FE KUDU WIND ENERGY FACILITY, EASTERN CAPE PROVINCE

ENVIRONMENTAL MANAGEMENT PROGRAMME

OCTOBER 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 ~9 170ha) 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, FE Kudu (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 (~9 170ha) within which the wind farm is proposed.

Proponent: Applicant/Project developer, FE Kudu (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 164m 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

DFFE	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 FE Kudu Wind Energy Facility. The project site is located approximately 40km 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 FE Kudu Wind Energy Facility will include a total of 80 wind turbines with a contracted capacity of up to 600MW and associated infrastructure to be constructed over an area of approximately 9 170ha 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 FE Kudu (Pty) Ltd employees and contractors working on the pre-construction, construction, and operation and maintenance phases of the FE Kudu Wind Energy Facility. 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 FE Kudu Wind Energy Facility, 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 wind energy facility project site consists of a single property, namely Portion 2 of Farm Oorlogspoort 85.

Access to the facility will be via an existing (unnamed) gravel road originating off the DR02310 which turns off from the R61 between Beaufort West and Aberdeen. A main access road up to 8m in width will provide access to the facility. It is likely sections of this road will require upgrading and widening to 8m to accommodate the movement of heavy vehicles. This existing road traverses the Remaining Extent of Farm Pretorius Kuil 89 and Portion 2 of Farm Oorlogspoort 85.

The project site/development area has an extent of ~9 170ha, which is considered sufficient in extent (allowing sufficient space to avoid any major environmental sensitivities) and suitable from a technical perspective for the development of up to 80 wind turbines with a contracted capacity of up to 600MW (**Figure 2.1** and **Table 2.1**). The smaller facility development footprint[2] will be sited within the development area, with an estimated disturbance area of up to 185ha of the development area. The infrastructure associated with the 600MW FE Kudu Wind Energy Facility will include:

- Up to 80 wind turbines, turbine foundations and turbine hardstands
- An on-site substation hub incorporating:
  - A132kV on-site facility substation
  - Switchyard with collector infrastructure
  - Battery Energy Storage System (BESS)
  - Operation and Maintenance buildings
- A balance of plant area incorporating:
  - Temporary laydown areas
  - A construction camp laydown and temporary concrete batching plant
- Power lines internal to the wind farm, trenched and located adjacent to internal access roads, where feasible[3].
- Access roads to the site and between project components with a width up to 8m for primary access routes.

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

[3] The intention is for internal project cabling to follow the internal roads.

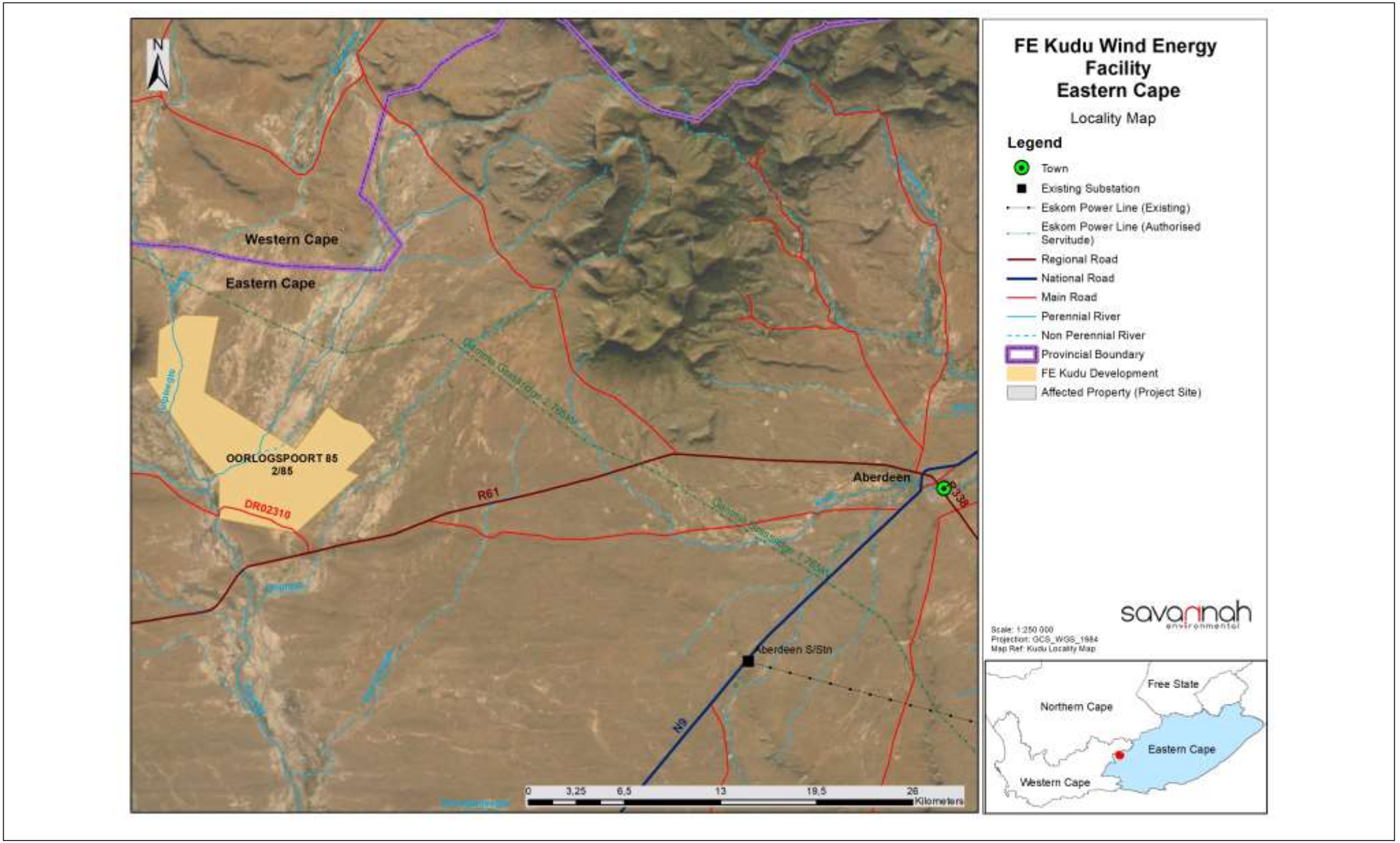


Figure 2.1: Locality map showing the location of the project site proposed for the FE Kudu Wind Energy Facility

Table 2.1: Detailed description of the FE Kudu Wind Energy Facility 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 (40km west of the FE Kudu Wind Energy Facility)
Affected Properties: Farm name(s), number(s) and portion numbers	Wind Farm: » Portion 2 of Farm Oorlogspoort 85 Access Road » Portion 2 of Farm Oorlogspoort 85 » Remaining Extent of Farm Pretorius Kuil 89
SG 21 Digit Code (s)	» C00100000000008500002 - Portion 2 of Farm Oorlogspoort 85 » C00100000000008900000 - Remaining Extent of Farm Pretorius Kuil 89
Current zoning and land use	Zoning: Agricultural Land Use: Farming
Site central coordinates	32°27'44.58"S, 23°34'31.98"E

Start, middle and end points of the access road to be upgraded

	Latitude	Longitude
Start	32°30'58.28"S	23°36'34.75"E
Middle	32°29'50.08"S	23°35'0.61"E
End	32°29'30.91"S	23°32'39.80"E

Site Corner Coordinates

	Latitude	Longitude
Corner 1	32°24'29.46"S	23°29'36.93"E
Corner 2	32°22'46.75"S	23°30'10.13"E
Corner 3	32°22'10.09"S	23°31'17.62"E
Corner 4	32°22'14.43"S	23°32'48.88"E
Corner 5	32°25'3.81"S	23°32'6.27"E
Corner 6	32°27'8.90"S	23°36'4.32"E
Corner 7	32°25'34.88"S	23°37'26.27"E
Corner 8	32°26'51.50"S	23°39'29.31"E
Corner 9	32°28'5.73"S	23°38'48.27"E
Corner 10	32°30'11.84"S	23°36'4.85"E
Corner 11	32°29'40.19"S	23°32'38.24"E
Corner 12	32°28'14.81"S	23°32'44.20"E

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 FE Kudu Wind Energy Facility.

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 FE Kudu Wind Energy Facility 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:

Company	Specialist Area and Expertise	Specialist Name
Jamie Pote as an Independent Specialist	Terrestrial Ecology	Jamie Pote
The Biodiversity Company	Freshwater and surface water ecology	Dale Kindler
AfriAvian Environmental	Avifauna	Albert Froneman Megan Loftie-Eaton
ERM Southern Africa	Bats	Craig Campbell Dieter Rodewald
Terra Africa	Soils and Agricultural potential	Mariné Pienaar
CTS Heritage	Heritage (including cultural landscape, archaeology and palaeontology)	Jenna Lavin
Enviro Acoustic Research	Noise	Morné de Jager
LOGIS & NuLeaf	Visual	Lourens du Plessis Bryony van Niekerk Tosca de Villiers
Tony Barbour & Schalk van der Merwe as Independent Specialists	Social	Tony Barbour
iWink Consulting	Traffic	Iris Wink

2.1.1. Terrestrial Ecological Features and Associated Sensitivity

An area and feature mapped as high ecological sensitivity identified within the development area, which consist primarily of water features and associated thicket vegetation and include (refer to **Figure 2.2**):

» Major riverine watercourses (and their buffers) with riparian thicket vegetation. These areas are noted to be important ecologically within an arid environment. These areas must be avoided by turbine and other associated infrastructure placement, other than strategic and necessary access road crossings.

A detailed assessment of the development footprint showed that approximately 380m of access road to turbine S18 will pass through designated CBA2 area, the impact thereof being negligible in terms of loss to a vegetation unit that has low transformation levels as well as any disruptions to ecological processes. This alignment is associated with an existing road alignment. Four turbines (S1, S5, N1 and N8) are within the

aquatic and ecological corridors, but these are unlikely to significantly compromise any ecological functioning since the remainder of the corridors are not affected and are therefore assessed as being acceptable. No turbines are situated within the watercourse buffers and the mitigation strategy has eliminated several crossings from watercourses and buffers. Only necessary access road crossings, mostly along existing farm tracks remain, which are deemed acceptable.

The development of the FE Kudu Wind Energy Facility would avoid significant impact on the major ecological features of the site. As a result, there are no fatal flaws. Only an existing road alignment traverses the CBA2. Given the avoidance of sensitive features at the site by the facility layout no high impacts are likely to occur as a result of the development.

2.1.2. Aquatics and Associated Sensitivity

All freshwater resource features are ephemeral. The Tulpleegte and Kariega rivers are the primary drainage features within the development area. The FE Kudu Wind Energy Facility project site is dominated by two types of natural aquatic features, some artificial features, and a small number of wetland features. The aquatic areas and drainage systems occur in the development area and have been buffered by 32m (refer to **Figure 2.2**):

- Ephemeral main watercourse - alluvial systems with or without riparian vegetation. Numerous drainage features are present comprising of an extensive braided watercourse network, only active during peak flood events with no permanent aquatic habitat presenting ephemeral conditions. Several watercourses presented surface water at the time of the survey, however not all of them were suitable for the assessment of aquatic biota. The sampled watercourses were tributaries of the Tulpleegte and Kariega rivers.
- Ephemeral watercourses in arid environments – Present as vernal pools that intermittently hold water for short periods (from a few days to months) following sufficient rainfall, whereby the standing surface water may support vernal biota.
- Artificial dams; and
- Wetland features.

The facility layout has implemented the avoidance strategy and positioned majority of the turbine platforms and road networks outside the buffer areas. The facility layout indicates limited impacts on the aquatic environment as the micro-siting ensured that the wind turbine positions were all located outside of the delineated aquatic features and recommended buffer areas identified as no-go areas or high sensitivity areas. Turbines S1, S5, N1 & N8 are located within the aquatic corridors which is medium sensitivity and within acceptable limits.

There are however some watercourse road crossings, and these are deemed acceptable and appropriately placed. New road infrastructure is of moderate sensitivity to aquatic features and considered acceptable. Existing road crossings are considered to have a low sensitivity to all delineated watercourse and acceptable to be used/upgraded.

Several artificial and natural vernal pools are located in close proximity to some of the roads. Road infrastructure (specifically the roads between turbines N23 and N24, and turbines S37 and S38) should be re-aligned to avoid the 32m vernal pool buffers while catering for natural surface runoff (box culverts) to continue to feed into these aquatic features to sustain the functioning of these systems and their likely vernal biota. Ensuring that aquatic features and buffers are intact increases the resilience of a watercourse to

future disturbances. These buffers would ensure adequate ecological integrity maintenance from the adjacent proposed wind energy facilities.

The development footprint is considered as acceptable in terms of aquatic resources.

2.1.3. Avifauna and Associated Sensitivity

The following high sensitivities were identified on site (refer to **Figure 2.2**):

» A 200m turbine (including rotor-swept area) exclusion zone should be implemented around boreholes and dams,
» A 100m turbine (including rotor-swept area) exclusion zone on either side of drainage lines. The exclusion zone should also exclude the rotor swept area of the turbines.

The high avifauna sensitivity areas represent no-go areas (i.e., turbine exclusion zones) for the construction of wind farm infrastructure, in particular the turbines.

The current 80-turbine layout assessed in this report avoids all the recommended avifaunal turbine exclusion zones (including rotor-swept areas). It is the specialist opinion that the current facility layout is acceptable. Turbine N20 has been micro-sited to avoid the recommended avifaunal sensitivity buffer. The development is supported, provided the mitigation measures are strictly applied.

2.1.4. Bats and Associated Sensitivity

Buffers have been placed around important habitat for bats and include (refer to **Figure 2.2**):

» High sensitivity features and areas (inclusive of full blade length):
- Important habitats such as perennial watercourses, rivers, rocky outcrops, buildings, trees, water features, wetlands, cultivated lands, and orchards/vineyards have been buffered by 200m.
- Smaller non-perennial drainage lines have been buffered by 100m.

The high bat sensitivity areas represent turbine exclusion zones (including the full blade length) to minimise potential impacts on the local bat population.

Considering the bat sensitivity, there is no encroachment into any high (no-go) sensitivity areas by any turbines, or the battery energy storage system, operation and maintenance buildings, or laydown areas.

The development footprint is considered as acceptable in terms of bat sensitivity.

2.1.5. Soils and Agriculture and Associated Sensitivity

The project development area includes areas of medium and low sensitivity. The sensitivity rating considers the land capability and agricultural potential as well as the soil erodibility. The majority of the facility infrastructure components are located well within areas with Medium Sensitivity. Medium agricultural sensitivity is mainly due to the high land capability of Low-Moderate (Class 07) areas and the depth of the soil which ranged between 0.6 and 1.5m. Low agricultural sensitivity is due to the Low (Class 05) land capability and the absence of any field crop boundaries. Areas shown as having field crops did not show any signs of cultivation during the site visit. The Low Sensitivity areas have shallow effective soil depth, and the arid climate reduces the land capability of the area significantly.

For the placement of the wind turbines, it is confirmed that the majority of the turbines are located within the Medium sensitivity areas, with 29 turbines located within the low sensitivity areas. Although most of the area is allocated a Medium sensitivity, the area is only used for livestock grazing as was observed during the site visit. In addition, no field crops were present within the development area. The turbine positions are considered to be acceptable with no adjustments to the development footprint required.

The facility substation, BESS, O&M hub footprints are within areas of medium sensitivity. The placement of the infrastructure is considered to be acceptable.

Several sections of the access roads (and cable routes) traverse through moderate sensitivity soil resources. The placement of the infrastructure is considered to be acceptable.

2.1.6. Heritage Resources and Associated Sensitivity

At the local scale, the project is generally located away from major scenic topographical features and beyond 16km from the town of Aberdeen and beyond 10km from the Fonteinbos Nature Reserve. At a local and site scales, the following sensitive heritage receptors have been identified:

- Historical farmsteads (Grade IIIB and IIIC)
- The scenic qualities of the R61
- The Murraysburg Road and east-west historical access route
- Wolwekop as a distinctive topographical feature adjacent to the R61

For the placement of the wind turbines, it is confirmed that all of the turbines are located within the Low sensitivity areas. No turbines in the layout fall within any of the no-go buffers. The placement of the turbines as proposed is considered to be acceptable with no adjustments to the development footprint required.

For the placement of the Facility substation, BESS, O&M hub it is confirmed that the footprint of the infrastructure will be placed within areas of low sensitivity. Therefore, the placement of the infrastructure is considered to be acceptable.

In terms of linear infrastructure proposed, most of the roads have been planned to run through low sensitivity areas. The roads planned within the no-go buffers on the map are not considered high sensitivity as there are already existing roads present and only a very small area is otherwise encroached on. The placement of the infrastructure is considered to be acceptable.

2.1.7. Noise and Associated Sensitivity

There is no residential area close to the proposed development. The closest community is the town of Aberdeen, located more than 40km east of the project site, which is too far from the project site for sound to be of any concern. The area surrounding the development area consists of dispersed residences. Four potential noise sensitive receptors (NSRs) were identified within the development area. These include areas used for residential purposes.
Based on the results of the Noise Impact Assessment no adjustments to the development footprint are required. However, this is subject to the implementation if the recommended mitigation measures.

All wind turbines are located more than 1km from the NSRs identified. For the layout evaluated, considering a WTG with a SPL of 109.2 dBA (re 1 pW), it is recommended that the proposed FE Kudu Wind Energy Facility (and associated infrastructure) be authorised.

2.1.8. Visual Sensitivity

Overall, the significance of the visual impacts associated with the proposed FE Kudu Wind Energy Facility 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.

2.1.9. Social Sensitivity

The positive effects and impacts of FE Kudu Wind Energy Facility would outweigh the negative effects. This is largely due to the fact that the project is expected to have a positive net impact on economic development, employment, household earnings, government revenue and skills development in the country and most importantly in the local community that experiences a high unemployment rate as well as a small economic base. The negative impacts that are expected to occur as a result of the project will be far more localised and would affect a significantly smaller number of people and households than in the case of the net benefits that would be derived by the project.

No negative impacts with an unacceptable level of significance following the implementation of mitigation are expected to occur from a social perspective.

2.1.10. Impacts on Traffic

The traffic generated during the construction phase, although significant, will be temporary and impacts are considered to be negative and of medium significance before and of low significance after mitigation. The operation phase impacts would be minimal. The decommissioning phase will result in the same impact as the construction phase as similar trips are expected. The potential traffic impact will be of medium significance before mitigation measures during the construction and decommissioning phases. However, considering that this is temporary and short term in nature, the impact can be mitigated to an acceptable level of low significance.

No impacts of high significance were identified, and no fatal flaws are associated with the FE Kudu Wind Energy Facility from a traffic perspective.

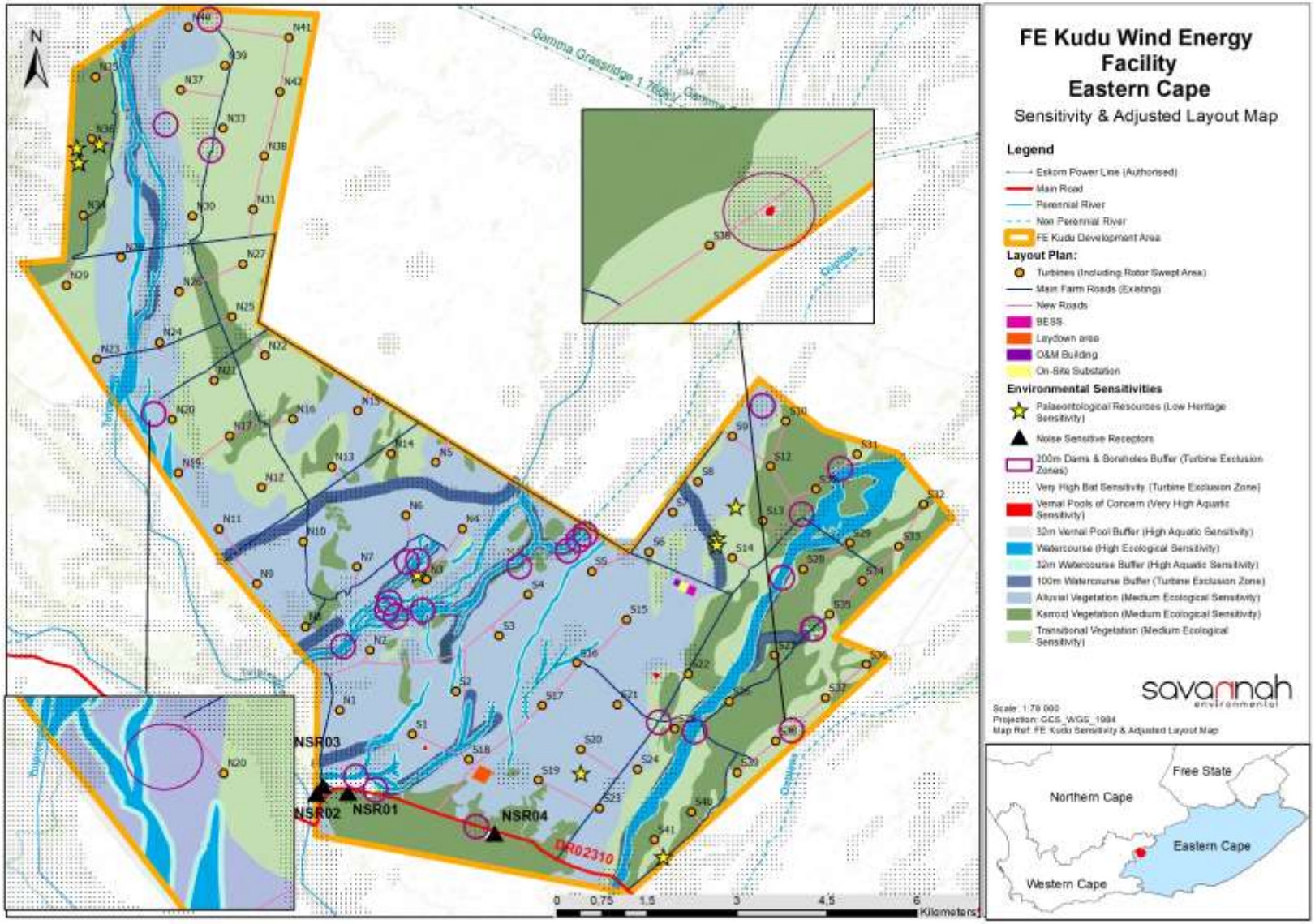

FE Kudu Wind Energy Facility
Eastern Cape
Sensitivity & Adjusted Layout Map
Legend
Eskom Power Line (Authorised)
Main Road
Perennial River
Non Perennial River
FE Kudu Development Area
Layout Plan:
Turbines (Including Rotor Swept Area)
Main Farm Roads (Existing)
New Roads
BESS
Laydown area
O&M Building
On-Site Substation
Environmental Sensitivities
Palaeontological Resources (Low Heritage Sensitivity)
Noise Sensitive Receptors
200m Dams & Boreholes Buffer (Turbine Exclusion Zones)
Very High Bat Sensitivity (Turbine Exclusion Zone)
Vernal Pools of Concern (Very High Aquatic Sensitivity)
32m Vernal Pool Buffer (High Aquatic Sensitivity)
Watercourse (High Ecological Sensitivity)
32m Watercourse Buffer (High Aquatic Sensitivity)
100m Watercourse Buffer (Turbine Exclusion Zone)
Alluvial Vegetation (Medium Ecological Sensitivity)
Karroid Vegetation (Medium Ecological Sensitivity)
Transitional Vegetation (Medium Ecological Sensitivity)
savannah environmental
Scale: 1:70 000
Projection: GCS_WGS_1984
Map Ref: FE Kudu Sensitivity & Adjusted Layout Map
Free State
Northern Cape
Eastern Cape
Western Cape
NSR01
NSR02
NSR03
NSR04
DR02310
0 0.75 1.5 3 4.5 6
Kilometers

Figure 2.2: Combined environmental sensitivity and adjusted layout map for the FE Kudu Wind Energy Facility development area

CHAPTER 3: PURPOSE AND OBJECTIVES OF THE EMPR

An Environmental Management Programme (EMPr) is defined as "an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented or mitigated, and that the positive benefits of the projects are enhanced". The objective of this EMPr is to provide consistent information and guidance for implementing the management and monitoring measures established in the permitting process and help achieve environmental policy goals. The purpose of an EMPr is to help ensure continuous improvement of environmental performance, reducing negative impacts and enhancing positive effects during the construction and operation of the 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 FE Kudu Wind Energy Facility. 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 FE Kudu Wind Energy Facility 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 FE Kudu Wind Energy Facility.
- 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.

FE Kudu (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 FE Kudu Wind Energy Facility, 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 FE Kudu Wind Energy Facility, 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 FE Kudu (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.: » Wind turbines; » Access roads; and » 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:

EMP Compilers	
Karen Jodas	Savannah Environmental
Chantelle Geyer	Savannah Environmental
Input from Specialist Consultants	
Jamie Pote	Terrestrial Ecology
The Biodiversity Company	Freshwater and surface water ecology
AfriAvian Environmental	Avifauna
ERM	Bats
iWink Consulting	Traffic
Enviro Acoustic Research	Noise
LOGIS & NuLeaf Planning and Environmental	Visual
CTS Heritage	Heritage (including cultural landscape, archaeology and palaeontology)
Tony Barbour & Schalk van der Merwe	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.

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, FE Kudu (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 FE Kudu Wind Energy Facility 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. » Access roads and crane hardstand areas. » Cabling between turbines. » Substation, BESS and O&M Building hub » Laydown area, warehouse area, and site camp hub » All other associated infrastructure.
Potential Impact	» Design fails to respond optimally to the identified environmental considerations. » Employment creation for the construction, operation and decommissioning activities.
Activities/risk sources	» Positioning of turbines and alignment of access roads and underground cabling. » Positioning of Substation, BESS and O&M Building hub. » Positioning of Warehouse area, laydown area and site camp hub. » 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. » 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 EPC Contractor	Design phase 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 EPC Contractor	Design phase
Following the final site layout plan of FE Kudu Wind Energy Facility, 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 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 EPC Contractor	Design phase Construction
Minimise the development footprint in areas mapped as high sensitivity (i.e., near watercourses and other ecologically significant features).	Developer	Design phase 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 EPC Contractor	Design phase 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 EPC Contractor	Design phase 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 EPC Contractor	Design phase 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 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 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 EPC Contractor	Construction
A pre-construction walkthrough with an aquatic specialist is recommended and they can assist with the revision of the	Developer	Design phase Pre-construction

stormwater management plan and Aquatic Rehabilitation and Monitoring plan, coupled to micro-siting of the final layout.		
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 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
The supporting infrastructure must be constructed as closely as possible together to avoid fragmentation of the entire project site.	Developer	Design phase
FE Kudu (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
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: » Implement needs-based night lighting if considered acceptable by the SACAA. » Limit aircraft warning lights to the turbines on the perimeter according to SACAA requirements, thereby reducing the overall impact. » Shield the sources of light by physical barriers (walls, vegetation, or the structure itself). » Limit mounting heights of lighting fixtures, or alternatively use foot-lights or bollard level lights. » Make use of minimum lumen or wattage in fixtures. » Make use of down-lighters, or shielded fixtures. » Make use of Low-Pressure Sodium lighting or other types of low impact lighting. » 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.	Developer EPC Contractor	Design phase Operation
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	Developer	Design phase

employment procedures that the Developer intends following for the construction phase of the project.		
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/ 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
Applicant to re-evaluate the noise impact should the layout be revised where any WTG, located within 2,000 m from a confirmed NSR, are moved closer to the NSR.	Applicant	Planning phase, before development of WEF
Applicant to re-evaluate the noise impact should the layout be revised where any new WTG are introduced within 2,000 m from an NSR	Applicant	Planning phase, before development of WEF
Applicant to re-evaluate the noise impact should the layout be revised where the number of WTG within 2,000 m from an NSR are increased	Applicant	Planning phase, before development of WEF
Applicant to re-evaluate the noise impact should the applicant make use of a wind turbine with a maximum SPL exceeding 109.2 dBA re 1 pW	Applicant	Planning phase, before development of WEF
The optimized road alignments have been designed to largely avoid most watercourses and their 32 m buffer areas. Multiple crossings across the same watercourse section are not advised, and must be restricted to the minimum number feasible;	Developer	Planning and Design
Align Wind Energy Facility and other infrastructure in a manner that will minimise fragmentation and/or impacts to recommended buffers and/or sensitive features.	Applicant	During application and final walkdown before commencement.

Performance Indicator	» Design meets the objectives and does not degrade the environment. » 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. » Access roads and crane hardstand areas. » Cabling between turbines. » Substation, BESS and O&M Building hub » Laydown area, warehouse area, and site camp hub » All other associated infrastructure.
Potential Impact	» Impact on identified sensitive areas.

	» Design fails to respond optimally to the environmental considerations.
Activities/Risk Sources	» Positioning of all project components » Pre-construction activities, e.g. geotechnical investigations, site surveys of substation footprint, and internal access roads and environmental walk-through surveys. » Positioning of temporary sites.
Mitigation: Target/Objective	» To ensure that the design of the power plant responds to the identified environmental constraints and opportunities. » To ensure that pre-construction activities are undertaken in an environmentally friendly manner. » 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
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
Any stormwater within the site must be handled in a suitable manner, i.e. trap sediments, and reduce flow velocities	Developer 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 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 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 Specialist	Pre-construction
Respective flora & fauna permits to be obtained timeously before construction is to commence.	ECO	Pre-construction

Performance Indicator	» Layout does not destroy/degrade no-go areas. » No disturbance of no-go areas. » Permits are obtained and relevant conditions complied with. » 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. » Monitor ongoing compliance with the EMPr.

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

Project Component/s	» Wind turbines. » Access roads and crane hardstand areas. » Cabling between turbines. » Substation, BESS and O&M Building hub » Laydown area, warehouse area, and site camp hub » All other associated infrastructure.
Potential Impact	» Impact on identified sensitive areas. » Planning fails to respond optimally to the environmental considerations.
Activities/Risk Sources	» Positioning of all project components » Pre-construction activities. » Positioning of temporary sites. » 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. » 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 EPC Contractor	Pre-construction
Create awareness of skills through posters and media announcements and set-up a skills desk at a central and	Developer 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 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 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 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 EPC Contractor	Pre-construction

Performance Indicator	» Conditions of the EA and EMPr form part of all contracts. » 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 FE Kudu Wind Energy Facility. Any issues and concerns raised should be addressed as far as possible in as short a timeframe as possible.

Project component/s	» Wind turbines. » Access roads and crane hardstand areas. » Cabling between turbines. » Substation, BESS and O&M Building hub » Laydown area, warehouse area, and site camp hub » All other associated infrastructure.
Potential Impact	» Impacts on affected and surrounding landowners and land uses.
Activity/risk source	» Activities associated with pre-construction phase. » Activities associated with construction of the wind energy facility. » Activities associated with operation.
Mitigation: Target/Objective	» Effective communication with affected and surrounding landowners. » 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. A Project Specific Grievance Mechanism will be developed and implemented prior to construction.	Developer EPC Contractor O&M Operator	Pre-construction (construction procedure) 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 EPC Contractor O&M Operator	Pre-construction (construction procedure) 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) Pre-operation (operation procedure)

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. » Grievance mechanism procedures implemented. » Public complaints register developed and maintained.

OBJECTIVE 5: The mitigation and possible negation of visual impacts associated with the planning of the Proposed FE Kudu Wind Energy Facility.

Project component/s	» Wind turbines. » Access roads and crane hardstand areas. » Cabling between turbines. » Substation, BESS and O&M Building hub » Laydown area, warehouse area, and site camp hub » All other associated infrastructure.

Potential Impact	» Primary visual impact of the facility due to the presence of the turbines and associated infrastructure as well as the visual impact of lighting at night.
Activity/risk source	» The viewing of the above mentioned by observers on or near the site (i.e., within 5-10km of the site) as well as within the region.
Mitigation: Target/Objective	» Optimal planning of infrastructure to minimise visual impact.

Mitigation: Action/control	Responsibility	Timeframe
Retain and maintain natural and / or cultivated vegetation in all areas outside of the development footprint, but within the project site.	Project proponent/ design consultant/ Engineering, Procurement and Construction (EPC) contractor	Early in the planning phase.
Make use of existing roads wherever possible and plan the layout and construction of roads and infrastructure with due cognisance of the topography to limit cut and fill requirements.	Project proponent/ design consultant/ EPC contractor	Early in the planning phase.
Plan all roads, ancillary buildings and ancillary infrastructure in such a way that clearing of vegetation is minimised. Consolidate infrastructure and make use of already disturbed sites rather than undisturbed areas.	Project proponent/ design consultant/ EPC contractor	Early in the planning phase.
Consult a lighting engineer in the design and planning of lighting to ensure the correct specification and placement of lighting and light fixtures for the WEF and the ancillary infrastructure. The following is recommended: » Install aircraft warning lights that only activate when an aircraft is detected (CAA regulations/conditions permitting, where deemed feasible). » Limit aircraft warning lights for the proposed WEF to the turbines on the perimeter, thereby reducing the overall requirement (CAA regulations/conditions permitting). » Shield the sources of light by physical barriers (walls, vegetation, or the structure itself); » Limit mounting heights of fixtures, or use foot-lights or bollard lights; » Make use of minimum lumen or wattage in fixtures; » Making use of down-lighters or shielded fixtures; » Make use of Low-Pressure Sodium lighting or other low impact lighting. Make use of motion detectors on security lighting, so allowing the site to remain in darkness until lighting is required for security or maintenance purposes.	Project proponent/ design consultant/ EPC contractor	Early in the planning phase.
Preparation of crossing points and installation of the crossing structures must be undertaken during the low flow period to avoid the need for river diversions and associated impacts;	Project proponent/ design consultant/ EPC contractor	Early in the planning phase.

Performance Indicator	» Minimal exposure (limited or no complaints from I&APs) of ancillary infrastructure and lighting at night to observers on or near the site (i.e., within 5-10km) and within the region.

Monitoring » Not applicable.

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

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

Performance Indicator	» Site is secure and there is no unauthorised entry. » No members of the public/ landowners injured as a result of construction activities. » Fauna and flora is protected as far as practically possible. » 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. » An incident reporting system must be used to record non-conformances to the EMPr. » Public complaints register must be developed and maintained on site. » ECO/ EO to monitor all construction areas on a continuous basis until all construction is completed; immediate reporting back to the site manager. » 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

Project Component/s	» Wind turbines. » Access roads and crane hardstand areas. » Cabling between turbines. » Substation, BESS and O&M Building hub » Warehouse area, laydown area and site camp hub. » All other associated infrastructure.
Potential Impact	» Damage to indigenous natural vegetation and sensitive areas. » Damage to and/or loss of topsoil (i.e., pollution, compaction etc.). » Impacts on the surrounding environment due to inadequate sanitation and waste removal facilities. » Pollution/contamination of the environment.
Activities/Risk Sources	» Vegetation clearing and levelling of equipment storage area/s. » Access to and from the equipment storage area/s. » Ablution facilities. » 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. » Ensure adequate sanitation facilities and waste management practices. » 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
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. Ablutions must be removed from site when construction is completed.	EPC Contractor and sub-contractor/s	Construction

Mitigation: Action/Control	Responsibility	Timeframe
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

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. » Ablution and waste removal facilities are in a good working order and do not pollute the environment due to mismanagement. » All areas are rehabilitated promptly after construction in an area is complete. » Excess vegetation clearing and levelling is not undertaken. » No complaints regarding contractor behaviour or habits.
Monitoring	» Regular audits of the construction camps and areas of construction on site by the EO. » Proof of disposal of sewage at an appropriate licensed wastewater treatment works. » Proof of disposal of waste at an appropriate licensed waste disposal facility. » An incident reporting system must be used to record non-conformances to the EMPr. » Observation and supervision of Contractor practices throughout the construction phase by the EO. » 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.

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. » 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
Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria.	EPC Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
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

Performance Indicator	» Maximum amount of semi and unskilled labour locally sourced where possible. » Local suppliers and SMMEs contracted where possible. » Skills transfer facilitated where required. » 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.

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

	» 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. » Impacts on the surrounding environment due to inadequate sanitation and waste removal facilities. » 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. » 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. » 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. » To minimise impacts on the social and biophysical environment. » Maximise the economic benefit to the local municipality. » Prohibit theft of stock and valuables on impacted and adjacent farm portions. » Procure goods and services, as far as practically possible, from the local municipality. » 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
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
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

Mitigation: Action/control	Responsibility	Timeframe
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

Performance Indicator	» No criminal activities attributable to the construction workers are reported. » 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. » 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.

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

Mitigation: Action/control	Responsibility	Timeframe
ECO to ensure that equipment is well maintained and fitted with the correct and appropriate noise abatement measures;	ECO	Ongoing during construction phase
ECO to include a component covering environmental noise in the Health and Safety Induction to sensitize all employees and contractors about the potential impact from noise;	ECO	Ongoing during construction phase

Mitigation: Action/control	Responsibility	Timeframe
ECO to notify NSR (and/or land owner) before night-time construction activities are to take place within 1,000 m from this NSR (if the structures are used for residential activities during the proposed construction period).	ECO	Construction activities within 1,500 m from NSR, if NSR is used for residential purposes

Performance Indicator	» Night-time noise levels less than 45 dBA
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.

Project component/s	» Wind turbines. » Access roads and crane hardstand areas. » Cabling between turbines. » Substation, BESS and O&M Building hub » Warehouse area, laydown area and site camp hub. » All other associated infrastructure.
Potential Impact	» Dust impacts can occur from cleared areas and from vehicle movement along gravel roads. » 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. » Clearing of vegetation and topsoil. » Excavation, grading and scraping. » Transport of materials, equipment and components. » Re-entrainment of deposited dust by vehicle movements. » Wind erosion from topsoil and spoil stockpiles and unsealed roads and surfaces. » 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. » To ensure emissions from all vehicles are minimised, where possible, for the duration of the construction phase. » 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 (i.e., MR00599) during the construction phase, as required.	EPC Contractor	Construction phase
Regular maintenance of gravel roads (i.e., MR00599) 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
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
Blanket clearing of vegetation must be limited to the site footprint. No clearing outside of footprint to take place, without express approval of ECO and or indicated in approved layout plans	ECO	Construction phase
Site must be clearly demarcated and pegged out before any bush clearing or construction commences. The cleared area should not exceed the required footprint including a reasonable working area.	ECO	Construction phase
If required, water spray vehicles should be used to control dust caused by strong winds during activities on the works.	ECO	Construction phase
No over-watering of the site or road surfaces.	ECO	Construction phase
Wind screens can be used to reduce wind and dust in open areas if required.	ECO	Construction phase

Performance Indicator	» Appropriate dust suppression measures implemented on site during the construction phase. » Drivers made aware of the potential safety issues and enforcement of strict speed limits when they are employed or before entering the site. » 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. » Immediate reporting by personnel of any potential or actual issues with nuisance dust or emissions to the Site Manager. » An incident reporting system must be used to record non-conformances to the EMPr. » Public complaints register must be developed and maintained on site. » Monitor for excessive dust (daily).

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.

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

Mitigation: Action/control	Responsibility	Timeframe
» Spoil materials and subsoil must be back-filled first, then covered with topsoil. » Immediate replacement of topsoil after the undertaking of construction activities within an area. » Generally, topsoil should be re-applied to a depth slightly greater than the topsoil horizon of a pre-selected undisturbed reference site. » The minimum depth of topsoil needed for re-vegetation to be successful is approximately 20 cm. » If the amount of topsoil available is limited, a strategy must be devised to optimise re-vegetation efforts with the topsoil available. » 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. » To stabilise reapplied topsoil and minimise raindrop impact and erosion: * Use organic material from cleared and shredded woody vegetation where possible * Alternatively, suitable geotextiles or organic erosion mats can be used as necessary » Continued monitoring will be necessary to detect any sign of erosion early enough to allow timeous mitigation.		
Re-applied topsoil needs to be re-vegetated as soon as possible.	EPC Contractor	Construction
Implement general erosion control measures/practises: » 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. * Ensure that all soil surfaces are protected by vegetation or a covering to avoid the surface being eroded by wind or water. » 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. » 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. » Minimise and restrict site clearing to areas required for construction purposes only and restrict disturbance to adjacent undisturbed natural vegetation. » Vegetation clearing should occur in parallel with the construction progress to minimise erosion and/or run-off.	EPC Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
Large tracts of bare soil will either cause dust pollution or quickly erode and then result in sedimentation. » When implementing dust control measures, prevent over-wetting, saturation, and run-off that may cause erosion and sedimentation.		
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
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

Mitigation: Action/control	Responsibility	Timeframe
Maintenance must be undertaken regularly on all vehicles and construction/maintenance.	EPC Contractor	Construction phase
Topsoil shall be removed from all areas where physical disturbance of the surface will occur.	ECO	Construction phase
All available topsoil shall be removed after consultation with the botanist and/or ECO prior to commencement of any operations and sufficient topsoil must be stored for later use during decommissioning.	ECO	Construction phase
The removed topsoil shall be stored on high ground within the site footprint outside the 1:100 flood level within demarcated areas.	ECO	Construction phase
Topsoil shall be kept separate from overburden and shall not be used for building or maintenance of roads.	ECO	Construction phase
The stockpiled topsoil shall be protected from being blown away or being eroded. The application of a suitable grass seed/runner mix will facilitate this and reduce the minimise weeds if necessary.	ECO	Construction phase
A suitable weed management strategy to be implemented on topsoil stockpiles.	ECO	Construction phase

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

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

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.

Project component/s
- » Wind turbines.
- » Access roads and crane hardstand areas.
- » Cabling between turbines.
- » Substation, BESS and O&M Building hub
- » Warehouse area, laydown area and site camp hub.
- » All other associated infrastructure.

Potential Impact
- » Loss of plant cover leading to loss of faunal habitat and loss of specimens of protected plants.
- » Soil erosion.
- » Increased fire hazards.
- » Increased water use.

Activity/risk source
- » Site preparation and clearing.
- » Soil disturbance
- » Introduction of plant propagules with people and vehicles.
- » Activities outside of designated construction areas.
- » Driving off designated routes.

Mitigation:
- » To limit construction activities to designated areas.

Target/Objective
- » 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
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 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, and 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: » Keep disturbance of indigenous vegetation to a minimum » Rehabilitate disturbed areas as quickly as possible once construction is complete in an area » 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
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 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
Blanket clearing of vegetation must be limited to the site footprint. No clearing outside of footprint to take place, without express approval of ECO and or indicated in approved layout plans.	ECO	Construction
Site must be clearly demarcated and pegged out before any bush clearing or construction commences. The cleared area should not exceed the required footprint including a reasonable working area.	ECO	Construction
Any site camps and laydown areas requiring clearing must be located within already disturbed areas away from watercourses.	ECO	Construction
Search and rescue operations for Species of Conservation Concern must be undertaken before the commencement of site clearing activities.	ECO	Construction
It is important that clearing activities are kept to the minimum and take place in a phased manner. This minimises wind and water erosion of the cleared areas.	ECO	Construction
Workers are NOT allowed to collect any flora. All flora remains the property of the landowner and must not be disturbed, upset or used without their expressed consent.	ECO	Construction
It is the responsibility of the Contractor to provide sufficient fuel for cooking and heated as needed by the staff.	ECO	Construction
No domestic animals are permitted on the sites.	ECO	Construction
Trees and shrubs that are directly affected by the operations may be felled or cleared but only by the expressed written permission of the ECO.	ECO	Construction
A buffer of 32 m is allocated to the watercourse delineations. Adherence to the buffer areas outside of the areas earmarked for the proposed project infrastructure. These should be visibly demarcated in areas where construction will verge the buffers to avoid encroachment into these areas;	ECO	Construction
Ensure that hydrological connectivity between areas upstream and downstream of construction activities are maintained throughout the construction phase;	ECO	Construction
The maintenance of natural interflow in the watercourses must be maintained using several culverts that span the extent of the macro-channel, thus box type culverts are preferred over pipe culverts to avoid concentrating flows, scouring and erosion. This is applicable where crossings are required;	ECO	Construction

All crossings along the road route must allow for sufficient dispersion of water through the road to prevent the concentration of flow and the resultant scouring and incision of the discharge areas;	ECO	Construction
To minimise the impact on both surface water flow and interflow, portions of the road must include a coarse rock layer that has been specifically incorporated to increase the porosity and permeability of the sub-layers of the road. This is most applicable in depressions and the supporting structures of drainage crossings, even if these drainage lines seem inferior;	ECO	Construction
The width of the culvert should be at least equal to the average stream bed width, otherwise multicell box culverts must be used;	ECO	Construction
Box culverts that have a solid flat cement base (cube shaped) must be avoided as they result in a uniform depth and flow of water covering the full width of the culvert floor, resulting in an insufficient depth of water for the passage of aquatic biota during periods of flow;	ECO	Construction
Alternatively, arch shaped box culverts with natural riverine bottoms allow for the natural stream depth and flow characteristics, with associated maintenance of a low flow channel that aquatic biota can utilise;	ECO	Construction
The use of precast arch shaped (with an open base) box culverts, could result in substantial cost savings associated with lower difficulty and less time spent on site (speed of construction), which in turn will lower the environmental impact at the crossing sites;	ECO	Construction
Inlets and outlets of each culvert must be positioned below the stream bed for the continuation of the streambed and natural movement of riverine substrates as discussed for Arch shaped box culverts;	ECO	Construction
The gradient and horizontal alignment of the culverts must be the same as the existing watercourse bed;	ECO	Construction
The culverts to be utilised must be able to accommodate at least a 1:50 year flood;	ECO	Construction
Rocky material (aggregate) must be placed at the base of the culvert discharge point(s) to avoid the concentrated flow from eroding and scouring the receiving area. Ideally this layer should incorporate a double layer with the bottom layer partially sunken into the riverbed, with the second layer placed on top of the base layer. Due to the increased flow velocities created by smooth concrete and box culverts flow dynamics, the sediments in the discharge area are expected to be washed away. The double aggregate layer will limit this;	ECO	Construction
For best environmental practice implementation and least long-term environmental impact, each watercourse crossing structure should incorporate larger box (single or multicell) culverts with natural riverine bottoms over the smaller culvert pipes; and	ECO	Construction
Ensure that the beds and banks of the watercourses at the road crossing areas are restored to the natural base level to prevent erosion or upstream ponding post construction.	ECO	Construction
There are several artificial and natural vernal pools located in close proximity to the proposed road between turbines N23 and N24, and	Freshwater Specialist Contractor	Project Lifespan

turbines S37 and S38, respectively. It is suggested that these roads be relocated slightly and meander to avoid these aquatic features while catering for natural surface runoff (box culverts) to continue to feed into these aquatic features to sustain the functioning of these systems and their likely vernal biota;		
Due to the deficiency in data on vernal biota, species diversity and conservation status across South Africa, the applicant must appoint a freshwater ecologist to conduct seasonal (wet season) monitoring every two to three years for the life of the project. This will exclude years of drought where no rain has fallen, when the vernal biota is in their dormant desiccated egg stages. The monitoring should be conducted during October/ November or shortly after the first summer rains, within two weeks of the first rains. The monitoring should inspect the following: » Presence/absence of vernal biota and impacts from road network on hydrology for these systems; » Collection of vernal biota and/or sediment samples for hatching and species identification studies. This should be done for at least 2 surveys until no new species are recorded; and » Thereafter, surveys should be repeated once every 5 years to monitor the state of the vernal systems and associated vernal biota.	Freshwater Specialist Contractor	Project Lifespan

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

OBJECTIVE 9: Protection of terrestrial fauna

The National Environmental Screening Tool identified no mammal species. Riverine Rabbit is not anticipated to be present. 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. The National Environmental Screening Tool identifies *Chersobius boulengeri* (Karoo Padloper), as possibly occurring in the area. Initial site investigations suggest that this species is unlikely to be present due to unsuitability of habitat in the lower lying areas of the sites, where development would occur.

National Environmental Screening Tool identifies no amphibian species of conservation concern as possibly being in the area. Amphibians are likely to be present due to the prevalence of watercourses and wetland areas, however no species of conservation concern are flagged for the site.

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

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.		
Small mammals within the habitat on and around the affected area are generally mobile and likely to be transient to the area. They will most likely vacate the area once construction commences. As with all construction sites there is a latent risk that there will be some accidental mortalities. Specific measures are made to reduce this risk. The risk of species of Conservation Concern is low, and it is unlikely that there will be any impact to populations of such species because of the activity.	ECO	Construction
Reptiles such as lizards are less mobile compared to mammals, and some mortalities could arise. It is recommended that a faunal search and rescue be conducted before construction commences, although experience has shown that there could still be some mortalities as these species are mobile and may thus move onto site once construction is underway. A reptile handler should be on call for such circumstances.	ECO	Construction
No animals are to be harmed or killed during the course of operations.	ECO	Construction
It is important that clearing activities are kept to the minimum and take place in a phased manner. This allows animal species to move into safe areas	ECO	Construction
Workers are NOT allowed to collect or snare any faunal species. All fauna remains the property of the landowner and must not be disturbed, upset or used without their expressed consent.	ECO	Construction

Performance Indicator	» No disturbance outside of designated work areas. » Minimised clearing of existing/natural vegetation and habitats for fauna. » 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. » Supervision of all clearing and earthworks by the EO. » Regular checks on trenches and excavations for trapped animals (daily) » Regular checks of fences for snares (monthly)

OBJECTIVE 10: Protection of avifauna

The effects of a wind energy facility on birds are highly variable and depend on a wide range of factors including the specification of the development, the topography of the surrounding land, the habitats affected and the number and species of birds present, density of the prey and types of bird. Each of these potential effects can interact with each other, either increasing the overall impact on birds or, in some cases, reducing a particular impact (for example where habitat loss or displacement causes a reduction in birds using an area which might then reduce the risk of collision):

- Mortality due to collisions with the wind turbines
- Displacement due to disturbance during construction and operation of the wind farm
- Displacement due to habitat change and loss at the wind farm

- Mortality due to electrocution on the electrical infrastructure
- Collisions with the 33kV overhead lines

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

Mitigation: Action/control	Responsibility	Timeframe
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

Performance Indicator	» No disturbance outside of designated work areas. » Minimised clearing of existing/natural vegetation and habitats for avifauna. » 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. » Supervision of all clearing and earthworks by the EO.

OBJECTIVE 11: Protection of bats

At the FE Kudu Wind Energy Facility, direct impacts pose the greatest risk to bats, with collisions being most relevant. However, habitat modification and disturbance/displacement also raise potential risks, especially if bats are disturbed during peak foraging or commuting hours or if potential roosting habitats are disturbed or destroyed. There is a possibility that bats may be reluctant to leave their roosts when subjected to disturbance, which may further exacerbate the impact.

Project component/s	» Wind turbines. » Access roads and crane hardstand areas. » Cabling between turbines.

	» Substation, BESS and O&M Building hub » Warehouse area, laydown area and site camp hub. » All other associated infrastructure.
Potential Impact	» Roost disturbance or destruction » Destruction, degradation, fragmentation of, and displacement of bats from, foraging habitat » Bat fatalities from collision with turbines, and potential population declines
Activity/risk source	» Blasting, » Operation of turbines between sunset and sunrise » vegetation clearing, » excavation works, » construction of infrastructure » operational activities » decommissioning of infrastructure, » proliferation of invasive alien flora » noise, » Erosion » light, » Traffic » dust
Mitigation: Target/Objective	» Minimise potential bat roosts disturbed » Minimise disturbance or destruction of natural habitat » 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**
Minimize degradation of terrestrial habitat by implementing and maintaining effective invasive alien plant, stormwater, erosion, sediment, and dust control measures	Developer ECO EPC Contractor	Construction and Operational Phase
The removal of vegetation and man-made buildings should be avoided in all high sensitive areas, as far as possible, and reduced across the project site in all other areas. Associated infrastructures are permissible in sensitive areas, but should aim to avoid them, as far as possible.	Developer, on-site Environmental Control Officer (ECO) and construction teams.	Construction Phase
Limit all construction activities to daylight hours only.	Construction team, on-site ECO and appropriate bat specialist.	Entire duration of construction phase. Bat roost specialist walk-through to be conducted within 6 months of anticipated construction date.
Avoid all construction activities within potential roosting habitats, if identified at the time when construction activities (for wind turbines and associated infrastructures) take place. No confirmed roosts have been identified on site to date, although it is recommended for a final specialist site walk-through to take place prior to construction to confirm this, and to provide further construction and roost management recommendations, if required (i.e., if roosts are found).	Construction team, on-site ECO and appropriate bat specialist.	Entire duration of construction phase. Bat roost specialist walk-through to be conducted within 6 months of anticipated construction date.

Performance Indicator	» Potential roosts remain undisturbed where possible. » Artificial lighting is effectively minimized throughout the life of the wind energy facility » Operational bat monitoring is performed as per Aronson et al. 2020 (or later). » Bat fatalities remain below the wind energy facility bat fatality threshold, calculated as per MacEwan et al. 2018 (or later). » If/When the bat fatality threshold is exceeded, this is promptly mitigated by implementing turbine curtailment (as described herein) or better. » 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. » Confirmed and potential roosts should be checked during operation and decommissioning » 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.

Project component/s	» Excavations of turbine foundations. » Excavations of trenches for the installation of cabling and infrastructure.
Potential Impact	» Loss of archaeological artefacts. » Loss of fossil resources. » Impacts on heritage sites. » Impacts on graves or burial sites. » Loss of resources going unnoticed. » 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
If any evidence of archaeological or palaeontological sites or remains (e.g., remnants of stone-made structures, indigenous	ECO	Construction

ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils, burials or other categories of heritage resources are found during the proposed development, work must cease in the vicinity of the find and SAHRA must be alerted immediately to determine an appropriate way forward		

Performance Indicator	» Reporting of and liaison about possible finds of heritage resources. » Heritage resources noticed and rescued. » 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. » 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.

Project component/s	» Construction site. » 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. » 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. » Minimised construction traffic, where possible. » Minimal visual intrusion by construction activities and intact vegetation covers outside of the immediate construction work areas.

Mitigation: Action/control	Responsibility	Timeframe
Ensure that vegetation is not unnecessarily cleared or removed during the construction period.	Project proponent/ EPC contractor	Early in the construction phase.
Reduce the construction period through careful logistical planning and productive implementation of resources.	Project proponent/ EPC contractor	Early in the construction phase.
Plan the placement of laydown areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e., in already disturbed areas) wherever possible.	Project proponent/ EPC contractor	Early in and throughout the construction phase.
Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.	Project proponent/ EPC contractor	Throughout the construction phase.
Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.	Project proponent/ EPC contractor	Throughout the construction phase.

Reduce and control construction dust through the use of approved dust suppression techniques as and when required (i.e., whenever dust becomes apparent).	Project proponent/ EPC contractor	Throughout the construction phase.
Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting.	Project proponent/ EPC contractor	Throughout the construction phase.
Rehabilitate all disturbed areas, construction areas, servitudes etc. immediately after the completion of construction works. If necessary, an ecologist should be consulted to assist or give input into rehabilitation specifications.	Project proponent/ EPC contractor	Throughout and at the end of the construction phase.

Performance Indicator	» Vegetation cover on and in the vicinity of the site is intact (i.e. full cover as per natural vegetation within the environment) with no evidence of degradation or erosion.
Monitoring	» Monitoring of vegetation clearing during construction (by contractor as part of the construction contract). » Monitoring of rehabilitated areas quarterly for at least a year following the end of construction (by contractor as part of construction contract).

OBJECTIVE 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)

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

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
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
Excavations may not be used for the dumping of construction wastes.	ECO	Construction
Waste (non-biodegradable refuse) will not be permitted to be deposited in the excavations and must be disposed of appropriately.	ECO	Construction

Performance Indicator	» No complaints received regarding waste on site or indiscriminate dumping. » Internal site audits ensuring that waste segregation, recycling and reuse is occurring appropriately. » Provision of all appropriate waste manifests for all waste streams.
Monitoring	» Observation and supervision of waste management practices throughout construction phase. » Waste collection will be monitored on a regular basis. » Waste documentation completed. » Proof of disposal of sewage at an appropriate wastewater treatment works. » A complaints register will be maintained, in which any complaints from the community will be logged. Complaints will be investigated and, if appropriate, acted upon. » An incident reporting system will be used to record non-conformances to the EMPr.

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.

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

» Designated area; » All applicable safety signage; » Firefighting equipment; » Enclosed by an impermeable bund as per the requirements of the relevant standards and any relevant by-laws; » Protected from the elements, » Lockable; » Ventilated; and » Has adequate capacity to contain 110% of the largest container contents.		
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
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
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

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

	» Records of accidental spills and clean-up procedures and the results thereof must be audited on an annual basis by the ECO. » 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.

Project component/s	» Concrete batching plant.
Potential Impact	» Dust emissions. » Release of contaminated water. » Generation of contaminated wastes from used chemical containers » Inefficient use of resources resulting in excessive waste generation.
Activity/risk source	» Operation of the batching plant. » Packaging and other construction wastes. » Hydrocarbon use and storage. » 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

Mitigation: Action/control	Responsibility	Timeframe
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
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

Performance Indicator	» No complaints regarding dust. » No water or soil contamination by chemical spills. » 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. » 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. » An incident reporting system must be used to record non-conformances to the EMPr. » 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**.

Project component/s	» Wind turbines.

	» Access roads and crane hardstand areas. » Cabling between turbines. » Substation, BESS and O&M Building hub » Laydown area, warehouse and site camp hub. » All other associated infrastructure.
Potential Impact	» Traffic congestion, particularly on narrow roads or on road passes where overtaking is not permitted. » Risk of accidents. » Deterioration of road pavement conditions (i.e., both surfaced and gravel road) due to abnormal loads.
Activity/risk source	» Construction vehicle movement. » Speeding on local roads. » Degradation of local road conditions. » Site preparation and earthworks. » Foundations or plant equipment installation. » Mobile construction equipment movement on-site. » Substation construction activities.
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. » To minimise the potential for negative interaction between pedestrians or sensitive users and traffic associated with the wind energy facility construction. » 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
Reduce daily construction trips (i.e., adjusting delivery schedule accordingly) on public roads, if possible, to minimise dust and to reduce maintenance of gravel roads » Stagger turbine component delivery to site. » Staff and general trips should occur outside of peak traffic periods as far as possible.	Contractor(s)	Duration of contract

Performance Indicator	» No traffic incidents involving project personnel or appointed contractors. » Appropriate signage in place. » 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. » A complaints register will be maintained, in which any complaints from the community will be logged. Complaints will be investigated and, if appropriate, acted upon. » An incident reporting system will be used to record non-conformances to the EMPr.

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.

Project component/s	» Wind turbines. » Access roads and crane hardstand areas. » Cabling between turbines. » Substation, BESS and O&M Building hub » Laydown area, warehouse and site camp hub. » 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. » Excavation of foundations and trenches. » Temporary laydown areas. » Temporary access roads/tracks. » Other disturbed areas/footprints.
Mitigation: Target/Objective	» To ensure and encourage site rehabilitation of disturbed areas. » 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
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 ECO	Construction
A suitable weed management strategy to be implemented in construction phase.	ECO	Completion of phased construction into operational phase for duration of aftercare period on completion of construction (2 years recommended)
Alien trees and weeds must be removed from the site as per CARA/NEMBA requirements.	ECO	Completion of phased construction into operational phase for duration of aftercare period on completion of construction (2 years recommended)
Suitable measures must be implemented in areas that are susceptible to erosion. Areas must be rehabilitated, and a suitable cover crop planted once construction is completed.	ECO	Completion of phased construction into operational phase for

		duration of aftercare period on completion of construction (2 years recommended)
Any topsoil stripped during site preparation must be replaced on completion in areas where rehabilitation is required.	ECO	Completion of phased construction into operational phase for duration of aftercare period on completion of construction (2 years recommended)
Stormwater discharge into watercourses to be protected against erosion.	ECO	Completion of phased construction into operational phase for duration of aftercare period on completion of construction (2 years recommended)

Performance Indicator	» All portions of site, including construction camp and working areas, cleared of equipment and temporary facilities. » Topsoil replaced on all areas and stabilised. » Disturbed areas rehabilitated and acceptable plant cover achieved on rehabilitated sites. » 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. » On-going alien plant monitoring and removal should be undertaken on an annual basis. » An incident reporting system must be used to record non-conformances to the EMPr. » Check quality of topsoil and weed free. » Check for weed regrowth and manage timeously, before seed is set (monthly). » If natural revegetation does not occur, reseeding may be required (monitor for 6 – 12 months after completion of construction (depending on time of year that construction is completed, as regrowth will be poor over winter months)

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 FE Kudu Wind Energy Facility

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 FE Kudu Wind Energy Facility

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 FE Kudu Wind Energy Facility 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 FE Kudu Wind Energy Facility 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.

Project component/s	» Wind turbines. » Access roads and crane hardstand areas. » Substation, BESS and O&M Building hub » Laydown area, warehouse and site camp hub. » 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. » 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 FE Kudu Wind Energy Facility 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: » 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. » 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. » 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. » 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. » 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

Performance Indicator	» Site is secure and there is no unauthorised entry. » No members of the public/ landowners injured. » No complaints from landowners/ public.
Monitoring and Reporting	» Regular visual inspection of fence for signs of deterioration/forced access. » An incident reporting system must be used to record non-conformances to the EMPr. » A public complaints register must be developed and maintained on site. » 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 FE Kudu Wind Energy Facility prior to the implementation of appropriate recommendation and mitigation measures. There are no impacts associated with the development of the FE Kudu Wind Energy Facility 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.

Project component/s	» Areas requiring regular maintenance. » Route of the security team. » Wind energy facility including access roads and laydown area hub. » Areas disturbed during the construction phase and subsequently rehabilitated at its completion.
Potential Impact	» Disturbance to or loss of vegetation and/or habitat. » Alien plant invasion. » 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. » 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
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
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	O&M Operator	Operation

Mitigation: Action/Control	Responsibility	Timeframe
cleaned up in the appropriate manner as related to the nature of the spill.		
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
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	O&M Operator	Operation

Mitigation: Action/Control	Responsibility	Timeframe
species are already present in the area and are likely to increase rapidly if not controlled.		
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
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

Mitigation: Action/Control	Responsibility	Timeframe
All disturbed areas beyond the construction site that are intentionally or accidentally disturbed during the construction phase must be rehabilitated.	Contractor	Operation

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

OBJECTIVE 3: Protection of avifauna

The effects of a wind energy facility on birds are highly variable and depend on a wide range of factors including the specification of the development, the topography of the surrounding land, the habitats affected and the number and species of birds present, density of the prey and types of bird. Each of these potential effects can interact with each other, either increasing the overall impact on birds or, in some cases, reducing a particular impact (for example where habitat loss or displacement causes a reduction in birds using an area which might then reduce the risk of collision):

» Mortality due to collisions with the wind turbines
» Displacement due to disturbance during construction and operation of the wind farm
» Displacement due to habitat change and loss at the wind farm
» Mortality due to electrocution on the electrical infrastructure
» Collisions with the 33kV overhead lines

Project component/s	» Wind turbines. » Substation.
Potential Impact	» Disturbance to or loss of birds as a result of collision with the turbine blades and project components. » Destruction of habitat. » Displacement of birds. » Collision with project components. » Traffic to and from site.
Activity/risk source	» Spinning turbine blades. » Substation.
Mitigation: Target/Objective	» More accurately determine the impact of the operating wind energy facility on collision-prone Red Data species. » 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
Excavated rocks should be removed, or all infilling for road construction should be compacted and all lose rock piles at the base or periphery of such infilling should be covered and packed down to eliminate all potential crevices and shelter for small mammals such as Rock Hyraxes (the primary source of food for the Verreaux's Eagles).	Wind Farm Operator	Operation
Formal live-bird monitoring should be resumed once the turbines have been constructed, as per the most recent edition of the Best Practice Guidelines (Jenkins et al. 2015). The purpose of this would be to establish if displacement of priority species has occurred and to what extent. The exact time when operational monitoring should commence, will depend on the construction schedule, and should commence when the first turbines start operating. The Best Practice Guidelines require that, as an absolute minimum, operational monitoring should be undertaken for the first two (preferably three) years of operation, and then repeated again in year 5, and again every five years thereafter for the operational lifetime of the facility.	Wind Farm Operator	Operation
A 200m turbine exclusion zone should be implemented around boreholes and dams and a 100m turbine (including rotor-swept area) exclusion zone on either side of drainage lines	Contractor Wind farm operator	Operation
Carcass searches must commence to establish mortality rates, as per the most recent edition of the Best Practice Guidelines (Jenkins et al. 2015). The exact time when operational monitoring should commence, will depend on the construction schedule, and should commence when the first turbines start operating. The Best Practice Guidelines require that, as an absolute minimum, operational monitoring should be undertaken for the first two (preferably three) years of operation, and then repeated again in year 5, and again every five years thereafter for the operational lifetime of the facility.	Contractor Wind farm operator	Operation
Should any mortalities of the following collision prone species of conservation concern (Black Harrier (see section 3.5 above) and Verreaux's Eagle) be recorded, an observer led shutdown on demand (SDoD) programme should be considered for rapid implementation at the WEF, targeting these species.	Contractor Wind farm operator	Operation
Furthermore, if annual estimated collision rates of other species of conservation concern indicate unsustainable mortality levels of priority species, i.e., if natural background mortality together with the estimated mortality caused by turbine collisions exceeds a critical mortality threshold as determined by the avifaunal specialist in consultation with other experts e.g., BLSA, additional measures will have to be implemented which could include shutdown on demand. This must be undertaken in consultation with a qualified avifaunal specialist.	Contractor Wind farm operator	Operation
Bird flight diverters should be installed on all 33kV overhead lines on the full span length on the earthwire (according to Eskom	Developer Wind farm operator	Operation

Mitigation: Action/control	Responsibility	Timeframe
guidelines - five metres apart). Light and dark colour devices must be alternated to provide contrast against both dark and light backgrounds respectively. These devices must be installed as soon as the conductors are strung.		

Performance Indicator	» Minimal additional disturbance to bird populations on the wind energy facility site. » Continued improvement of bird protection devices, as informed by the operational monitoring. » Regular provision of clearly worded, logical and objective information on the interface between the local avifauna and operating wind energy facility. » 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.
Monitoring and Reporting	» Observation of avifaunal populations and incidence of injuries/death from collisions from turbine blades. » Monitoring of facility and reporting where fatalities do occur. » Review of bird monitoring report on a full year of post-construction monitoring. » Weekly carcass searches under turbines

OBJECTIVE 4: Protection of bat species

At the FE Kudu Wind Energy Facility, direct impacts pose the greatest risk to bats, with collisions being most relevant. However, habitat modification and disturbance/displacement also raise potential risks, especially if bats are disturbed during peak foraging or commuting hours or if potential roosting habitats are disturbed or destroyed. There is a possibility that bats may be reluctant to leave their roosts when subjected to disturbance, which may further exacerbate the impact.

Project component/s	» Wind turbines. » 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
Minimize artificial lighting	Developer ECO Contractor	Operation
Implement an operational phase bat monitoring programme, in accordance with the most recent version of the operational phase bat monitoring guidelines.	Developer, on-site Environmental Control Officer (ECO), construction teams and an appropriate bat specialist.	Entire duration of the operational phase, with turbine placement and lighting types already considered from the outset of the design phase.

Mitigation: Action/control	Responsibility	Timeframe
Implement blade feathering (up to the manufacturers cut-in speed) as soon as operation begins, to prevent free-wheeling.	Developer, on-site Environmental Control Officer (ECO), construction teams and an appropriate bat specialist.	Entire duration of the operational phase, with turbine placement and lighting types already considered from the outset of the design phase.
The placement of all turbines, as well as their full blade length, should avoid high sensitivity areas, to be considered from the outset of the design phase.	Developer, on-site Environmental Control Officer (ECO), construction teams and an appropriate bat specialist.	Entire duration of the operational phase, with turbine placement and lighting types already considered from the outset of the design phase.
If residual impacts reach the threshold limit (at any wind turbine), then appropriate minimisation measures should be implemented (turbine curtailment and/or acoustic deterrence mechanisms).	Developer, on-site Environmental Control Officer (ECO), construction teams and an appropriate bat specialist.	Entire duration of the operational phase, with turbine placement and lighting types already considered from the outset of the design phase.
Lighting at the project should be kept to a minimum at all associated infrastructures.	Developer, on-site Environmental Control Officer (ECO), construction teams and an appropriate bat specialist.	Entire duration of the operational phase, with turbine placement and lighting types already considered from the outset of the design phase.
Appropriate types of lighting are to be used to avoid attracting insects, and hence, bats. This includes downward facing low-pressure sodium and warm white LED lights. To be considered from the outset of the design phase	Developer, on-site Environmental Control Officer (ECO), construction teams and an appropriate bat specialist.	Entire duration of the operational phase, with turbine placement and lighting types already considered from the outset of the design phase.
Limit O&M activities to daylight hours.	Wind farm operator / maintenance team, on-site ECO and appropriate bat specialist.	Operational Phase
Avoid all O&M activities for wind turbines and associated infrastructures within potential bat roosting habitats, as far as possible. No confirmed bat roosts have been identified on site to date, although it is recommended that a suitably qualified bat specialist (appointed to conduct the operational phase bat monitoring programme) is to further advise on refining recommendations pertaining to O&M activities as new roosting information becomes available, during the project's operational phase (if relevant).	Wind farm operator / maintenance team, on-site ECO and appropriate bat specialist.	Operational Phase

Performance Indicator	» Operational bat monitoring is performed as per Aronson et al. 2020 (or later). » Bat fatalities remain below the WEF's bat fatality threshold, calculated as per MacEwan et al. 2018 (or later). » If/When the bat fatality threshold is exceeded, this is promptly mitigated by implementing turbine curtailment (as described herein) or better. » 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

During operation, the wind energy facility may be a visual nuisance to landowners and residents in the area as well as road users.

Project component/s	» Wind energy facility (including access roads). » Substation. » Ancillary infrastructure.
Potential Impact	» Risk to aircraft in terms of the potential for collision. » Enhanced visual intrusion. » Visual impact of the wind energy facility degradation (including operational wind turbines) and vegetation rehabilitation failure.
Activity/risk source	» Size/scale of turbines. » Associated lighting. » Wind turbines and other infrastructure. » Access roads. » Other associated infrastructure. » 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. » To ensure that the wind energy facility complies with Civil Aviation Authority requirements for turbine visibility to aircraft. » Minimise the contrast with the surrounding environment and visibility of the turbines to humans. » The containment of light emitted from the substation in order to eliminate the risk of additional night-time visual impacts. » 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.	Project proponent/ operator	Operation
Maintain roads and servitudes to forego erosion and to suppress dust.	Project proponent/ operator	Operation
Monitor rehabilitated areas, and implement remedial action as and when required.	Project proponent/ operator	Operation

Performance Indicator	» Appropriate visibility of infrastructure to aircraft. » 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. » Monitoring of the entire site on an ongoing basis by the operator.

OBJECTIVE 6: Minimisation of noise impacts from turbines

Project component/s	» Wind energy facility (including access roads).
Potential Impact	» Increased noise levels at potentially sensitive receptors. » Changing ambient sound levels could change the acceptable land use capability. » 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. » Ensure acceptable noise levels at surrounding stakeholders and potentially sensitive receptors.

Mitigation: Action/control	Responsibility	Timeframe
ECO to conduct noise monitoring when a reasonable and valid noise complaint are received from an NSR living within 2,000m from a WTG of the project.	ECO	Within 2 months after a noise complaint is registered

Performance Indicator	» Night-time noise levels less than 45 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.

Project component/s	» Wind turbines. » Substations. » Associated infrastructure.
Potential Impact	» Inefficient use of resources resulting in excessive waste generation. » Litter or contamination of the site or water through poor waste management practices.
Activity/risk source	» Generators and gearbox – turbines. » Transformers and switchgear – substation. » Fuel and oil storage.

Mitigation: Target/Objective	» To comply with waste management legislation. » To minimise production of waste. » To ensure appropriate waste disposal. » 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: » Where these cannot be recycled, appropriate disposal must be arranged with a licensed facility in consultation with the administering authority. » 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

Performance Indicator	» No complaints received regarding waste on site or dumping. » Internal site audits identifying that waste segregation, recycling and reuse is occurring appropriately. » Provision of all appropriate waste manifests. » No contamination of soil.

Monitoring and Reporting	» Waste collection must be monitored internally on a regular basis. » Waste documentation must be completed and made available for inspection on request. » 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. » 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

Project component/s	» Wind energy facility. » 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. » 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
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

Mitigation: Action/control	Responsibility	Timeframe
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

Performance Indicator	» Maximum amount of semi and unskilled labour locally sourced where possible. » Local suppliers and SMMEs contracted where possible. » Skills transfer facilitated where required. » 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.

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

Mitigation: Action/Control	Responsibility	Timeframe
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

Performance Indicator	» Firefighting equipment and training provided before the construction phase commences. » 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.

Project Component/s	» Battery Energy Storage System.
Potential Impact	» Fire and safety risks » 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
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: o Potential impact of electrolyte spills on groundwater; o Suitable disposal of waste and effluent; o Key measures in the EMPr relevant to worker's activities; o How incidents and suggestions for improvement can be reported. 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

Performance Indicator	» BESS operated and maintained in accordance with supplier specifications. » Appropriate signage on site. » Employees appropriately trained. » Required documentation available on site. » 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 FE Kudu Wind Energy Facility

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 FE Kudu Wind Energy Facility 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 FE Kudu Wind Energy Facility, the FE Kudu (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 FE Kudu Wind Energy Facility and must be adhered to.

OBJECTIVE 1: The mitigation and possible negation of visual impacts associated with the decommissioning of the Proposed FE Kudu Wind Energy Facility.

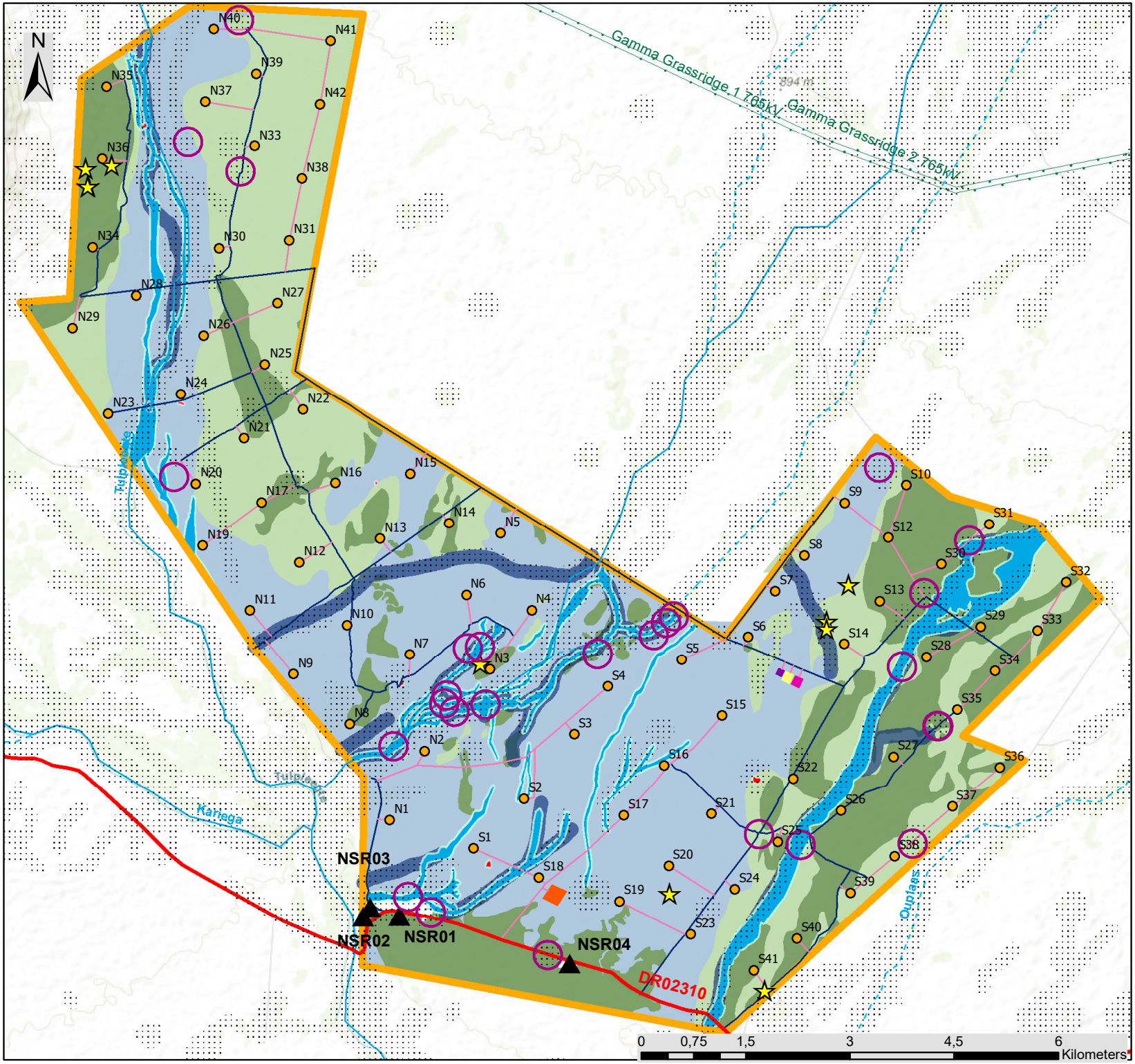
Project component/s	» Wind turbines. » Access roads and crane hardstand areas. » Substation, BESS and O&M Building hub » Laydown area, warehouse and site camp hub. » All other associated infrastructure.
Potential Impact	» Visual impact of residual visual scarring and vegetation rehabilitation failure.
Activities/risk sources	» The viewing of the above mentioned by observers on or near the site.
Mitigation: Target/Objective	» Only the infrastructure required for post decommissioning use of the site retained and rehabilitated vegetation in all disturbed areas.

Mitigation: Action/control	Responsibility	Timeframe
Remove infrastructure not required for the post-decommissioning use of the site. This may include the turbines, substations, ancillary buildings, masts etc.	Project proponent/ operator	During the decommissioning phase.
Rehabilitate access 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.	Project proponent/ operator	During the decommissioning phase.

Mitigation: Action/control	Responsibility	Timeframe
Monitor rehabilitated areas quarterly for at least a year following decommissioning, and implement remedial action as and when required.	Project proponent/ operator	Post decommissioning.

Performance Indicator	» Vegetation cover on and in the vicinity of the site is intact (i.e., full cover as per natural vegetation within the environment) with no evidence of degradation or erosion.
Monitoring and Reporting	» Monitoring of rehabilitated areas quarterly for at least a year following decommissioning.

APPENDIX A:
FACILITY LAYOUT AND SENSITIVITY MAPS



FE Kudu Wind Energy Facility Eastern Cape

Sensitivity & Adjusted Layout Map

Legend

- Eskom Power Line (Authorised)
- Main Road
- Perennial River
- Non Perennial River
- FE Kudu Development Area

Layout Plan:

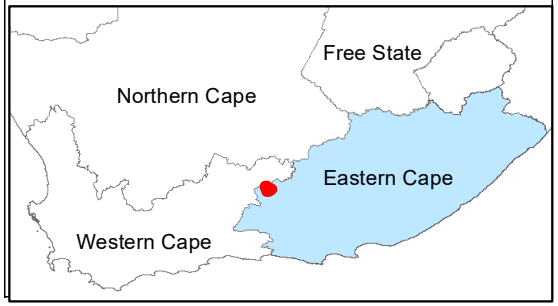
- Turbines (Including Rotor Swept Area)
- Main Farm Roads (Existing)
- New Roads
- BESS
- Laydown area
- O&M Building
- On-Site Substation

Environmental Sensitivities

- Palaeontological Resources (Low Heritage Sensitivity)
- Noise Sensitive Receptors
- 200m Dams & Boreholes Buffer (Turbine Exclusion Zones)
- Very High Bat Sensitivity (Turbine Exclusion Zone)
- Vernal Pools of Concern (Very High Aquatic Sensitivity)
- 32m Vernal Pool Buffer (High Aquatic Sensitivity)
- Watercourse (High Ecological Sensitivity)
- 32m Watercourse Buffer (High Aquatic Sensitivity)
- 100m Watercourse Buffer (Turbine Exclusion Zone)
- Alluvial Vegetation (Medium Ecological Sensitivity)
- Karroid Vegetation (Medium Ecological Sensitivity)
- Transitional Vegetation (Medium Ecological Sensitivity)

savannah environmental

Scale: 1:78 000
Projection: GCS_WGS_1984
Map Ref: FE Kudu Sensitivity & Adjusted Layout Map



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 Monthly during Summer and Autumn 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 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 FE Kudu Wind Energy Facility, 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 FE Kudu Wind Energy Facility 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 FE Kudu Wind Energy Facility site. No sensitive plant species were observed on site.

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 FE Tango Wind Energy Facility. No sensitive plant species were recorded on site.

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 FE Kudu Wind Energy Facility 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 AND EROSION MANAGEMENT PLAN

1. PURPOSE

By taking greater cognisance of natural hydrological patterns and processes, it is possible to develop storm water management systems in a manner that reduces these potentially negative impacts and mimic nature. The main risks associated with inappropriate storm water management are increased erosion risk and risks associated with flooding. Therefore, this Stormwater Management Guide and the Erosion Management Plan are closely linked to one another and should be managed together.

This Stormwater Management Guide addresses the management of stormwater runoff from the development area and significant impacts relating to resultant impacts such as soil erosion and downstream sedimentation. The main factors influencing the planning of stormwater management measures and infrastructure are:

» Topography and slope gradients.
» Placing of infrastructure and infrastructure design.
» Annual average rainfall.
» Rainfall intensities.

The objective of these guiding principles is therefore to provide measures to address runoff from disturbed portions of the development area, such that they:

» Do not result in concentrated flows into natural watercourses i.e., provision should be made for temporary or permanent measures that allow for attenuation, control of velocities and capturing of sediment upstream of natural watercourses.
» Do not result in any necessity for concrete or other lining of natural watercourses to protect them from concentrated flows off the development if not necessary.
» Do not divert flows out of their natural flow pathways, thus depriving downstream watercourses of water.

This Stormwater Management Guide must be updated and refined once the construction/ civil engineering plans have been finalised following detailed design.

2. RELEVANT ASPECTS OF THE SITE

The desktop review indicated the land use within the area to be dominated by agriculture (active cultivation) with a growing population due to an expanding informal residential area located near to the project site. There is a wastewater treatment works located upstream of the site that releases processed effluent into the watercourse that runs through the southern section of the site. The survey property is currently being utilised as an active chicken farm enterprise. The wetland unit has suffered varying degrees of transformation and ecological degradation due to both local and catchment pressures and drivers of ecological change.

The Screening Tool Assessment and Site Verification showed that the actual proposed development footprint falls within an area classified as Low ecological sensitivity, with only the watercourse and associated wetland zones that associate with the southern boundary area of the larger property being assigned a Very high ecological sensitivity. The proposed development activities therefore only associate with the area zoned as being of Low ecological sensitivity.

The general Present Ecological State (PES) of the wetland unit associated with the site calculated to represent a D ecological category. The watercourse was also evaluated as an aquatic system, which resulted in an E/F ecological category for the SASS5 survey. Only one individual of an alien fish species was sampled, which then also translates to an E/F category for fish. The *in-situ* water quality results showed that all the parameters tested for remained within acceptable limits excepting for a low oxygen level that could be regarded as unsustainable to supporting a diversity of aquatic biota.

The application of the DWS Risk Assessment Matrix indicated that an overall low risk to the wetland unit is assumed for any activities associated with the proposed development. This is largely due to the infrastructure footprint being located some distance from the wetland area. The impacting features that were identified, however, could be lowered with the implementation of proposed mitigation measures. The overall impact significance of the proposed development activities to surface water ecosystems within the area is insignificant.

3. STORMWATER MANAGEMENT PRINCIPLES

In the design phase, various stormwater management principles should be considered including:

- Prevent concentration of stormwater flow at any point where the ground is susceptible to erosion.
- Reduce stormwater flows as far as possible by the effective use of attenuating devices (such as swales, berms, and silt fences). As construction progresses, the stormwater control measures are to be monitored and adjusted to ensure complete erosion and pollution control at all times.
- Silt traps must be used where there is a danger of topsoil or material stockpiles eroding and entering streams and other sensitive areas.
- Construction of gabions and other stabilisation features on steep slopes may be undertaken to prevent erosion, if deemed necessary.
- Minimise the area of exposed bare soils to minimise the erosive forces of wind, water and all forms of traffic.
- Ensure that development does not increase the rate of stormwater flow above that which the natural ground can safely accommodate at any point in the sub-catchments.
- Ensure that all stormwater control works are constructed in a safe and aesthetic manner in keeping with the overall development.
- Plan and construct stormwater management systems to remove contaminants before they pollute surface waters or groundwater resources.
- Contain soil erosion, whether induced by wind or water forces, by constructing protective works to trap sediment at appropriate locations. This applies particularly during construction.
- Avoid situations where natural or artificial slopes may become saturated and unstable, both during and after the construction process.
- Design and construct roads to avoid concentration of flow along and off the road. Where flow concentration is unavoidable, measures to incorporate the road into the pre-development stormwater flow should not exceed the capacity of the culvert. To assist with the stormwater run-off, gravel roads should typically be graded and shaped with a 2-3% cross fall back into the slope, allowing stormwater to be channelled in a controlled manner towards the natural drainage lines and to assist with any sheet flow on the project area.

- Design culvert inlet structures to ensure that the capacity of the culvert does not exceed the pre-development stormwater flow at that point. Provide detention storage on the road and/or upstream of the stormwater culvert.
- Design outlet culvert structures to dissipate flow energy. Any unlined downstream channel must be adequately protected against soil erosion.
- Where the construction of a building causes a change in the vegetative cover of the site that might result in soil erosion, the risk of soil erosion by stormwater must be minimised by the provision of appropriate artificial soil stabilisation mechanisms or re-vegetation of the area. Any inlet to a piped system should be fitted with a screen or grating to prevent debris and refuse from entering the stormwater system.
- Preferably all drainage channels on the project area and contained within the larger area of the property (i.e., including buffer zone) should remain in the natural state so that the existing hydrology is not disturbed.

3.1. Engineering Specifications

Detailed engineering specifications for a Stormwater 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 this Stormwater Management Guide. 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 stormwater control measures (post construction) must be indicated within the Final/Updated Stormwater Management Plan.
- All temporary and permanent water management structures or stabilisation methods must be indicated within the Final/Updated Stormwater Management Plan.
- The drainage system for the project area should be designed to specifications that can adequately deal with a 1:50 year intensity rainfall event or more to ensure sufficient capacity for carrying stormwater around and away from infrastructure.
- Procedures for stormwater flow through a project area need to take into consideration both normal operating practice and special circumstances. Special circumstances in this case typically include severe rainfall events.
- An on-site Engineer or Environmental Officer (EO) is to be responsible for ensuring implementation of the erosion control measures on site during the construction period.
- The Engineering, Procurement and Construction (EPC) Contractor holds ultimate responsibility for remedial action in the event that the approved stormwater plan is not correctly or appropriately implemented and damage to the environment is caused.

During the construction phase, the contractor must prepare a Stormwater Control Method Statement to ensure that all construction methods adopted on the project area do not cause, or precipitate soil erosion and shall take adequate steps to ensure that the requirements of the Stormwater Management Plan are met before, during and after construction. The designated responsible person on the project area, must be indicated in the Stormwater Control Method Statement and shall ensure that no construction work takes place before the relevant stormwater control measures are in place.

An operation phase Stormwater 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.

PRINCIPLES FOR EROSION MANAGEMENT

1. PURPOSE

Exposed and unprotected soils are the main cause of erosion in most situations. Therefore, this Erosion Management Plan, the Storm water Management Plan and the Revegetation and Habitat Rehabilitation Plan are closely linked to one another and should not operate independently but should rather be seen as complementary activities within the broader environmental management of the site and should therefore be managed together.

This Erosion Management Plan addresses the management and mitigation of potential impacts relating to soil erosion. The objective of the plan is to provide:

» A general framework for soil erosion and sediment control, which enables the contractor to identify areas where erosion can occur and is likely to be accelerated by construction related activities.
» An outline of general methods to monitor, manage and rehabilitate erosion prone areas, ensuring that all erosion resulting from all phases of the development is addressed.

This plan must be updated and refined once the construction/ civil engineering plans have been finalised following detailed design.

2. RELEVANT ASPECTS OF THE SITE

Three soil forms were identified throughout the 50 m regulated area namely Hutton, Kimberley and Glenrosa, with the Glenrosa soil form being the most dominant form. Hard rock patches together with disturbed soil forms, due to building rubble, were also identified within the 50 m regulated area (GN 3201) as well as a stream which mostly indicates hydromorphic soil conditions due to seasonal or permanent water flows. These hydromorphic soils were mostly dominated by the Glenrosa soil form characterised with gleylithic conditions associated to water saturation.

The Hutton and Kimberley soil forms are regarded to be most important in the study area as they demonstrate the most sensitive land capabilities. The Hutton soil form consists of an orthic topsoil horizon on top of a thick red apedal horizon. The Kimberley soil form has an orthic topsoil with a red apedal subsurface horizon with a soft carbonate horizon below.

The most sensitive land capability of the above mentioned soils has been determined to be class “II”. A climate capability level 8 has been assigned to the area given the low Mean Annual Precipitation and the high Mean Annual Potential Evapotranspiration (MAPE) rates. By using the determined land capability for the most sensitive soil and the determined climate capability, a land potential of “L5” was calculated. According to Smith (2006), the “L5” land potential level is characterised by restricted potential. Regular and/or moderate to severe limitations are expected due to soil, slope, temperatures or rainfall.

All areas where vegetation is removed from the soil surface in preparation for the Solar PV facility construction, will result in exposed soil surfaces that will be prone to erosion. Both wind and water erosion are a risk. Once the soil particles are removed, vegetation will have difficulty establishing itself on the rock and lithic material in the area.

Soil erosion is a frequent risk associated with solar facilities on account of the vegetation clearing and disturbance associated with the construction phase of the development and may continue occurring throughout the operation phase. All areas where vegetation is removed from the soil surface in preparation for the infrastructure construction will result in exposed soil surfaces that will be prone to erosion.

During the operation phase, the areas where vegetation was cleared will remain at risk of soil erosion, especially during a rainfall event when runoff from the cleared surfaces will increase the risk of soil erosion in the areas directly surrounding the project area.

3. EROSION AND SEDIMENT CONTROL PRINCIPLES

The goals of erosion control during and after construction at the project area 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.
» Progressively revegetate or stabilise disturbed areas.

These goals can be achieved by applying the management practices outlined in the following sections.

3.1. On-Site Erosion Management

General factors to consider regarding erosion risk at the project area include the following:

» 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 project area 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. 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 project area for erosion problems during construction (on-going) and operation (at least twice annually) is recommended, particularly after large summer thunderstorms have been experienced. The Environmental Control Officer (ECO) will determine the frequency of monitoring based on the severity of the impacts in the erosion prone areas.

3.1.1 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.
- Tilling.

3.2 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 EO/ Safety, Health and Environment (SHE) Representative to be responsible for ensuring implementation of the erosion control measures on the project area 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.

3.3 Monitoring

The project area 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 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.

3 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 Environmental Management Programme (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 the project area 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 the project area, 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 are
as.

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 FE Kudu Wind Energy Facility 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.

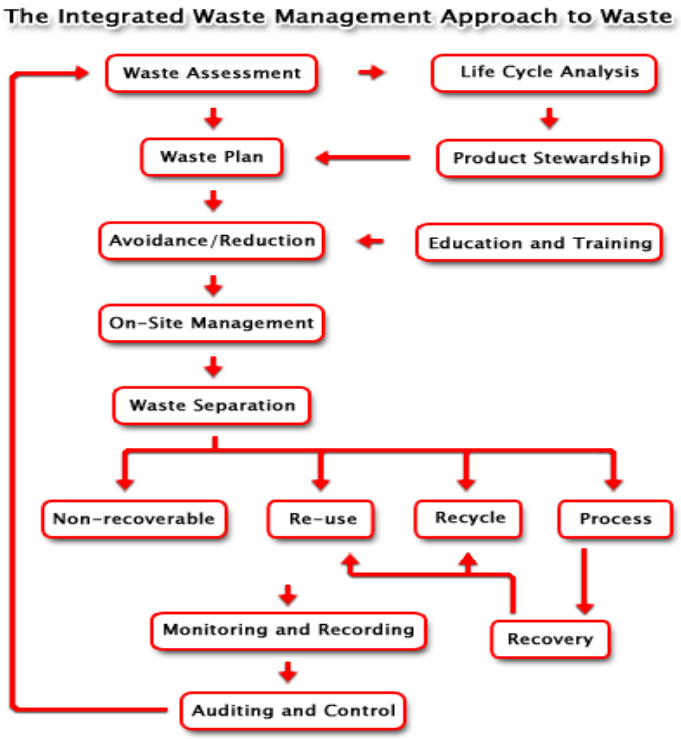


Figure 1: Integrated Waste Management Flow Diagram
(Source: http://www.enviroserv.co.za/pages/content.asp?SectionId=496)

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

FE Tango (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 FE Tango Wind Energy Facility will include a maximum of 18 wind turbines with a contracted capacity of up to 150MW and associated infrastructure to be constructed over an area of approximately 2250ha 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

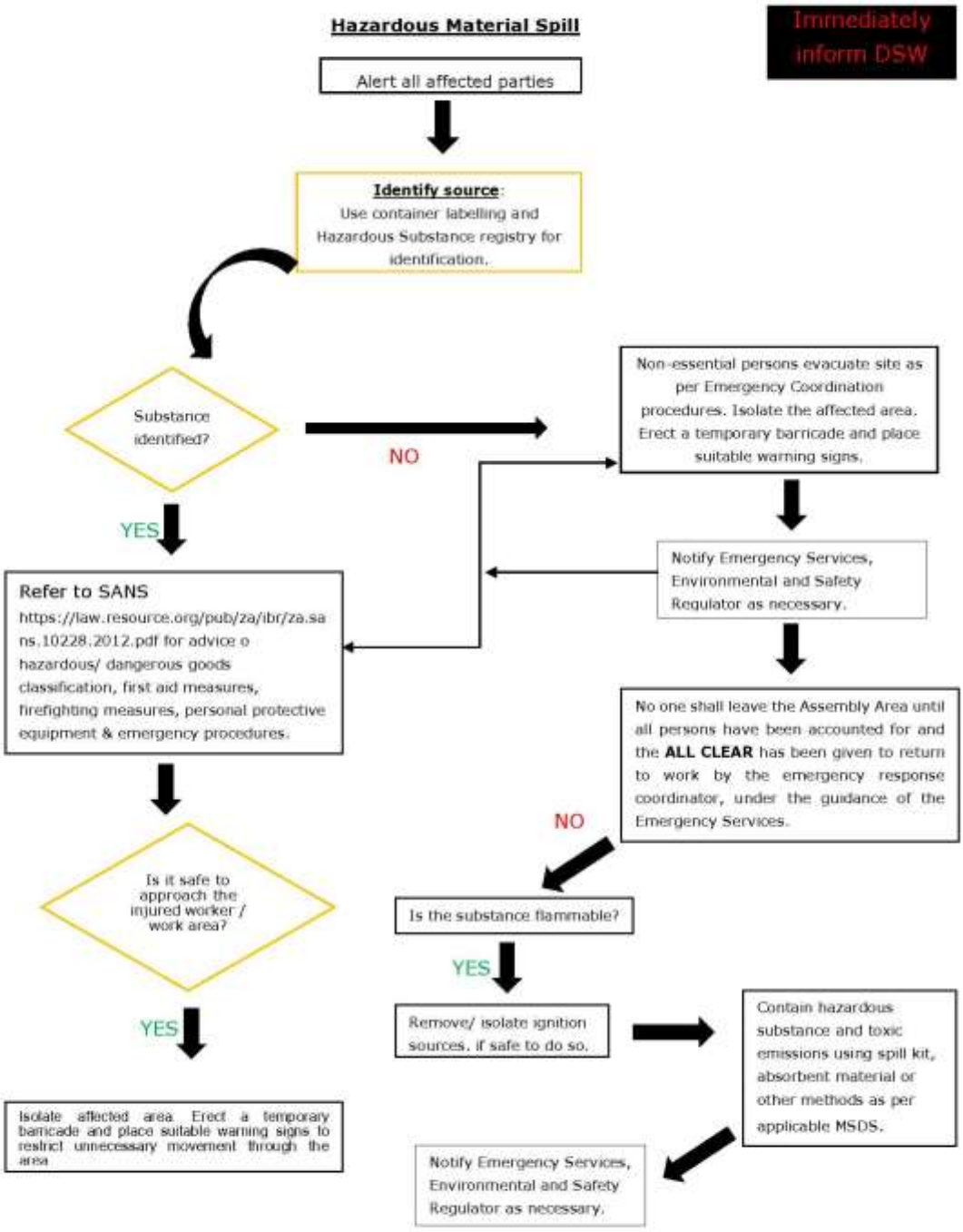


Figure 1: Hazardous Material Spill

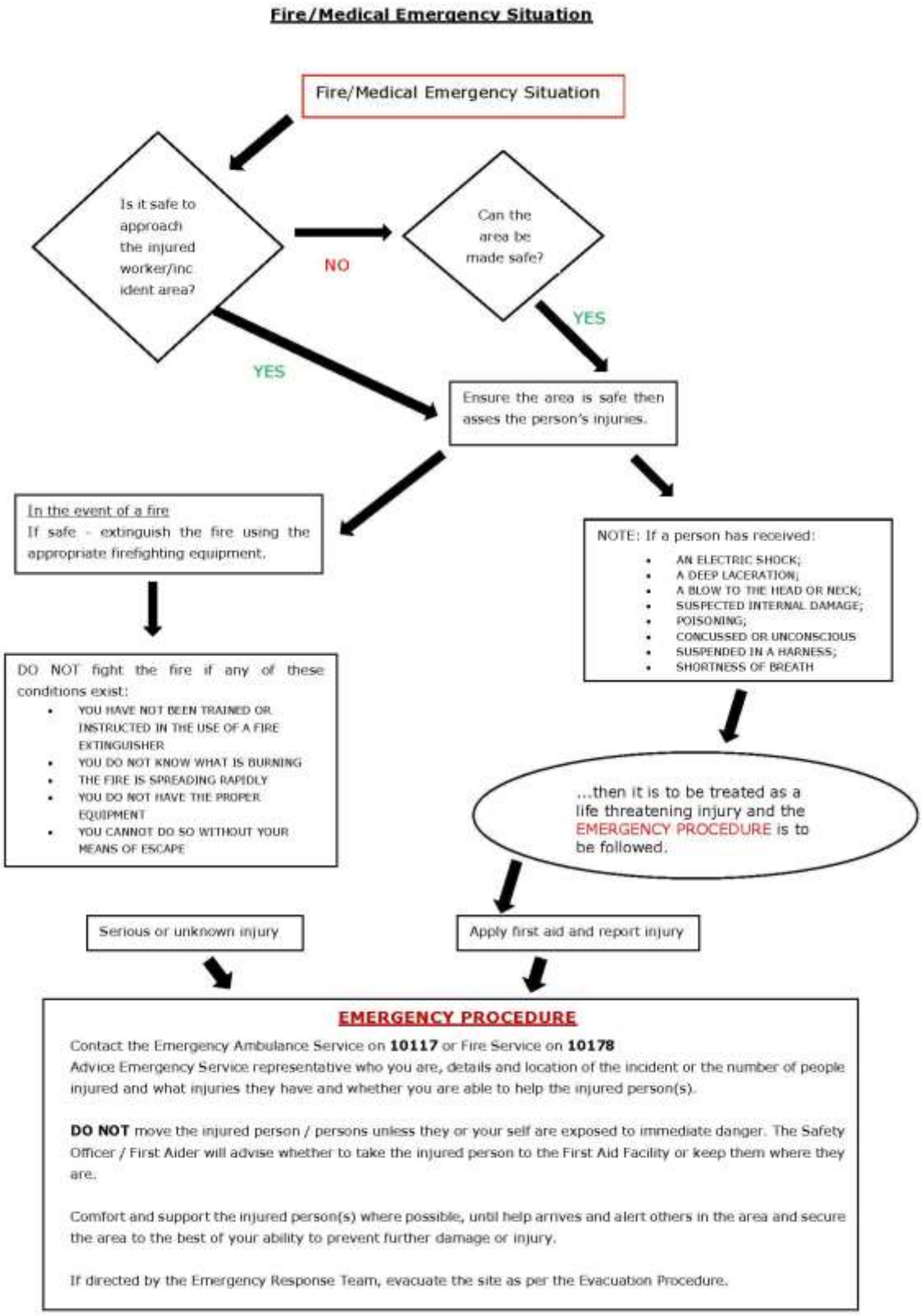


Figure 2: Emergency Fire/Medical

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. 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 *Independent specialist environmental consultant, Environmental Assessment Practitioner (EAP) and advisor* Tasks include: • *Project management.*

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

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CURRICULUM VITAE OF CHANTELLE GEYER

Profession : Environmental Assessment Practitioner and Lead GIS Consultant

Specialisation: Environmental Management; Project-Related GIS Mapping; Water Use Licenses; Public Participation; General Geology and Geochemistry.

Work Experience: One year in the environmental field.

VOCATIONAL EXPERIENCE

Chantelle is a conscientious and ambitious Environmental Consultant who holds a BSc (Hons) degree in Environmental Geology. She recently graduated from the North-West University where she consistently stayed in the top 3 of her class. She joined a group of passionate academic peers in her third year to create the first North-West University Geoscience Society to teach young earth scientists about the environment and introduce them to professional mentors, thus bridging the gap between university and a professional career. She was appointed as project manager for this society for two consecutive terms and organized career talks, academic game shows, alumni talks, clean-up initiatives, and numerous team-building events.

She has special interests in geological formations, geochemistry, minerals, contamination studies, rehabilitation and restoration of disturbed areas, as well as hydrology. However, she found her passion for Environmental Management during an environmental internship where she gained experience in:

- Environmental Impact Assessments
- Project-related GIS mapping
- Water use licences
- Public participation processes

Chantelle is a loyal and enthusiastic individual who is dedicated to further her studies in Environmental Management, Environmental Legislation, GIS-mapping, and studies on the renewable energy sector of South Africa. Her goal is to gain knowledge in the processes of Basic Assessments, Environmental Impact Assessments, Environmental Compliance, EA amendments, environmental permitting, public participation, screening assessments, and environmental authorisation applications. She aims to use this knowledge to strategically consult clients and undertaking projects efficiently and to the highest standard.

SKILLS BASE AND CORE COMPETENCIES

- Specialized in environmental permitting
- Great organisational skills
- Good at time management
- Passionate about the environment
- Compilation of Environmental Reports in compliance with environmental legislation.
- Project management for environmental-related events and projects.
- Water Use Licences
- Aiding with public participation processes.
- Experience with South African environmental legislation.

- ArcMap.

EDUCATION AND PROFESSIONAL STATUS

Degrees:

- BSc Environmental Sciences, North-West University, Potchefstroom (2021)
- BSc Honours Environmental Geology, North-West University, Potchefstroom (2022)

Short Courses:

- Advanced Microsoft Excel Qualification, Lead Academy (2020)

Professional Society Affiliations:

- Candidate EAP with the Environmental Assessment Practitioners Association of South Africa (EAPASA)(2022/5021)
- Registered with the International Association for Impact Assessment South Africa (IAIAsa)
- Golden Key International Honour Society

EMPLOYMENT

Date	Company	Roles and Responsibilities
July 2023 – Present:	Savannah Environmental (Pty) Ltd	*Environmental Assessment Practitioner and Lead GIS Consultant* Tasks include: *Environmental Assessment Practitioner (EAP); Leading project-related GIS mapping.* *Performing Basic Assessment Reports and Environmental Impact Assessments, Environmental Permitting, and Public Participation Processes.*
July 2022 – July 2023:	Savannah Environmental (Pty) Ltd	*Junior Environmental Consultant* Tasks include: *Environmental Assessment Practitioner (EAP); Specialising in project-related GIS mapping.* *Performing Basic Assessment Reports and Environmental Impact Assessments,* *Assisting with public participation processes.*
February 2020 – November 2022	North-West University Geoscience Society	*Project Manager* Tasks include: *Organize and facilitate all the committee events* *Plan and allocate project resources* *Creating a budget* *Track projects progress and inform the rest of the society members regarding the running projects* *Translation of important documents and posters* *Graphic Design* *Social Media management and marketing*
September 2021 – November 2021	Prescali Environmental (Pty)	*Environmental Intern* Tasks included:

Date	Company	Roles and Responsibilities
		Liaising with senior management on environmental concerns, Preparing Water Use Licence (WUL) audits, Taking minutes during meetings, Public Participation tasks.

PROJECT EXPERIENCE

Project experience includes renewable energy projects, grid connection infrastructure, and other infrastructure.

RENEWABLE POWER GENERATION PROJECTS: SOLAR ENERGY FACILITIES

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	*Client Name*	*Role*
Mutsho Solar PV (4x100MW projects), Limpopo	*Cri-Eagle*	*Junior EAP & GIS Specialist*
Harmony One Plant Solar PV Facility (30MW), Free State	*ENGP/Harmony Gold*	*Junior EAP & GIS Specialist*
Harmony Target Solar PV Facility (30MW), Free State	*ENGP/Harmony Gold*	*Junior EAP & GIS Specialist*
Harmony Joel Solar PV Facility (18MW), Free State	*ENGP/Harmony Gold*	*Junior EAP & GIS Specialist*
Ummbila Emoyeni SEF (150MW), Mpumalanga	*Windlab Developments South Africa (Pty) Ltd*	*Junior EAP & GIS Specialist*
Phadima Solar PV Facility (240MW), Gauteng Province	*WKN Windcurrent*	*EAP & GIS Specialist*
Rivierplaats Energy Park (200MW), Free State	*Pele Energy*	*EAP & GIS Specialist*

Basic Assessments

Project Name & Location	*Client Name*	*Role*
Harmony Central Plant Solar PV Facility (14MW), Free State	*ENGP/Harmony Gold*	*Junior EAP & GIS Specialist*
Harmony Moab Khotsong Solar PV Facility (100MW), Free State	*ENGP/Harmony Gold*	*Junior EAP & GIS Specialist*
Highveld Solar PV Facility (240MW), North West	*WKN Windcurrent*	*Junior EAP & GIS Specialist*
Riet Solar PV Cluster (400MW), Mpumalanga	*African Clean Energy Developments (ACED)*	*Junior EAP & GIS Specialist*
Harmony Kalgold Solar PV Facility (15MW), North West	*ENGP/Harmony Gold*	*Junior EAP & GIS Specialist*
Harmony Chemwes Solar PV Facility (15MW), North West	*ENGP/Harmony Gold*	*Junior EAP & GIS Specialist*
Quantum 1 Solar PV Facility (10MW), Gauteng	*South African Mainstream Renewable Power*	*EAP & GIS Specialist*
Matla Solar PV Facility (35MW), Mpumalanga	*Cennergi Holdings*	*EAP & GIS Specialist*

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

Project Name & Location	*Client Name*	*Role*
San Solar PV Part 1 Amendment	*Acciona*	*Junior EAP & GIS Specialist*
San Solar PV WULA	*Acciona*	*Junior EAP & GIS Specialist*
Red Sands PV3 Part 1 Amendment	*AGV Projects*	*Junior EAP & GIS Specialist*

Harmony Central Plant Solar PV Facility GA	*ENGP/Harmony Gold*	*Junior EAP & GIS Specialist*
Harmony Moab Khotsong Solar PV Facility GA	*ENGP/Harmony Gold*	*Junior EAP & GIS Specialist*
Mutsho Solar PV (4x100MW projects) GAs	*Cri-Eagle*	*EAP & GIS Specialist*
Harmony One Plant Solar PV Facility GA	*ENGP/Harmony Gold*	*Junior EAP & GIS Specialist*
Highveld Solar PV Facility GA	*WKN Windcurrent*	*EAP & GIS Specialist*
Highveld Solar PV Facility S53	*WKN Windcurrent*	*EAP & GIS Specialist*
Ummbila SEF Biodiversity Permitting	*Seriti Green*	*EAP & GIS Specialist*

RENEWABLE POWER GENERATION PROJECTS: WIND ENERGY FACILITIES

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	***Client Name***	***Role***
Ummbila Emoyeni WEF (666MW), Mpumalanga	*Windlab Developments South Africa (Pty) Ltd*	*Junior EAP & GIS Specialist*

Basic Assessments

Project Name & Location	***Client Name***	***Role***
Kudu Wind Farm (625MW), Eastern Cape	*EnergyTeam*	*Junior EAP & GIS Specialist*
Tango Wind Farm (240MW), Eastern Cape	*EnergyTeam*	*Junior EAP & GIS Specialist*

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

Project Name & Location	***Client Name***	***Role***
Ummbila WEF Biodiversity Permitting	*Seriti Green*	*EAP & GIS Specialist*

RENEWABLE POWER GENERATION PROJECTS: OTHER TECHNOLOGY

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	***Client Name***	***Role***
Renewstable Anzani Power Plant (65MW), Mpumalanga	*HDF Energy*	*GIS Specialist*
Renewstable Kopano Power Plant (65MW), Mpumalanga	*HDF Energy*	*GIS Specialist*

GRID INFRASTRUCTURE PROJECTS

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	***Client Name***	***Role***
Ummbila Emoyeni EGI, Mpumalanga	*Windlab Developments South Africa (Pty) Ltd*	*Junior EAP & GIS Specialist*

Basic Assessments

Project Name & Location	***Client Name***	***Role***
Mutsho Solar Grid Connection, Limpopo	*Cri-Eagle*	*Junior EAP & GIS Specialist*
Highveld Grid Connection, North West	*WKN Windcurrent*	*Junior EAP & GIS Specialist*

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

Basic Assessments

Project Name & Location	***Client Name***	***Role***
Witberg WEF Access Road, Western Cape	*Red Rocket South Africa (Pty) Ltd*	*Junior EAP and GIS Specialist*
Impofu Buffer Yard, Eastern Cape	*Enel Green Power South Africa*	*GIS Specialist*

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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 <u>*Tasks include:*</u> *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.* *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 *(Director of Imaginative Africa)*	Independent Consultant *Consulting to various Environmental Assessment Practitioners for Public Participation and Stakeholder Engagements:* *<u>Tasks include:</u>* *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.* *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* *<u>Clients</u>:* *SiVEST Environmental* *Savannah Environmental* *Baagi Environmental* *Royal Haskoning DHV (previously SSI)*
2013 - 2016	Zitholele Consulting *Contact person: Dr Mathys Vosloo* *Contact number: 011 207 2060*	Senior Public Participation Practitioner and Project Manager <u>Tasks included:</u> *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 *(company owned by Nicolene Venter)*	Independent Consultant Consulting to various Environmental Assessment Practitioners for Public Participation and Stakeholder Engagements <u>Tasks included:</u> *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. *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* *<u>Clients</u>:* *Bohlweki Environmental* *Bembani Sustainability (Pty) Ltd* *Naledzi Environmental*
2007 – 2011	SiVEST SA (Pty) Ltd *Contact person: Andrea Gibb* *Contact number: 011 798 0600*	Unit Manager: Public Participation Practitioner *<u>Tasks included:</u>* *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 *(company owned by Nicolene Venter)*	Independent Consultant Public Participation and Stakeholder Engagement Practitioner *<u>Tasks included:</u>* *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.* *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. *<u>Clients</u>:* *Manyaka-Greyling-Meiring (previously Greyling Liaison and currently Golder Associates)*
1997 - 2004	Imaginative Africa (Pty) Ltd *(company owned by Nicolene Venter)*	Independent Consultant: Public Participation Practitioner. *<u>Tasks included:</u>* *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.* *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.* *<u>Clients</u>:* *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* *EAP: Savannah Environmental*	*Project Manage the Public Participation Process* *Facilitate all meetings* *Consultation with Government Officials, Key Stakeholders, Landowners & Community Leaders*
Allepad PVs 4 PVs) & Power Lines (grid connection), Upington, Northern Cape Province	*IL Energy* *EAP: Savannah Environmental*	
Hyperion Solar PV Developments (4 PVs) and Associated Infrastructures, Kathu, Northern Cape Province	*Building Energy* *EAP: Savannah Environmental*	
Aggeneys Solar PV Developments (2 PVs) and Associated Infrastructures, Aggeneys, Northern Cape Province	*Atlantic Energy Partners and ABO Wind* *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* *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* *EAP: SiVEST*	*Public Participation, Landowner and Community Consultation*
De Aar Solar Energy Facility, De Aar, Northern Cape Province	*South Africa Mainstream Renewable Power Developments* *EAP: SiVEST*	*Public Participation, Landowner and Community Consultation*
Droogfontein Solar Energy Facility, Kimberley, Northern Cape Province		
Kaalspruit Solar Energy Facility, Loeriesfontein, Northern Cape Province		

Platsjambok East PV, Prieska, Northern Cape Province		
Renosterburg PV, De Aar, Northern Cape Province	*Renosterberg Wind Energy Company* *EAP: SiVEST*	*Public Participation, Landowner and Community Consultation*
19MW Solar Power Plant on Farm 198 (Slypklip), Danielskuil, Northern Cape Province	*Solar Reserve South Africa* *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* *Facilitate all meetings* *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* *EAP: SiVEST*	*Public Participation*
Eureka Wind Farm, Copperton, Northern Cape Province		
Loeriesfontein Wind Farm, Loeriesfontein, Northern Cape Province	*South Africa Mainstream Renewable Power Developments* *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* *EAP: Savannah Environmental*	*Project Manage the Public Participation Process* *Facilitate all meetings* *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* *EAP: Bohlweki Environmental*	*Project Manage the Public Participation Process* *Facilitate all meetings* *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* *Facilitate all meetings* *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* *Facilitate all meetings* *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* *EAP: Baagi Environmental*	
Thyspunt Transmission Lines Integration Project, Eastern Cape Province	*Eskom Holdings* *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* *EAP: Bembani Environmental*	
Melkhout-Kudu-Grassridge 132kV Power Line Project (project not submitted to DEA), Eastern Cape Province	*Eskom Holdings* *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* *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 EAP: Baagi Environmental	Public Meetings
Mooidraai-Smitkloof 132kV Power Line and Substation, Northern Cape Province	Eskom Holdings EAP: SSI	Focus Group Meetings
Aggeneis-Oranjemond 400kV Eskom Transmission Power Line, Northern Cape Province	Eskom Holdings EAP: Savannah Environmental	Focus Group Meetings & Public Meetings
Ariadne-Eros 400kV/132kV Multi-Circuit Transmission Power Line (Public Meetings)	Eskom Holdings EAP: ACER Africa	Public Meetings
Majuba-Venus 765kV Transmission Power Lines, Mpumlanaga Province		
Thabametsi IPP Power Station, Limpopo Province	Thabametsi Power Company EAP: Savannah Environmental	Focus Group Meeting & Public Meeting
Aggeneis-Oranjemond Transmission Line & Substation Upgrade, Northern Cape	Eskom Transmission	Focus Group Meetings & 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* *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* *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* *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* *Facilitate all meetings* *Consultation with Government Officials, Key Stakeholders & Landowners*
Transnet's New Multi-Products Pipeline traversing Kwa-Zulu Natal, Free State and Gauteng Provinces	*Transnet* *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* *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* *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* *EAP: Environment al Science Associates*	*Public Meeting*
SANRAL N4 Toll Highway Project (2nd Phase), Gauteng & North West Provinces	*Department of Transport* *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* *EAP: Savannah Environmental*	*Public Participation*
Koffiefontein Slimes Dam, Free State Province	*Petra Diamond Mines* *EAP: Zitholele*	*Public Participation*
Baobab Project: Ethenol Plant, Chimbanje, Middle Sabie, Zimbabwe	*Applicant: Green Fuel* *EAP: SiVEST*	*Public Participation & Community Consultation*
BHP Billiton Energy Coal SA's Middelburg Water Treatment Plant, Mpumalanga	*BHP Billiton Group* *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* *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:
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:		

CTS Heritage
34 Harries Street, Plumstead, Cape Town, 7800
Tel: +27 (0)87 073 5739 **Email:** info@ctsheritage.com **Web:** www.ctsheritage.com

APPENDIX L:
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.