in managing public participation and stakeholder engagement projects and awareness creation programmes. Her experience includes designing and managing countrywide public participation and stakeholder engagement projects and awareness creation projects, managing multi-project schedules, budgets and achieving project goals. She has successfully undertaken several public participation processes for EIA, BA and WULA projects. The EIA and BA process include linear projects such as the NMPP, Eskom Transmission and Distribution power lines as well as site specific developments such as renewable energy projects i.e. solar, photo voltaic and wind farms. She also successfully managed stakeholder engagement projects which were required to be in line with the Equator Principles, locally and in neighbouring countries.

## SKILLS BASE AND CORE COMPETENCIES

- Project Management
- Public Participation, Stakeholder Engagement and Awareness Creation
- Public Speaking and Presentation Skills
- Facilitation (workshops, focus group meetings, public meetings, public open days, working groups and committees)
- Social Assessments (Stakeholder Analysis / Stakeholder Mapping)
- Monitoring and Evaluation of Public Participation and Stakeholder Engagement Processes
- Community Liaison
- IFC Performance Standards
- Equator Principles
- Minute taking, issues mapping, report writing and quality control

## EDUCATION AND PROFESSIONAL STATUS

**Degrees / Diplomas / Certificates:**

- Higher Secretarial Certificate, Pretoria Technicon (1970)

**Short Courses:**

- Techniques for Effective Public Participation, International Association for Public Participation, IAP2 (2008)
- Foundations of Public Participation (Planning and Communication for Effective Public Participation), IAP2 (2009)
- Certificate in Public Participation – IAP2SA Modules 1, 2 and 3 (2013)

Certificate in Public Relations, Public Relation Institute of South Africa, Damelin Management School (1989)

**Professional Society Affiliations:**

- Member of International Association for Public Participation (IAP2): Southern Africa

## EMPLOYMENT

| Date | Company | Roles and Responsibilities |
|---|---|---|
| **November 2018 – current** | Savannah Environmental (Pty) Ltd | Public Participation and Social Consultant<br><br><u>*Tasks include:*</u><br><br>*Tasks include: Drafting of a Public Participation Plan with key deliverable dates and methodology to be followed, Background Information Document, Letters to Stakeholders and Interested and/or Affected Parties (I&APs) inclusive of key project deliverables and responses to questions / concerns raised; Stakeholder identification; facilitating stakeholder workshops, focus group and public meetings; conduct one-on-one consultation with Community Leaders, Tribal Chiefs, affected landowners, etc.*<br><br>*Managing interaction between Stakeholders and Team Members, liaising with National, Provincial and Local Authorities, managing community consultation and communications in project affected areas, attend to the level of technical information communicated to and consultation with all level of stakeholders involved.* |

| Date | Company | Roles and Responsibilities |
|---|---|---|
| **2016 – October 2018** | Imaginative Africa (Pty) Ltd<br><br>*(Director of Imaginative Africa)* | Independent Consultant<br><br>*Consulting to various Environmental Assessment Practitioners for Public Participation and Stakeholder Engagements:*<br><br>*<u>Tasks include:</u>*<br><br>*Tasks include: Drafting of a Public Participation Plan with key deliverable dates and methodology to be followed, Background Information Document, Letters to Stakeholders and Interested and/or Affected Parties (I&APs) inclusive of key project deliverables and responses to questions / concerns raised; Stakeholder identification; facilitating stakeholder workshops, focus group and public meetings; conduct one-on-one consultation with Community Leaders, Tribal Chiefs, affected landowners, etc.*<br><br>*Managing interaction between Stakeholders and Team Members, liaising with National, Provincial and Local Authorities, managing community consultation and communications in project affected areas, attend to the level of technical information communicated to and consultation with all level of stakeholders involved*<br><br>*<u>Clients</u>:*<br><br>*SiVEST Environmental*<br>*Savannah Environmental*<br>*Baagi Environmental*<br>*Royal Haskoning DHV (previously SSI)* |
| **2013 - 2016** | Zitholele Consulting<br><br>*Contact person: Dr Mathys Vosloo*<br><br>*Contact number: 011 207 2060* | Senior Public Participation Practitioner and Project Manager<br><br><u>Tasks included:</u><br><br>*Project managed public participation process for EIA/BA/WULA/EAL projects. Manages two Public Participation Administrators. Public Participation tasks as outlined as above and including financial management of public participation processes.* |
| **2011 - 2013** | Imaginative Africa (Pty) Ltd<br><br>*(company owned by Nicolene Venter)* | Independent Consultant<br><br>Consulting to various Environmental Assessment Practitioners for Public Participation and Stakeholder Engagements<br><br><u>Tasks included:</u><br><br>*Drafting of a Public Participation Plan with key deliverable dates and methodology to be followed, Background Information Document,* |

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|---|---|---|
| | | *Letters to Stakeholders and Interested and/or Affected Parties (I&APs) inclusive of key project deliverables and responses to questions / concerns raised; Stakeholder identification; facilitating stakeholder workshops, focus group and public meetings; conduct one-on-one consultation with Community Leaders, Tribal Chiefs, affected landowners, etc.*<br><br>*Managing interaction between Stakeholders and Team Members, liaising with National, Provincial and Local Authorities, managing community consultation and communications in project affected areas, attend to the level of technical information communicated to and consultation with all level of stakeholders involved*<br><br>*<u>Clients</u>:*<br>*Bohlweki Environmental*<br>*Bembani Sustainability (Pty) Ltd*<br>*Naledzi Environmental* |
| **2007 – 2011** | SiVEST SA (Pty) Ltd<br><br>*Contact person: Andrea Gibb*<br><br>*Contact number: 011 798 0600* | Unit Manager: Public Participation Practitioner<br><br>*<u>Tasks included:</u>*<br><br>*Project managed public participation process for EIA/BA projects. Manages two Junior Public Participation Practitioners. Public Participation tasks as outlined as above and including financial management of public participation processes.* |
| **2005 – 2006** | Imaginative Africa (Pty) Ltd<br><br>*(company owned by Nicolene Venter)* | Independent Consultant<br><br>Public Participation and Stakeholder Engagement Practitioner<br><br>*<u>Tasks included:</u>*<br><br>*Drafting of a Public Participation Plan with key deliverable dates and methodology to be followed, Background Information Document, Letters to Stakeholders and Interested and/or Affected Parties (I&APs) inclusive of key project deliverables and responses to questions / concerns raised; Stakeholder identification; facilitating stakeholder workshops, focus group and public meetings; conduct one-on-one consultation with Community Leaders, Tribal Chiefs, affected landowners, etc.*<br><br>*Managing interaction between Stakeholders and Team Members, liaising with National, Provincial and Local Authorities, managing community consultation and communications in project affected areas, attend to the level of technical* |

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|---|---|---|
| | | *information communicated to and consultation with all level of stakeholders involved.*<br><br>*<u>Clients</u>:*<br><br>*Manyaka-Greyling-Meiring (previously Greyling Liaison and currently Golder Associates)* |
| **1997 - 2004** | Imaginative Africa (Pty) Ltd<br><br>*(company owned by Nicolene Venter)* | Independent Consultant: Public Participation Practitioner.<br><br>*<u>Tasks included:</u>*<br><br>*Drafting of a Public Participation Plan with key deliverable dates and methodology to be followed, Background Information Document, Letters to Stakeholders and Interested and/or Affected Parties (I&APs) inclusive of key project deliverables and responses to questions / concerns raised; Stakeholder identification; facilitating stakeholder workshops, focus group and public meetings; conduct one-on-one consultation with Community Leaders, affected landowners, etc.*<br><br>*Managing interaction between Stakeholders and Team Members, liaising with National, Provincial Local Authorities, managing community consultation and communications in project affected areas, attend to the level of technical information communicated to and consultation with all level of stakeholders involved.*<br><br>*<u>Clients</u>:*<br><br>*Greyling Liaison (currently Golder Associates); Bembani Sustainability (Pty) Ltd; Lidwala Environmental; Naledzi Environmental* |

**PROJECT EXPERIENCE**

**RENEWABLE POWER GENERATION PROJECTS**

***PHOTOVOLTAIC SOLAR ENERGY FACILITIES***

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

| ***Project Name & Location*** | ***Client Name*** | ***Role*** |
|---|---|---|
| *Lichtenburg PVs (3 PVs) & Power Lines (grid connection), Lichtenburg, North West Province* | *Atlantic Energy Partners*<br>*EAP: Savannah Environmental* | *Project Manage the Public Participation Process*<br>*Facilitate all meetings*<br>*Consultation with Government Officials, Key Stakeholders, Landowners & Community Leaders* |
| *Allepad PVs 4 PVs) & Power Lines (grid connection), Upington, Northern Cape Province* | *IL Energy*<br>*EAP: Savannah Environmental* | |
| *Hyperion Solar PV Developments (4 PVs) and Associated Infrastructures, Kathu, Northern Cape Province* | *Building Energy*<br>*EAP: Savannah Environmental* | |
| *Aggeneys Solar PV Developments (2 PVs) and Associated Infrastructures, Aggeneys, Northern Cape Province* | *Atlantic Energy Partners and ABO Wind*<br>*EAP: Savannah Environmental* | |
| *Upilanga Solar Park, Northern Cape (350MW CSP Tower)* | *Emvelo Capital Projects (Pty) Ltd* | |
| *Khunab Solar Development, consisting of Klip Punt PV1, McTaggarts PV1, McTaggarts PV2, McTaggarts PV3 and the Khunab solar Grid Connection near Upington, Northern Cape Province* | *Atlantic Energy Partners and Abengoa* | |
| *Sirius Solar PV3 and PV4, near Upington, Northern Cape Province* | *Solal* | |
| *Geelstert PV 1 and PV2 solar energy facilities, near Aggeneys, Northern Cape* | *ABO Wind* | |
| *Naledi PV and Ngwedi PV solar energy facilities, near Upington, Northern Cape* | *Atlantic Energy Partners and Abengoa* | |
| *Kotulo Tsatsi PV1, Kotulo Tsatsi PV3 and Kotulo Tsatsi PV4 solar energy facilities, near Kenhardt, Northern Cape* | *Kotulo Tsatsi Energy* | |
| *Tlisitseng PV, including Substations & Power Lines, Lichtenburg, North West Province* | *BioTherm Energy*<br>*EAP: SiVEST* | *Public Participation, Landowner and Community Consultation* |
| *Sendawo PVs, including Substations & Power Lines, Vryburg, North West Province* | | |
| *Helena Solar 1, 2 and 3 PVs, Copperton, Northern Cape Province* | | |
| *Farm Spes Bona 23552 Solar PV Plants, Bloemfontein, Free State Province* | *Surya Power*<br>*EAP: SiVEST* | *Public Participation, Landowner and Community Consultation* |
| *De Aar Solar Energy Facility, De Aar, Northern Cape Province* | *South Africa Mainstream Renewable Power Developments*<br>*EAP: SiVEST* | *Public Participation, Landowner and Community Consultation* |
| *Droogfontein Solar Energy Facility, Kimberley, Northern Cape Province* | | |
| *Kaalspruit Solar Energy Facility, Loeriesfontein, Northern Cape Province* | | |

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|---|---|---|
| *Platsjambok East PV, Prieska, Northern Cape Province* | | |
| *Renosterburg PV, De Aar, Northern Cape Province* | *Renosterberg Wind Energy Company*<br>*EAP: SiVEST* | *Public Participation, Landowner and Community Consultation* |
| *19MW Solar Power Plant on Farm 198 (Slypklip), Danielskuil, Northern Cape Province* | *Solar Reserve South Africa*<br>*EAP: SiVEST* | *Public Participation, Landowner and Community Consultation* |

***Basic Assessments and Environmental Management Programmes***

| ***Project Name & Location*** | ***Client Name*** | ***Role*** |
|---|---|---|
| *Upilanga Solar Park, Northern Cape (x6 100MW PV's and x3 350MW PV Basic Assessments)* | *Emvelo Capital Projects (Pty) Ltd* | *Project Manage the Public Participation Process*<br>*Facilitate all meetings*<br>*Consultation with Government Officials, Key Stakeholders, Landowners & Community Leaders* |
| *Sirius Solar PV Solar Energy Facility, Upington, Northern Cape Province* | *SOLA Future Energy* | |
| *Khunab Solar Development, consisting of Klip Punt PV1, McTaggarts PV1, McTaggarts PV2, McTaggarts PV3 and the Khunab solar Grid Connection near Upington, Northern Cape Province* | *Atlantic Energy Partners and Abengoa* | |

***WIND ENERGY FACILITIES***

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

| ***Project Name & Location*** | ***Client Name*** | ***Role*** |
|---|---|---|
| *Aletta Wind Farm, Copperton, Northern Cape Province* | *BioTherm Energy*<br>*EAP: SiVEST* | *Public Participation* |
| *Eureka Wind Farm, Copperton, Northern Cape Province* | | |
| *Loeriesfontein Wind Farm, Loeriesfontein, Northern Cape Province* | *South Africa Mainstream Renewable Power Developments*<br>*EAP: SiVEST* | *Public Participation* |
| *Droogfontein Wind Farm, Loeriesfontein, Northern Cape Province* | | |
| *Four Leeuwberg Wind Farms, Loeriesfontein, Northern Cape Province* | | |
| *Noupoort Wind Farm, Noupoort, Northern Cape Province* | | |
| *Mierdam PV & Wind Farm, Prieska, Northern Cape Province* | | |
| *Platsjambok West Wind Farm & PV, Prieska, Northern Cape Province* | | |

**Basic Assessments and Environmental Management Programmes**

| **Project Name & Location** | **Client Name** | **Role** |
|---|---|---|
| *Cluster of Renewable Energy Developments, Eastern Cape Province* | *Wind Relic* | |

| | | |
|---|---|---|
| *Nama Wind Energy Facility, Northern Cape Province* | *Genesis ECO*<br>*EAP: Savannah Environmental* | *Project Manage the Public Participation Process*<br>*Facilitate all meetings*<br>*Consultation with Government Officials, Key Stakeholders, Landowners & Community Leaders* |
| *Zonnequa Wind Energy Facility, Northern Cape Province* | | |

***CONCENTRATED SOLAR FACILITIES (CSP)***

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

| ***Project Name & Location*** | ***Client Name*** | ***Role*** |
|---|---|---|
| *Upington Concentrating Solar Plant and associated Infrastructures, Northern Cape Province* | *Eskom Holdings*<br>*EAP: Bohlweki Environmental* | *Project Manage the Public Participation Process*<br>*Facilitate all meetings*<br>*Consultation with Government Officials, Key Stakeholders, Landowners & Community Leaders* |

**CONVENTIONAL POWER GENERATION PROJECTS (GAS)**

**Environmental Impact Assessments and Environmental Management Programmes**

| **Project Name & Location** | **Client Name** | **Role** |
|---|---|---|
| 450MW gas to power project and associated 132kV power line, Richards bay, KwaZulu-Natal | Phinda Power Producers | *Project Manage the Public Participation Process*<br>*Facilitate all meetings*<br>*Consultation with Government Officials, Key Stakeholders & Landowners* |
| 4000MW gas to power project and associated 400kV power lines, Richards bay, KwaZulu-Natal | Phinda Power Producers | |
| Richards Bay Gas to Power Combined Cycle Power Station, KwaZulu-Natal | Eskom Holdings SoC Limited | |

**GRID INFRASTRUCTURE PROJECTS**

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

| ***Project Name & Location*** | ***Client Name*** | ***Role*** |
|---|---|---|
| *132/11kV Olifantshoek Substation and Power Line, Northern Cape* | *Eskom* | *Project Manage the Public Participation Process*<br>*Facilitate all meetings*<br>*Consultation with Government Officials, Key Stakeholders, Landowners & Community Leaders* |
| *Grid connection infrastructure for the Namas Wind Farm, Northern Cape Province* | *Genesis Namas Wind (Pty) Ltd* | |
| *Grid connection infrastructure for the Zonnequa Wind Farm, Northern Cape Province* | *Genesis Zonnequa Wind (Pty) Ltd* | |
| *Khunab Solar Grid Connection, near Upington, Northern Cape Province* | *Atlantic Energy Partners and Abengoa* | |
| *Pluto-Mahikeng Main Transmission Substation and 400kV Power Line (Carletonville to Mahikeng), Gauteng and North West Provinces* | *Eskom Holdings*<br>*EAP: Baagi Environmental* | |
| *Thyspunt Transmission Lines Integration Project, Eastern Cape Province* | *Eskom Holdings*<br>*EAP: SiVEST* | *Public Participation, Landowner and Community Consultation* |
| *Westrand Strengthening Project, Gauteng Province* | | *Public Participation,* |

| | | |
|---|---|---|
| *Mookodi Integration Project, North-West Province* | | |
| *Transnet Coallink, Mpumalanga and KwaZulu-Natal Provinces* | | |
| *Delarey-Kopela-Phahameng Distribution power line and newly proposed Substations, North-West Province* | | *Public Participation, Landowner and Community Consultation* |
| *Invubu-Theta 400kV Eskom Transmission Power Line, KwaZulu-Natal Province* | *Eskom Holding*<br>*EAP: Bembani Environmental* | |
| *Melkhout-Kudu-Grassridge 132kV Power Line Project (project not submitted to DEA), Eastern Cape Province* | *Eskom Holdings*<br>*EAP: SiVEST* | *Public Participation, Landowner and Community Consultation* |
| *Tweespruit-Welroux-Driedorp-Wepener 132Kv Power Line, Free State Province* | | |
| *Kuruman 132Kv Power Line Upgrade, Northern Cape Province* | *Eskom Holdings*<br>*EAP: Zitholele* | |
| *Vaalbank 132Kv Power Line, Free State Province* | | |
| *Pongola-Candover-Golela 132kV Power Line (Impact Phase), KwaZulu-Natal Province* | | |

**PART 2 AMENDMENTs**

| ***Project Name & Location*** | ***Client Name*** | ***Role*** |
|---|---|---|
| *Transalloys Coal-Fired Power Station near Emalahleni, Mpumalanga Province* | *Transalloys (Pty) Ltd* | *Project Manage the Public Participation Process* |
| *Zen Wind Energy Facility, Western Cape* | *Energy Team (Pty) Ltd* | |
| *Hartebeest Wind Energy Facility, Western Cape* | *juwi Renewable Energies (Pty) Ltd* | |
| *Khai-Ma and Korana Wind Energy Facilities* | *Mainstream Renewable Power (Pty) Ltd* | |

**FACILITATION**

| ***Project Name & Location*** | ***Client Name*** | ***Meeting Type*** |
|---|---|---|
| Bloemfontein Strengthening Project, Free State Province | Eskom Holdings<br>EAP: Baagi Environmental | Public Meetings |
| Mooidraai-Smitkloof 132kV Power Line and Substation, Northern Cape Province | Eskom Holdings<br>EAP: SSI | Focus Group Meetings |
| Aggeneis-Oranjemond 400kV Eskom Transmission Power Line, Northern Cape Province | Eskom Holdings<br>EAP: Savannah Environmental | Focus Group Meetings &<br>Public Meetings |
| Ariadne-Eros 400kV/132kV Multi-Circuit Transmission Power Line (Public Meetings) | Eskom Holdings<br>EAP: ACER Africa | Public Meetings |
| Majuba-Venus 765kV Transmission Power Lines, Mpumlanaga Province | | |
| Thabametsi IPP Power Station, Limpopo Province | Thabametsi Power Company<br>EAP: Savannah Environmental | Focus Group Meeting &<br>Public Meeting |
| Aggeneis-Oranjemond Transmission Line & Substation Upgrade, Northern Cape | Eskom Transmission | Focus Group Meetings &<br>Public Meetings |

**SCREENING STUDIES**

| ***Project Name & Location*** | ***Client Name*** | ***Role*** |
|---|---|---|
| *Potential Power Line Alternatives from Humansdorp to Port Elizabeth, Eastern Cape Province* | *Nelson Mandela Bay Municipality*<br>*EAP: SiVEST* | *Social Assessment* |

**ASH DISPOSAL FACILITIES**

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

| ***Project Name & Location*** | ***Client Name*** | ***Role*** |
|---|---|---|
| *Medupi Flue Gas Desulphurisation Project (up to completion of Scoping Phase), Limpopo Province* | *Eskom Holdings SOC Ltd*<br>*EAP: Zitholele Consulting* | *Public Participation, Landowner and Community Consultation* |
| *Kendal 30-year Ash Disposal Facility, Mpumalanga Province* | | |
| *Kusile 60-year Ash Disposal Facility, Mpumalanga Province* | | |
| *Camden Power Station Ash Disposal Facility, Mpumalanga Province* | | |
| *Tutuka Fabric Filter Retrofit and Dust Handling Plant Projects, Mpumalanga Province* | *Eskom Holdings SOC Ltd*<br>*EAP: Lidwala Environmental* | |
| *Eskom's Majuba and Tutuka Ash Dump Expansion, Mpumalanga Province* | | |
| *Hendrina Ash Dam Expansion, Mpumalanga Province* | | |

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

***Basic Assessments***

| ***Project Name & Location*** | ***Client Name*** | ***Role*** |
|---|---|---|
| *Expansion of LOX and Diesel Storage at the Air Products Facility in Coega, Eastern Cape* | *Air Products South Africa (Pty) Ltd* | *Project Manage the Public Participation Process*<br>*Facilitate all meetings*<br>*Consultation with Government Officials, Key Stakeholders & Landowners* |
| *Transnet's New Multi-Products Pipeline traversing Kwa-Zulu Natal, Free State and Gauteng Provinces* | *Transnet*<br>*EAP: Bohlweki Environmental* | |
| *Realignment of the Bulshoek Dam Weir near Klawer and the Doring River Weir near Clanwilliam, Western Cape Province* | *Dept of Water and Sanitation*<br>*EAP: Zitholele* | *Public Participation* |

**STAKEHOLDER ENGAGEMENT**

| ***Project Name & Location*** | ***Client Name*** | ***Role*** |
|---|---|---|
| *Socio-Economic Impact Study for the shutdown and repurposing of Eskom Power Stations: Komati Power Station, Hendrina Power Station & Grootvlei Power Station* | *Urban-Econ* | *Project Management for the stakeholder engagement with Community* |

| | | |
|---|---|---|
| | | *Representatives in the primary data capture area* |
| *First State of Waste Report for South Africa* | *Golder Associates on behalf of the Department of Environmental Affairs* | *Secretarial Services* |
| *Determination, Review and Implementation of the Reserve in the Olifants/Letaba System* | *Golder Associates on behalf of the Department of Water and Sanitation* | |
| *Orange River Bulk Water Supply System* | | |
| *Levuvu-Letaba Resources Quality Objectives* | | |

**FACILITATION**

| ***Project Name & Location*** | ***Client Name*** | ***Meeting Type*** |
|---|---|---|
| *Determination, Review and Implementation of the Reserve in the Olifants/Letaba System* | *Department of Water and Sanitation*<br>*Golder Associates* | *Secretarial Services* |
| *Orange River Bulk Water Supply System* | | *Secretarial Services* |
| *Levuvu-Letaba Resources Quality Objectives* | | *Secretarial Services* |
| *SmancorCR Chemical Plant (Public Meeting), Gauteng Province* | *Samancor Chrome (Pty) Ltd*<br>*EAP: Environment al Science Associates* | *Public Meeting* |
| *SANRAL N4 Toll Highway Project (2nd Phase), Gauteng & North West Provinces* | *Department of Transport*<br>*EAP: Bohlweki Environmental* | *Public Meetings* |

**MINING SECTOR**

**Environmental Impact Assessment and Environmental Management Programme**

| **Project Name & Location** | **Client Name** | **Role** |
|---|---|---|
| *Zero Waste Recovery Plant at highveld Steel, Mpumalanga Province* | *Anglo African Metals*<br>*EAP: Savannah Environmental* | *Public Participation* |
| *Koffiefontein Slimes Dam, Free State Province* | *Petra Diamond Mines*<br>*EAP: Zitholele* | *Public Participation* |
| *Baobab Project: Ethenol Plant, Chimbanje, Middle Sabie, Zimbabwe* | *Applicant: Green Fuel*<br>*EAP: SiVEST* | *Public Participation & Community Consultation* |
| *BHP Billiton Energy Coal SA's Middelburg Water Treatment Plant, Mpumalanga* | *BHP Billiton Group*<br>*EAP: Jones & Wagener* | *Public Participation* |

**ENVIRONMENTAL AUTHORISATION AMENDMENTS**

| ***Project Name & Location*** | ***Client Name*** | ***Role*** |
|---|---|---|
| *Transalloys Coal-Fired Power Station near Emalahleni, Mpumalanga Province* | *Transalloys (Pty) Ltd* | *Public Participation* |
| *Zen Wind Energy Facility, Western Cape* | *Energy Team (Pty) Ltd* | |
| *Hartebeest Wind Energy Facility, Western Cape* | *juwi Renewable Energies (Pty) Ltd* | |
| *Khai-Ma and Korana Wind Energy Facilities* | *Mainstream Renewable Power (Pty) Ltd* | |
| *Beaufort West 280MW Wind Farm into two 140MW Trakas and Beaufort West Wind Farms, Western Cape* | *South Africa Mainstream Renewable Power Developments*<br>*EAP: SiVEST* | |

**SECTION 54 AUDITS**

| ***Project Name & Location*** | ***Client Name*** | ***Role*** |
|---|---|---|
| *Mulilo 20MW PV Facility, Prieska, Northern Cape* | *Mulilo (Pty) Ltd* | *Public Participation: I&AP Notification process* |
| *Mulilo 10MW PV Facility, De Aar, Northern Cape* | *Mulilo (Pty) Ltd* | |
| *Karoshoek CSP 1 Facility/ Solar One, Upington, Northern Cape* | *Karoshoek Solar One (Pty) Ltd* | |

# APPENDIX K:
# APPLICABLE LEGISLATION

# APPLICABLE LEGISLATION

**Table 1:** Applicable Legislation, Policies and/or Guidelines associated with the development of the Aberdeen Wind Facility 1.

| Legislation | Applicable Requirements | Relevant Authority | Compliance Requirements |
|---|---|---|---|
| **National Legislation** | | | |
| Constitution of the Republic of South Africa (No. 108 of 1996) | In terms of Section 24, the State has an obligation to give effect to the environmental right. The environmental right states that:<br><br>"*Everyone has the right –*<br>» *To an environment that is not harmful to their health or well-being, and*<br>» *To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:*<br>* *Prevent pollution and ecological degradation,*<br>* *Promote conservation, and*<br>* *Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development*." | Applicable to all authorities | There are no permitting requirements associated with this Act. The application of the Environmental Right however implies that environmental impacts associated with proposed developments are considered separately and cumulatively. It is also important to note that the "right to an environment clause" includes the notion that justifiable economic and social development should be promoted, through the use of natural resources and ecologically sustainable development. |
| National Environmental Management Act (No 107 of 1998) (NEMA) | The 2014 EIA Regulations have been promulgated in terms of Chapter 5 of NEMA. Listed activities which may not commence without EA are identified within the Listing Notices (GNR 327, GNR 325 and GNR 324) which form part of these Regulations (GNR 326).<br><br>In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation.<br><br>Considering the location of the project site within the Beaufort West Renewable Energy Development Zone and the requirements GNR114 of 16 February 2018, a Basic Assessment Process is required to be undertaken for the proposed project. All relevant listing notices for the project (GN R327, GN R325 and GN R324) will be applied for. | DFFE – Competent Authority<br><br>DEDEAT – Commenting Authority | The listed activities triggered by the project have been identified and are being assessed as part of the BA process. The Basic Assessment process will culminate in the submission of a final Basic Assessment Report to the competent authority in support of the application for EA. |
| National Environmental Management Act (No 107 of 1998) (NEMA) | In terms of the "Duty of Care and Remediation of Environmental Damage" provision in Section 28(1) of NEMA every person who causes, | DFFE | While no permitting or licensing requirements arise directly by virtue of the proposed project, this section |

| Legislation | Applicable Requirements | Relevant Authority | Compliance Requirements |
|---|---|---|---|
| | has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.<br><br>In terms of NEMA, it is the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts. | DEDEAT | finds application through the consideration of potential cumulative, direct, and indirect impacts. It will continue to apply throughout the life cycle of the project. |
| Environment Conservation Act (No. 73 of 1989) (ECA) | The Noise Control Regulations in terms of Section 25 of the ECA contain regulations applicable for the control of noise in the Provinces of Limpopo, North West, Mpumalanga, Northern Cape, Eastern Cape, and KwaZulu-Natal Provinces.<br><br>The Noise Control Regulations cover the powers of a local authority, general prohibitions, prohibitions of disturbing noise, prohibitions of noise nuisance, use of measuring instruments, exemptions, attachments, and penalties.<br><br>In terms of the Noise Control Regulations, no person shall make, produce or cause a disturbing noise, or allow it to be made, produced or caused by any person, machine, device or apparatus or any combination thereof (Regulation 04). | DFFE<br><br>DEDEAT<br><br>Dr Beyers Naude Local Municipality | Noise impacts are expected to be associated with the construction and operation phases of the project.<br><br>A Noise Impact Assessment (**Appendix J**) has been undertaken for the Aberdeen Wind Facility 1 which indicates that the impact of the project will be of low significance, with the implementation of mitigation measures. |
| National Water Act (No. 36 of 1998) (NWA) | A water use listed under Section 21 of the NWA must be licensed with the Regional DWS, unless it is listed in Schedule 1 of the NWA (i.e. is an existing lawful use), is permissible under a GA, or if a responsible authority waives the need for a licence.<br><br>Water use is defined broadly, and includes consumptive and non-consumptive water uses, taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation.<br><br>Consumptive water uses may include taking water from a water resource (Section 21(a)) and storing water (Section 21(b)). | Regional Department of Water and Sanitation | The project site considered for the establishment of the wind farm and associated infrastructure is associated with the presence of Ganneleegte and Kraai River systems as identified in the Aquatic Impact Assessment (**Appendix E**).<br><br>Where the development activities impede or divert the flow of water in a watercourse, or alter the bed, banks, course or characteristics of a watercourse, Section 21(c) and 21(i) of the NWA (Act 36 of 1998) would be triggered and the project proponent would need to apply for a WUL or register a GA with the DWS. |

| Legislation | Applicable Requirements | Relevant Authority | Compliance Requirements |
|---|---|---|---|
| | Non-consumptive water uses may include impeding or diverting of flow in a water course (Section 21(c)), and altering of bed, banks or characteristics of a watercourse (Section 21(i)). | | |
| Minerals and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA) | In accordance with the provisions of the MPRDA a mining permit is required in accordance with Section 27(6) of the Act where a mineral in question is to be mined, including the mining of materials from a borrow pit. | Department of Mineral Resources and Energy (DMRE) | Any person who wishes to apply for a mining permit in accordance with Section 27(6) must simultaneously apply for an Environmental Authorisation in terms of NEMA. No borrow pits are expected to be required for the construction of the project, and as a result a mining permit or EA in this regard is not required to be obtained. |
| | Section 53 of the MPRDA states that any person who intends to use the surface of any land in any way which may be contrary to any object of the Act, or which is likely to impede any such object must apply to the Minister for approval in the prescribed manner. | | In terms of Section 53 of the MPRDA approval is required from the Minister of Mineral Resources and Energy to ensure that the proposed development does not sterilise a mineral resource that might occur on site. |
| National Environmental Management: Air Quality Act (No. 39 of 2004) (NEM:AQA) | The National Dust Control Regulations (GNR 827) published under Section 32 of NEM:AQA prescribe the general measures for the control of dust in all areas, and provide a standard for acceptable dustfall rates for residential and non-residential areas.<br><br>In accordance with the Regulations (GNR 827) any person who conducts any activity in such a way as to give rise to dust in quantities and concentrations that may exceed the dustfall standard set out in Regulation 03 must, upon receipt of a notice from the air quality officer, implement a dustfall monitoring programme.<br><br>Any person who has exceeded the dustfall standard set out in Regulation 03 must, within three months after submission of the dustfall monitoring report, develop and submit a dust management plan to the air quality officer for approval. | DEDEAT<br><br>Sarah Baartman District Municipality | In the event that the project results in the generation of excessive levels of dust the possibility could exist that a dustfall monitoring programme would be required for the project, in which case dustfall monitoring results from the dustfall monitoring programme would need to be included in a dust monitoring report, and a dust management plan would need to be developed. However, with mitigation measures implemented, the Aberdeen Wind Facility 1 is not anticipated to result in significant dust generation with mitigation. |

| Legislation | Applicable Requirements | Relevant Authority | Compliance Requirements |
|---|---|---|---|
| National Heritage Resources Act (No. 25 of 1999) (NHRA) | Section 07 of the NHRA stipulates assessment criteria and categories of heritage resources according to their significance.<br><br>Section 35 of the NHRA provides for the protection of all archaeological and palaeontological sites, and meteorites.<br><br>Section 36 of the NHRA provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority.<br><br>Section 38 of the NHRA lists activities which require developers or any person who intends to undertake a listed activity to notify the responsible heritage resources authority and furnish it with details regarding the location, nature, and extent of the proposed development.<br><br>Section 44 of the NHRA requires the compilation of a Conservation Management Plan as well as a permit from SAHRA for the presentation of archaeological sites as part of tourism attraction. | South African Heritage Resources Agency (SAHRA)<br><br>Eastern Cape Provincial Heritage Resources Authority | A full Heritage Impact Assessment (HIA) (with field work) has been undertaken as part of the Basic Assessment process (refer to **Appendix H** of this Basic Assessment Report). Sites of varying significance, including cultural landscapes, have been identified within the project site and specific mitigation measures have been recommended by the specialist with regards to each identified find.<br><br>Should a heritage resource be impacted upon, a permit may be required from SAHRA or Eastern Cape Provincial Heritage Resources Authority in accordance with of Section 48 of the NHRA, and the SAHRA Permit Regulations (GN R668). This will be determined as part of the final walk-through survey once the final location of the development footprint and its associated infrastructure has been determined. |
| National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA) | Section 53 of NEM:BA provides for the MEC / Minister to identify any process or activity in such a listed ecosystem as a threatening process.<br><br>Three government notices have been published in terms of Section 56(1) of NEM:BA as follows:<br><br>» Commencement of TOPS Regulations, 2007 (GNR 150).<br>» Lists of critically endangered, vulnerable and protected species (GNR 151).<br>» TOPS Regulations (GNR 152).<br><br>It provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), and vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (NEM:BA: National list of ecosystems that are | DFFE<br><br>DEDEAT | Under NEM:BA, a permit would be required for any activity that is of a nature that may negatively impact on the survival of a listed protected species.<br><br>The Ecological Impact Assessment (**Appendix D**) has identified species of conservation concern present at the project site. *Peersia frithii; Tridentea virescens*; Sensitive Species 1212 and Sensitive Species 1039 were noted as potential plant species of conservation concern within the broader area, with only Sensitive Species 1212 occurring on site. The Mountain Reedbuck, Black-footed Cat and Karoo Dwarf Tortoise are potential animal species of conservation concern known to occur within the broader area, but with not confirmed as occurring on site. |

| Legislation | Applicable Requirements | Relevant Authority | Compliance Requirements |
|---|---|---|---|
| | threatened and in need of protection, (Government Gazette 37596, GNR 324), 29 April 2014). | | |
| National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA) | Chapter 5 of NEM:BA pertains to alien and invasive species, and states that a person may not carry out a restricted activity involving a specimen of an alien species without a permit issued in terms of Chapter 7 of NEM:BA, and that a permit may only be issued after a prescribed assessment of risks and potential impacts on biodiversity is carried out.<br><br>Applicable, and exempted alien and invasive species are contained within the Alien and Invasive Species List (GNR 864). | DFFE<br><br>DEDEAT | The Ecological Impact Assessment (**Appendix D**) has been undertaken as part of the EIA process to identify the presence of any alien and invasive species present on site. |
| Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA) | Section 05 of CARA provides for the prohibition of the spreading of weeds.<br><br>Regulation 15 of GN R1048 published under CARA provides for the classification of categories of weeds and invader plants, and restrictions in terms of where these species may occur.<br><br>Regulation 15E of GN R1048 published under CARA provides requirement and methods to implement control measures for different categories of alien and invasive plant species. | Department of Agriculture, Land Reform and Rural Development (DALRD) | CARA will find application throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies need to be developed and implemented. In addition, a weed control and management plan must be implemented.<br><br>In terms of Regulation 15E (GN R1048) where Category 1, 2 or 3 plants occur a land user is required to control such plants by means of one or more of the following methods:<br><br>» Uprooting, felling, cutting or burning.<br>» Treatment with a weed killer that is registered for use in connection with such plants in accordance with the directions for the use of such a weed killer.<br>» Biological control carried out in accordance with the stipulations of the Agricultural Pests Act (No. 36 of 1983), the ECA and any other applicable legislation.<br>» Any other method of treatment recognised by the executive officer that has as its object the control of plants concerned, subject to the provisions of sub-regulation 4. |

| Legislation | Applicable Requirements | Relevant Authority | Compliance Requirements |
|---|---|---|---|
| | | | » A combination of one or more of the methods prescribed, save that biological control reserves and areas where biological control agents are effective shall not be disturbed by other control methods to the extent that the agents are destroyed or become ineffective. |
| National Forests Act (No. 84 of 1998) (NFA) | According to this Act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. Notice of the List of Protected Tree Species under the National Forests Act (No. 84 of 1998) was published in GNR 734.<br><br>The prohibitions provide that "no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister". | Department of Agriculture, Land Reform and Rural Development (DALRD) | A licence is required for the removal of protected trees. It is therefore necessary to conduct a survey that will determine the number and relevant details pertaining to protected tree species present in the development footprint for the submission of relevant permits to authorities prior to the disturbance of these individuals.<br><br>The Ecological Impact Assessment undertaken as part of the BA Report included the identification of any protected tree species which may require a license in terms of the NFA (No. 84 of 1998) within the development footprint (refer to **Appendix D** of this BA Report). |
| National Veld and Forest Fire Act (No. 101 of 1998) (NVFFA) | Chapter 4 of the NVFFA places a duty on owners to prepare and maintain firebreaks, the procedure in this regard, and the role of adjoining owners and the fire protection association. Provision is also made for the making of firebreaks on the international boundary of the Republic of South Africa. The applicant must ensure that firebreaks are wide and long enough to have a reasonable chance of preventing a veldfire from spreading to or from neighbouring land, it does not cause soil erosion, and it is reasonably free of inflammable material capable of carrying a veldfire across it.<br><br>Chapter 5 of the Act places a duty on all owners to acquire equipment and have available personnel to fight fires. Every owner on whose land a veldfire may start or burn or from whose land it may spread must have such equipment, protective clothing and trained personnel for extinguishing fires, and ensure that in his or her absence responsible persons are present on or near his or her land who, in the event of fire, | DFFE | While no permitting or licensing requirements arise from this legislation, this Act will be applicable during the construction and operation of the Aberdeen Wind Facility 1, in terms of the preparation and maintenance of firebreaks, and the need to provide appropriate equipment and trained personnel for firefighting purposes. |

| Legislation | Applicable Requirements | Relevant Authority | Compliance Requirements |
|---|---|---|---|
| | will extinguish the fire or assist in doing so, and take all reasonable steps to alert the owners of adjoining land and the relevant fire protection association, if any. | | |
| Hazardous Substances Act (No. 15 of 1973) (HAS) | This Act regulates the control of substances that may cause injury, or ill health, or death due to their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger, to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products.<br><br>» Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc., nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared as Group I or Group II substance<br>» Group IV: any electronic product, and<br>» Group V: any radioactive material.<br><br>The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force. | Department of Health (DoH) | It is necessary to identify and list all Group I, II, III, and IV hazardous substances that may be on site and in what operational context they are used, stored or handled. If applicable, a license would be required to be obtained from the Department of Health (DoH). |
| National Environmental Management: Waste Act (No. 59 of 2008) (NEM:WA) | The Minister may by notice in the Gazette publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment.<br><br>The Minister may amend the list by –<br><br>» Adding other waste management activities to the list.<br>» Removing waste management activities from the list.<br>» Making other changes to the particulars on the list.<br><br>In terms of the Regulations published in terms of NEM:WA (GNR 912), a BA or EIA is required to be undertaken for identified listed activities. | DFFE– Hazardous Waste<br><br>DEDEAT – general waste | No waste listed activities are triggered by the Aberdeen Wind Facility 1, therefore, no Waste Management License is required to be obtained. General and hazardous waste handling, storage and disposal will be required during construction and operation. The National Norms and Standards for the Storage of Waste (GNR 926) published under Section 7(1)(c) of NEM:WA will need to be considered in this regard. |

| Legislation | Applicable Requirements | Relevant Authority | Compliance Requirements |
|---|---|---|---|
| | Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that:<br>» The containers in which any waste is stored, are intact and not corroded or in<br>» Any other way rendered unlit for the safe storage of waste.<br>» Adequate measures are taken to prevent accidental spillage or leaking.<br>» The waste cannot be blown away.<br>» Nuisances such as odour, visual impacts and breeding of vectors do not arise, and<br>» Pollution of the environment and harm to health are prevented. | | |
| National Road Traffic Act (No. 93 of 1996) (NRTA) | The technical recommendations for highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed.<br><br>Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts.<br><br>The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations. | South African National Roads Agency (SANRAL) – national roads<br><br>Eastern Cape Department of Transport | An abnormal load/vehicle permit will be required to transport the various components to site for construction. These include:<br>» Route clearances and permits will be required for vehicles carrying abnormally heavy or abnormally dimensioned loads.<br>» Transport vehicles exceeding the dimensional limitations (length) of 22m.<br>» Depending on the trailer configuration and height when loaded, some of the project components may not meet specified dimensional limitations (height and width). |
| Astronomy Geographic Advantage Act (Act No. 21 of 2007) | The Astronomy Geographic Advantage (AGA) Act (No. 21 of 2007) provides for the preservation and protection of areas within South Africa that are uniquely suited for optical and radio astronomy; for intergovernmental co-operation and public consultation on matters | Department of Science and Technology. | The site proposed for the development of the Aberdeen Wind Facility 1 is located within the Eastern Cape Province and therefore falls outside of the area considered to be uniquely suited in terms of nationally significant astronomy advantage areas. |

| Legislation | Applicable Requirements | Relevant Authority | Compliance Requirements |
|---|---|---|---|
| | concerning nationally significant astronomy advantage areas and for matters connected thereto.<br><br>Chapter 2 of the Act allows for the declaration of astronomy advantage areas whilst Chapter 3 pertains to the management and control of astronomy advantage areas. Management and control of astronomy advantage areas include, amongst others, the following:<br>* Restrictions on use of radio frequency spectrum in astronomy advantage areas<br>* Declared activities in core or central astronomy advantage area<br>* Identified activities in coordinated astronomy advantage area; and<br>* Authorisation to undertake identified activities. | | |
| Aviation Act (Act No 74 of 1962) 13th amendment of the Civil Aviation Regulations (CARS) 1997 | Any structure exceeding 45m above ground level or structures where the top of the structure exceeds 150m above the mean ground level, the mean ground level considered to be the lowest point in a 3km radius around such structure.<br><br>Structures lower than 45m, which are considered as a danger to aviation shall be marked as such when specified.<br><br>Overhead wires, cables etc., crossing a river, valley or major roads shall be marked and in addition their supporting towers marked and lighted if an aeronautical study indicates it could constitute a hazard to aircraft.<br><br>Section 14 of Obstacle limitations and marking outside aerodrome or heliport – CAR Part 139.01.33 relates specifically to appropriate marking of wind energy facilities. | South African Civil Aviation Authority (SACAA) | This Act will find application during the operation phase of Aberdeen Wind Facility 1. Appropriate marking on the project infrastructure is required to meet the specifications as detailed in the CAR Part 139.01.33. An obstacle approval for the wind energy facility is required to be obtained from the SACAA |
| | ***Provincial Policies / Legislation*** | | |

| Legislation | Applicable Requirements | Relevant Authority | Compliance Requirements |
|---|---|---|---|
| Nature and Environmental Conservation Ordinance (Act 19 of 1974) as amended. | The Nature and Environmental Ordinance 19 of 1974 defines the protection status of plants as follows:<br>• ''endangered flora'' means flora of any species which is in danger of extinction and is specified in Schedule 3 or Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, Washington, 1973; provided that it shall not include flora of any species specified in such Appendix and Schedule 4; (therefore all Schedule 3 species)<br>• ''protected flora'' means any species of flora specified in Schedule 4 or Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, Washington, 1973; provided that it shall not include any species of flora specified in such Appendix and Schedule 3<br>• ''indigenous unprotected flora'' means any species of indigenous flora not specified in Schedule 3 or 4. | Eastern Cape DEDEAT | Where protected plants are to be disturbed or destroyed by the development of the wind farm, the relevant permits need to be obtained. A collection/destruction permit must be obtained from the Eastern Cape DEDEAT for the removal of any protected plant or animal species found on site.<br><br>Ground truthing confirmed Species of Conservation Concern to be present within the study area (**Appendix D**). Based on the SANBI POSA records for the site and surrounding area, other species of conservation concern are potentially present on the site. |

# APPENDIX L:
# CHANCE FINDS PROCEDURE

CTS HERITAGE

**CHANCE FINDS OF PALAEONTOLOGICAL MATERIAL**

*(Adopted from the HWC Chance Fossils Finds Procedure: June 2016)*

## Introduction

This document is aimed to inform workmen and foremen working on a construction and/or mining site. It describes the procedure to follow in instances of accidental discovery of palaeontological material (please see attached poster with descriptions of palaeontological material) during construction/mining activities. This protocol does not apply to resources already identified under an assessment undertaken under s. 38 of the National Heritage Resources Act (no 25 of 1999).

Fossils are rare and irreplaceable. Fossils tell us about the environmental conditions that existed in a specific geographical area millions of years ago. As heritage resources that inform us of the history of a place, fossils are public property that the State is required to manage and conserve on behalf of all the citizens of South Africa. Fossils are therefore protected by the National Heritage Resources Act and are the property of the State. Ideally, a qualified person should be responsible for the recovery of fossils noticed during construction/mining to ensure that all relevant contextual information is recorded.

Heritage Authorities often rely on workmen and foremen to report finds, and thereby contribute to our knowledge of South Africa's past and contribute to its conservation for future generations.

## Training

Workmen and foremen need to be trained in the procedure to follow in instances of accidental discovery of fossil material, in a similar way to the Health and Safety protocol. A brief introduction to the process to follow in the event of possible accidental discovery of fossils should be conducted by the designated Environmental Control Officer (ECO) for the project, or the foreman or site agent in the absence of the ECO It is recommended that copies of the attached poster and procedure are printed out and displayed at the site office so that workmen may familiarise themselves with them and are thereby prepared in the event that accidental discovery of fossil material takes place.

**Actions to be taken**

One person in the staff must be identified and appointed as responsible for the implementation of the attached protocol in instances of accidental fossil discovery and must report to the ECO or site agent. If the ECO or site agent is not present on site, then the responsible person on site should follow the protocol correctly in order to not jeopardize the conservation and well-being of the fossil material.

Once a workman notices possible fossil material, he/she should report this to the ECO or site agent.Procedure to follow if it is likely that the material identified is a fossil:

- The ECO or site agent must ensure that all work ceases immediately in the vicinity of the area where the fossil or fossils have been found;
- The ECO or site agent must inform SAHRA of the find immediately. This information must include photographs of the findings and GPS co-ordinates;
- The ECO or site agent must compile a Preliminary Report and fill in the attached Fossil Discoveries: Preliminary Record Form within 24 hours without removing the fossil from its original position. The Preliminary Report records basic information about the find including:
    - The date
    - A description of the discovery
    - A description of the fossil and its context (e.g. position and depth of find)
    - Where and how the find has been stored
    - Photographs to accompany the preliminary report (the more the better):
        - A scale must be used
        - Photos of location from several angles
        - Photos of vertical section should be provided
        - Digital images of hole showing vertical section (side);
        - Digital images of fossil or fossils.

Upon receipt of this Preliminary Report, SAHRA will inform the ECO or site agent whether or not a rescue excavation or rescue collection by a palaeontologist is necessary.

- Exposed finds must be stabilised where they are unstable and the site capped, e.g. with a plastic sheet or sand bags. This protection should allow for the later excavation of the finds with due scientific care and diligence. SAHRA can advise on the most appropriate method for stabilisation.
- If the find cannot be stabilised, the fossil may be collect with extreme care by the ECO or the site agent and put aside and protected until SAHRA advises on further action. Finds collected in this way must be safely and securely stored in tissue paper and an appropriate box. Care must be taken to remove the all fossil material and any breakage of fossil material must be avoided at all costs.

No work may continue in the vicinity of the find until SAHRA has indicated, in writing, that it is appropriate to proceed.

CTS HERITAGE

| FOSSIL DISCOVERIES: PRELIMINARY RECORDING FORM | | |
|---|---|---|
| Name of project: | | |
| Name of fossil location: | | |
| Date of discovery: | | |
| Description of situation in which the fossil was found: | | |
| Description of context in which the fossil was found: | | |
| Description and condition of fossil identified: | | |
| GPS coordinates: | *Lat:* | *Long:* |
| If no co-ordinates available then please describe the location: | | |
| Time of discovery: | | |
| Depth of find in hole | | |
| Photographs (tick as appropriate and indicate number of the photograph) | *Digital image of vertical section (side)* | |
| | *Fossil from different angles* | |
| | *Wider context of the find* | |
| Temporary storage (where it is located and how it is conserved) | | |
| Person identifying the fossil Name: | | |
| Contact: | | |
| Recorder Name: | | |
| Contact: | | |
| Photographer Name: | | |
| Contact: | | |

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# APPENDIX M:
# EROSION MANAGEMENT PLAN

# EROSION MANAGEMENT PLAN

## 1. EROSION MANAGEMENT PRINCIPLES

The goals of erosion control during and after construction at the site should be to:

» Protect the land surface from erosion;
» Intercept and safely direct run-off water from undisturbed upslope areas through the site without allowing it to cause erosion within the site or become contaminated with sediment; and
» Progressively revegetate or stabilise disturbed areas.

These goals can be achieved by applying the management practices outlined in the following sections.

### 4.1. On-Site Erosion Management

Soil erosion is a frequent risk associated with developments such as the wind farm on account of the vegetation clearing and disturbance associated with the construction phase of the development and may continue occurring throughout the operation phase. Service roads and installed infrastructure will generate increased direct runoff during intense rainfall events and may exacerbate the loss of topsoil and the effects of erosion. These eroded materials may enter the nearby watercourses and may potentially impact these systems through siltation and change in chemistry and turbidity of the water. General factors to consider regarding erosion risk at the site includes the following:

» Due to the sandy nature of soils in the study area, soil loss will be greater during dry periods as it is more prone to wind erosion. Therefore, precautions to prevent erosion should be present throughout the year.
» Reduction of a stable vegetation cover and associated below-ground biomass that currently increases soil surface porosity, water infiltration rates and thus improves the soil moisture availability. Without the vegetation, the soil will be prone to extensive surface capping, leading to accelerated erosion and further loss of organic material and soil seed reserves from the local environment.
» Soil loss is related to the length of time that soils are exposed prior to rehabilitation or stabilisation. Therefore, the gap between construction activities and rehabilitation should be minimised. Phased construction and progressive rehabilitation, where practically possible, are therefore important elements of the erosion control strategy.
» The extent of disturbance will influence the risk and consequences of erosion. Therefore, site clearing should be restricted to areas required for construction purposes only. As far as possible, large areas should not be cleared all at once, especially in areas where the risk of erosion is higher.
» Roads should be planned and constructed in a manner which minimises their erosion potential. Roads should therefore follow the natural contour as far as possible. Roads parallel to the slope direction should be avoided as far as possible.
» Where necessary, new roads constructed should include water diversion structures with energy dissipation features present to slow and disperse the water into the receiving area.
» Roads used for project-related activities and other disturbed areas should be regularly monitored for erosion. Any erosion problems recorded should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.
» Runoff may have to be specifically channelled or storm water adequately controlled to prevent localised rill and gully erosion.
» Compacted areas should have adequate drainage systems to avoid pooling and surface flow. Heavy machinery should not compact those areas which are not intended to be compacted as this will result

in compacted hydrophobic, water repellent soils which increase the erosion potential of the area. Where compaction does occur, the areas should be ripped.
» All bare areas should be revegetated with appropriate locally occurring species, to bind the soil and limit erosion potential.
» Silt fences should be used where there is a danger of topsoil or material stockpiles eroding and entering streams and other sensitive areas.
» Gabions and other stabilisation features must be used on steep slopes and other areas vulnerable to erosion to minimise erosion risk as far as possible.
» Activity at the site after large rainfall events when the soils are wet and erosion risk is increased should be reduced. No driving off of hardened roads should occur at any time, and particularly immediately following large rainfall events.
» Topsoil should be removed and stored in a designated area separately from subsoil and away from construction activities (as per the recommendations in the EMPr). Topsoil should be reapplied where appropriate as soon as possible in order to encourage and facilitate rapid regeneration of the natural vegetation in cleared areas.
» Regular monitoring of the site for erosion problems during construction (on-going) and operation (at least twice annually) is recommended, particularly after large summer thunderstorms have been experienced. The ECO will determine the frequency of monitoring based on the severity of the impacts in the erosion prone areas.

### 4.1.1 Erosion control mechanisms

The contractor may use the following mechanisms (whichever proves more appropriate/ effective) to combat erosion when necessary:

» Reno mattresses;
» Slope attenuation;
» Hessian material;
» Shade catch nets;
» Gabion baskets;
» Silt fences;
» Storm water channels and catch pits;
» Soil bindings;
» Geofabrics;
» Hydro-seeding and/or re-vegetating;
» Mulching over cleared areas;
» Boulders and size varied rocks; and
» Tilling.

## 4.2. Engineering Specifications

A detailed engineering specifications Storm water Management Plan describing and illustrating the proposed stormwater control measures must be prepared by the Civil Engineers during the detailed design phase and should be based on the underlying principles of the Storm water Management Plan and this should include erosion control measures. Requirements for project design include:

» Erosion control measures to be implemented before and during the construction period, including the final storm water control measures (post construction).

- All temporary and permanent water management structures or stabilisation methods must be indicated within the Storm water Management Plan.
- An on-site Engineer or Environmental Officer (EO)/ SHE Representative to be responsible for ensuring implementation of the erosion control measures on site during the construction period. The ECO should monitor the effectiveness of these measures on the interval agreed upon with the Site Manager and EO.
- The EPC Contractor holds ultimate responsibility for remedial action in the event that the approved Storm water Management Plan is not correctly or appropriately implemented and damage to the environment is caused.

### 4.3 Monitoring

The site must be monitored continuously during construction and operation in order to determine any indications of erosion. If any erosion features are recorded as a result of the activities on-site the Environmental Officer (EO)/ SHE Representative (during construction) or Environmental Manager (during operation) must:

- Assess the significance of the situation.
- Take photographs of the soil degradation.
- Determine the cause of the soil erosion.
- Inform the contractor/operator that rehabilitation must take place and that the contractor/operator is to implement a rehabilitation method statement and management plan to be approved by the Site/Environmental Manager in conjunction with the ECO.
- Monitor that the contractor/operator is taking action to stop the erosion and assist them where needed.
- Report and monitor the progress of rehabilitation weekly and record all the findings in a site register (during construction).
- All actions with regards to the incidents must be reported on a monthly compliance report which should be kept on file for if/when the Competent Authority requests to see it (during construction) and kept on file for consideration during the annual audits (during construction and operation).

The Contractor (in consultation with an appropriate specialist, e.g. an engineer) must:

- Select a system/mechanism to treat the erosion.
- Design and implement the appropriate system/mechanism.
- Monitor the area to ensure that the system functions like it should. If the system fails, the method must be adapted or adjusted to ensure the accelerated erosion is controlled.
- Continue monitoring until the area has been stabilised.

## 5. CONCLUSION

The Erosion Management Plan is a document to assist the Proponent/ EPC Contractor with guidelines on how to manage erosion during all phases of the project. The implementation of management measures is not only good practice to ensure minimisation of degradation, but also necessary to ensure compliance with legislative requirements. This document forms part of the EMPr, and is required to be considered and adhered to during the design, construction, operation and decommissioning phases of the project (if and where applicable). During the construction phase, the contractor must prepare an Erosion Control Method Statement to ensure that all construction methods adopted on site do not cause, or precipitate soil erosion

and shall take adequate steps to ensure that the requirements of this plan are met before, during and after construction. The designated responsible person on site, must be indicated in the Method Statement and shall ensure that relevant erosion control measures are in place throughout the construction phase.

An operation phase Erosion Management Plan should be designed and implemented if not already addressed by the mitigations implemented as part of construction, with a view to preventing the passage of concentrated flows off hardened surfaces and onto natural areas.