KOMSBERG EAST WIND ENERGY FACILITY, WESTERN CAPE PROVINCE

CONSTRUCTION & OPERATION

ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

DFFE REFERENCE: 14/12/16/3/3/2/857

REVISION 2

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PROJECT 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.

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

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.

Commissioning: Commissioning commences once construction is completed. Commissioning covers all activities including testing after all components of the wind turbine are installed.

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

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

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

Development area: The development area is that identified area (located within the project site) where the Komsberg East Wind Energy is planned to be located. This area has been selected as a practicable option for the facility, considering technical preference and constraints, and has been assessed within this report and by the respective specialists. .

Development footprint: The development footprint is the defined area (located within the development area) where the Turbines infrastruction and other associated infrastructure for Komsberg East Wind Energy Facility is planned to be constructed. This is the anticipated 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.

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.

Emergency: An undesired/ unplanned event that results in a significant environmental impact and requires the notification of the relevant statutory body, such as a local authority.

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

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

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

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

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

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

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

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

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

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

Environmental Officer (EO): The Environmental Officer (EO), employed by the Contractor, is responsible for managing the day-to-day on-site implementation of this EMPr, and for the compilation of regular (usually weekly) Monitoring Reports. The EO must act as liaison and advisor on all environmental and related issues and ensure that any complaints received from the public are duly recorded and forwarded to the Site Manager and Contractor.

Environmental Site Manage (SM): The Applicant is to appoint an Environmental Site Manager (ESM) to ensure that relevant requirements of the OEMP document are implemented, and that the site is suitably managed.

Environmental Site Officer (ESO): environmental site officer (ESO) is appointed by the contractor, is responsible for conducting on-the-job environmental training of all employees on site, as well as ensuring that compliance with legislative requirements are met.

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

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 (Van der Linde and Feris, 2010; pg 185).

Heritage: That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act of 2000).

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

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

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

Interested and Affected Party (I&AP): Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups, and the public.

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

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.

Natural properties of an ecosystem (sensu Convention on Wetlands): Defined in Handbook 1 as the "…physical, biological or chemical components, such as soil, water, plants, animals and nutrients, and the interactions between them". (Ramsar Convention Secretariat. 2004. Ramsar handbooks for the wise use of wetlands. 2nd Edition. Handbook 1. Ramsar Convention Secretariat, Gland, Switzerland.) (see http://www.ramsar.org/).

No-go areas: Areas of environmental sensitivity that should not be impacted on or utilised during the development of a project as identified in any environmental reports.

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.

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

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 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 rotor, is constructed from tubular steel and/or concrete and may be up to 150m 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 wind turbine and to sustain vibration, wind loading and the overall weather elements for the lifetime of the wind turbine.

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

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

Watercourse: as per the National Water Act means -
(a) a river or spring;
(b) a natural channel in which water flows regularly or intermittently;
(c) a wetland, lake or dam into which, or from which, water flows; and
(d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.

Wetland: Wetlands are defined in the National Water Act as 'land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.

- **Intermittent or seasonal wetlands:** are vleis or larger drainage lines where water tends to accumulate during the rainy season, and may persist for a week or longer, usually several months. In this case there is enough seasonal moisture accumulation to ensure that surface soils remain waterlogged for a longer period, hence also supporting specially adapted flora that will grow in (seasonally) saturated soils.
- **Perennial[1] wetlands:** are all dams, rivers and other water bodies that carry water permanently, and will only have severely reduced flows or water during periods of prolonged severe droughts.

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.

[1] Perennial: from Latin per, "through", annus, "year", lasting or active through the year or through many years, indefinitely.

ABBREVIATIONS AND ACRONYMS

CBA	Critical Biodiversity Area
DFFE	Department of Forestry, Fisheries and the Environment (National)
DWS	Department of Water and Sanitation
CBA	Critical Biodiversity Area
CR	Critically Endangered
DM	District Municipality
DMRE	Department of Mineral Resources Energy
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
EN	Endangered
EP	Equator Principles
ESA	Ecological Support Area
GA	General Authorisation
IBA	Important Bird Area
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IEP	Integrated Energy Plan
IFC	International Finance Corporation
IPP	Independent Power Producer
IRP	Integrated Resource Plan
IUCN	International Union for Conservation of Nature
I&AP	Interested and Affected Party
Km	Kilometre
kWh	Kilowatt hour
LC	Least Concern
LM	Local Municipality
M	Metre
m^2	Square meters
m^3	Cubic meters
m amsl	Metres Above Mean Sea Level
MW	Megawatts
NDP	National Development Plan
NEMA	National Environmental Management Act (No. 107 of 1998)
NEM:AQA	National Environmental Management: Air Quality Act (No. 39 of 2004)
NEM:BA	National Environmental Management: Biodiversity Act (No. 10 of 2004)
NEM:WA	National Environmental Management: Waste Act (No. 59 of 2008)
NFA	National Forests Act (No. 84 of 1998)
NFEPA	National Freshwater Ecosystem Priority Area
NHRA	National Heritage Resources Act (No. 25 of 1999)
NT	Near Threatened
NWA	National Water Act (No. 36 of 1998)
ONA	Other Natural Area
PA	Protected Area

REIPP	Renewable Energy Independent Power Producer Procurement
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SAIAB	South African Institute for Aquatic Biodiversity
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework
TOPS	Threatened or Protected Species
VU	Vulnerable

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1 PURPOSE & OBJECTIVE 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"[2]. The objective of this Environmental Management Programme 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 compliance with recommendations and conditions specified through an EIA process, as well as to 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, operational and decommissioning phases of a project, and is intended to manage and mitigate construction and operational 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 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.

The EMPr has been developed as a set of environmental specifications (i.e. principles of environmental management for the proposed wind energy facility), which are appropriately contextualised to provide clear guidance in terms of the on-site implementation of these specifications (i.e. on-site contextualisation is provided through the inclusion of various monitoring and implementation for use of the EMPr by the project implementer as well as compliance monitors).

The EMPr has the following objectives:

- To 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 wind energy facility.
- To ensure that the construction, operational and decommissioning phases do not result in undue or reasonably avoidable adverse environmental impacts, and ensure that any potential environmental benefits are enhanced.
- To identify entities who will be responsible for the implementation of the measures and outline functions and responsibilities.
- To propose mechanisms for monitoring compliance, and preventing long-term or permanent environmental degradation.
- To facilitate appropriate and proactive responses to unforeseen events or changes in project implementation that was not considered in the EIA process.

[2] Provincial Government Western Cape, Department of Environmental Affairs and Development Planning: *Guideline for Environmental Management Plans,* 2005.

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

Komsberg Wind Energy Facility (Pty) Ltd must ensure that the implementation of the project complies with the requirements of any and all Environmental Authorisations (**Appendix J**) and permits, as well as with obligations emanating from all relevant environmental legislation. This obligation is partly met through the development of the EMPr, and the implementation of the EMPr through its integration into the contract documentation for activities associated with both construction and operation. Since this EMPr is part of the EIA process undertaken for the proposed wind energy facility, it is important that this guideline document be read in conjunction with the Final Scoping Report and EIA Report), as well as any relevant specialist studies and specialist walkthroughs conducted in accordance with the conditions of the EA. This will contextualise the EMPr and enable a thorough understanding of its role and purpose in the integrated environmental process. This EMPr for pre-construction, construction, operational and decommissioning activities has been compiled in accordance with Appendix 4 of the EIA Regulations (2014) as amended and in terms of specific requirements listed in any authorisations issued for the proposed project.

To achieve effective environmental management, it is important that Contractors are aware of their 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:

- Ensuring that employees have a basic understanding of the key environmental features of the construction site and the surrounding environment.
- Ensuring that a copy of the EMPr is readily available on-site, and that all site staff are aware of the location and have access to the document. Employees must be familiar with the requirements of the EMPr and the environmental specifications as they apply to the construction of the facility.
- Ensuring that, prior to commencing any site works, all employees and sub-contractors have attended an appropriate Environmental Awareness Training course. The course must provide the site staff with an appreciation of the project's environmental requirements, the EMPr specifications, and how they are to be implemented.
- Basic training in the identification of archaeological sites/objects, and protected or Red List flora and fauna that may be encountered on the site.
- Awareness of any other environmental matters, which are deemed to be necessary by the Environmental Control Officer (ECO).

The Komsberg Wind Farms (Pty) Ltd received an Environmental Authorisation (EA) for the construction of the Komsberg East Wind Energy Facility (WEF) on 08 August 2016. In terms of this EA, the EMPr for the project is amendable (Conditions 22-26), and must be implemented and strictly enforced. This revised EMPr includes additional mitigation measures as required by the specialist team specifically in accordance with conditions 17 and 18 of the issued EA, and is being submitted for authority approval. EMPr revision 1 (dated December 2019) was submitted as part of an amendment application (amendments to turbine specifications amongst others) in 2019, but was not approved in terms of Condition 17 & 18 of the EA.

The 2019 amendment application entailed an updated turbine model for the project and amendments to various conditions. This EA amendment is included in **Appendix J**

The EMPr is a dynamic document, which must be updated when required. It is considered critical that this EMPr be updated to include site-specific information and specifications as required throughout the life-cycle of the facility. This will ensure that the project activities are planned and implemented taking sensitive environmental features into account.

1.1. EMPr update as required in section 17 and 18.

This EMPr update is being undertaken in accordance with the requirements of Condition 18 and 19 of the EA dated, 08 August 2016.

Table 1.1: Indicates how the conditions of the EA have been addressed in this EMPr update:

EA Condition Reference	Section of EMPr where Condition has been addressed
The EMPR amendment must include the following:	
18. The Environmental Management Programme (EMPr) submitted as part of the EIR is not approved and must be amended to include measures as dictated in the final layout map, and micro-siting, and the provisions of this environmental authorisation. The EMPr must be made available for comment by registered interested and affected parties and the holder of this environmental authorisation must consider such comments. Once amended, the final EMPr must be submitted to the department for written approval prior to the commencement of the activity. Once approved the EMPr must be implemented and adhered to.	This is the updated EMPr Rev 2 which has been updated to take into account all measures arising from the final (2021 specialist walkthrough and micro-siting exercise and he result final layout This EMPr will be submitted for comment to the registered interested and affected parties and the public for comment from 02 August 2021 to 02 September 2021. All comments received will be considered and responded to in a comments and response report, the EMPr amended as appropriate in response to the received comments .
18.1. The requirements and conditions of this authorisation.	Chapter 3: *To ensure that the design of the power plant responds to identified environmental constraints. Chapters 4 and 5 of this EMPr*
18.2 All recommendations and mitigation measures recorded in the EIAr.	All recommendations and mitigation measures of the EIAr and the specialist reports have been included in Chapters 4, 5 and 6 of the EMPr. Where amendments and/or additions have been made, these have been underlined for an ease of reference.
18.3 All mitigation measures as listed in the specialist reports must be included in the EMPr and implemented.	All mitigation measures listed in the specialist reports have been included in Chapters 4, 5 and 6 of the EMPr. Where amendments and/or additions have been made, these have been underlined for an ease of reference.
18.4 The final Site Layout Map	The final site layout map for the facility is included in **Appendix K**of the EMPr and included as **Figure 2.1**
18.5. The South African Astronomical Observatory, South Africa's largest telescope and the South African Civil Aviation Authority must be provided an opportunity to review and provide comment on the use of lighting on	This updated EMPr (version 2) is made available to SAAO as interested and affected party and a copy thereof distributed for review during the 30-day public review period from 02 August 2021 to 02 September 2021. All comments received will be addressed and incorporated

EA Condition Reference	Section of EMPr where Condition has been addressed
the development footprint. The comments must be incorporated into the EMPr	into the Comments and Response Report and included with the final EMPr submitted for authority decision making.
18.6. An alien invasive management plan to be implemented during the construction and operation of the facility. The plan must include mitigation measures to reduce the invasion of alien species and ensure that the continuous monitoring and removal of alien species is undertaken.	An Alien Invasive Management Plan (inclusive of an Open Space Management Plan) has been included as **Appendix B** of the EMPr. The plan includes mitigation measures to be implemented to reduce the invasion of alien plant species within the project footprint and the surrounding area.
18.7. A plant rescue and protection plan which allows for the maximum transplant of conservation important species from areas to be transformed. This plan must be compiled by a vegetation specialist familiar with the site in consultation with the ECO and be implemented prior to the commencement of the construction phase.	The Plant and Rescue Protection Plan has been appended to the EMPr as **Appendix C** of the EMPr.
18.8. A re-vegetation and habitat rehabilitation plan to be implemented during the construction and operation of the facility. Restoration must be undertaken as soon as possible after completion of construction activities to reduce the amount of habitat converted at any one time and to speed up the recovery to natural habitats.	A Revegetation and Rehabilitation Plan has been included in the EMPr as **Appendix D**.
18.9. A traffic management plan for the site access roads to ensure that no hazards would result from the increase truck traffic flow would not be adversely impacted. This plan must include measures to minimize impacts on local commuters, e.g. limiting construction vehicles travelling on public roadways during the morning and late afternoon commute time and avoid using roads through densely populated built-up areas as not to disturb existing retail and commercial operations.	A Traffic Management Plan has been included in the EMPr as **Appendix E.**
18.10 The post construction Avifaunal monitoring plan that must adhere to Birdlife's most recent Avifaunal guideline.	A post construction Avifaunal Monitoring plan has been included as **Appendix I.**
18.11 A conservation management plan must be drafted and submitted to SAHRA for review and comment. The management plan, as recommended ny SAHRA must be included in the final EMPr.	
18.12. A stormwater management plan to be implemented during the construction and operation of the facility. The plan must ensure compliance with applicable regulations and prevent off-site migration of contaminated stormwater or increased soil erosion. The plan must include the construction of appropriate design measures that allow surface and subsurface movement of water along drainage lines so as not to impede natural surface and subsurface flows. Drainage measures must promote the dissipation of stormwater run-off.	A Storm Water Management Plan has been included in the EMPr as **Appendix F**.

EA Condition Reference	Section of EMPr where Condition has been addressed
18.13. An erosion management plan for monitoring and rehabilitation erosion events associated with the facility. Appropriate erosion mitigation must form part of this plan to prevent and reduce the risk of any potential erosion.	An Erosion Management Plan has been included in the EMPr as **Appendix H.**
18.14. 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 to the possibility of oil and other toxic liquids from entering the soil or storm water systems.	An Emergency Preparedness and Responses Plan has been included in the EMPr as **Appendix G.**
18.15. A fire management plan to be implemented during the construction and operational phase.	An Emergency Preparedness and Responses Plan has been included in the EMPr as **Appendix G**. The Plan includes mitigation measures to mitigate against possible fires during the construction and operation phases of the facility.
18.16. Measures to protect hydrological features such as streams, rivers, pans, wetlands, dams and their catchments, and other environmental sensitive areas from construction impacts including the direct or indirect spillage of pollutants.	The Stormwater Management Plan, including measures to protect hydrological features within the development area of the facility and the surrounding area has been included in **Appendix F**.
18.17. An environmental sensitivity map indicating environmental sensitive areas and features identified during the EIA process.	A sensitivity map has been included in **Appendix K**.
18.18. A map combining the final layout map superimposed (overlain) on the environmental sensitivity map. This map must reflect the proposed location of the facility as stated in the EIAr and this authorisation.	A map combining the final layout superimposed on the environmental sensitivity is included in **Appendix K, and Figure 2.2 of this EMPr**.

2 BACKGROUND TO THE PROJECT

Savannah Environmental (Pty) Ltd. was appointed by Komsberg Wind Farms (Pty) Ltd to conduct the Environmental Impact Assessment (EIA) process as required by the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), as amended, for the proposed establishment of two wind energy facilities (WEFs), Komsberg East and West and their associated grid connections. The aim of the projects is to generate electricity, which is likely to be sold through the Department of Energy's (DoE) Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). The WEFs will deliver electricity into the existing Eskom electricity grid via a high voltage grid connection. The proposed grid connections are undergoing two separate Basic Assessment processes.

This Environmental Management Program is focussed on the Komsberg East Wind Energy Facility.

2.1 Site Location and Project Description

The study area is located in the Western Cape Province approximately 60km north of Laingsburg and 40km southeast of Sutherland. The proposed site lies within the Moordenaars Karoo.

The study area covers a total area of approximately 15 740 hectares. The footprint of the proposed infrastructure would equate to less than one percent of the total area.

The proposed site is located in the Laingsburg Local Municipal area, which forms part of the Central Karoo District Municipality in the Western Cape Province. The main access route to the proposed site is via the R354 and the Komsberg and Moordenaars Karoo District Roads, approaching the study area from the west.

Currently, there are two occupied homesteads located within the study area. The main land uses in the area are linked to livestock farming. The proposed site is made up of a number of farms which are zoned for Agricultural Use.

The proposed project comprises of one WEF and its associated grid connection. The WEF will have a maximum generation capacity of up to 275 megawatts (MW).

The Komsberg East WEF will consist of the following infrastructural components:

- A maximum of 43 wind turbines each up to 6.5 MW in capacity with a rotor diameter of up to 180m and a hub height of up to 150m;
- Foundations and hardstands associated with the wind turbines;
- Up to 8m wide internal access road to each turbine, the substation complex and the ancillary infrastructure, including underground cabling adjacent the roads. Road length would be up to approximately 68km in total;
- Medium voltage cabling between turbines and the substation, to be laid underground where practical;
- Overhead medium voltage cables between certain turbine strings or rows;
- A 100m x 150m on-site substation complex to facilitate stepping up the voltage from medium to high voltage to enable the connection of the wind farm to the national grid;
- An approximately 55km high voltage power line (132kV) from the on-site substation to the national grid at the Eskom Komsberg Main Transmission Substation;[3]
- A 30m x 50m operations and services workshop area/office building for control, maintenance and storage; and

[3] Note that the 132kV grid connection infrastructure is authorized in a separate environmental authorization and is subject to its own EMPr.

» Temporary infrastructure including a site camp, lay down areas and a batching plant totalling 150m x100m in extent.

Refer to Figure 2.1 and **Appendix KA** for the final layout plan which indicates the proposed locations of turbines and associated infrastructure.

2.2 Background to the Environmental Management Program (EMPr)

An Environmental Management Program for the proposed WEF is required in terms of the following documents:

» 2014 Regulations in terms of Chapter 5 of the National Environmental Management Act (1998, as amended).

Conditions 17-21 of the EA also include specific requirements to be adhered to during the finalisation of the EMPr prior to the commencement of construction.

2.3 Expertise of the consultants responsible for the compilation of the EMPr

This EMPr was compiled by:

EMP Compilers	
EMPr Revision 2:	
Jo-Anne Thomas	Savannah Environmental
Tebogo Mapinga	Savannah Environmental
EMPr Revision 0:	
Barry Wiesner	Arcus Consultancy Services
Ashlin Bodasing	Arcus Consultancy Services
Emily Herschell	Arcus Consultancy Services
EMPr Revision 1:	
Franci Gresse	Aurecon
Input from Specialists - Specialist Walkthrough Reports	
Ecology	EnviroSci (Pty) Ltd
Avifauna	Wild Skies Ecological Services
Bats	Arcus Consulting
Heritage	Jenna Lavin of CTS Heritage
Noise	Morne de Jager of EAR- Enviro Acoustic Research

The Savannah Environmental team have extensive knowledge and experience in environmental impact assessment and environmental management and have managed and drafted Environmental Management Programmes for other wind energy facility projects throughout South Africa. In addition, they have been involved in compliance monitoring of major construction projects in South Africa.

» **Tebogo Mapinga:** is an experienced professional with 14 years across the fields of Environment, Permitting, Project Management, Contract Management and Business Development, within the built infrastructure and most recently renewable energy sectors. She has an excellent track record and across-the-board proficiency within the following business environments: Business Development | Tender Management | Environmental Regulations & Compliance (Renewable Energy, Power,

Infrastructure, Mining, ect) |Project Management (including contract management) | Design, Execution and management Project Permitting Processes| Team Management | Stakeholder Interfaces | Policy and Legislation Advisory. She is registered as a Professional Natural Scientist (11518) with the South African Council for Natural Scientific Professions (SACNASP)

» **Jo-Anne Thomas.** She holds a Master of Science Degree in Botany (M.S.c Botany) from the University of the Witwatersrand and is registered as a Professional Natural Scientist (400024/2000) with the South African Council for Natural Scientific Professions (SACNASP) and a registered Environmental Assessment Practitioner (EAP) with the Environmental Assessment Practitioners Association of South Africa (EAPASA) (2019/726). She has over 20 years of experience in the field of environmental assessment and management, and the management of large environmental assessment and management projects. During this time, she has managed and coordinated a multitude of large-scale infrastructure EIAs and is also well versed in the management and leadership of teams of specialist consultants, and dynamic stakeholders. She has been responsible for providing technical input for projects in the environmental management field, specialising in Strategic Environmental Advice, EIA studies, environmental permitting, public participation, EMPs and EMPrs, environmental policy, strategy and guideline formulation, and integrated environmental management (IEM). Her responsibilities for environmental studies include project management, review and integration of specialist studies, identification and assessment of potential negative environmental impacts and benefits, and the identification of mitigation measures, and compilation of reports in accordance with applicable environmental legislation.

» **Nicolene Venter.** She is a Board Member of IAPSA (International Association for Public Participation South Africa). She holds a Higher Secretarial Diploma and has over 21 years of experience in public participation, stakeholder engagement, awareness creation processes and facilitation of various meetings (focus group, public meetings, workshops, etc.). She is responsible for project management of public participation processes for a wide range of environmental projects across South Africa and neighbouring countries.

2.4 Components of the EMPr

Section 1: **Purpose & Objective of the EMPr**	outline the overall purpose of the EMPr and its objectives
Section 2: Background to the project	Provides background information regarding the site, the proposed development and the EMPr
Section 3: Implementation of EMPr	Provides details of the communication and organisational structures within which the EMPr will be implemented, responsibilities of key role players, and provides the terms of reference for the ECO.
Section 4: Environmental Management Specifications for the Pre-construction Phase	Provides environmental specifications for preconstruction phase
Section 5: Environmental Management Specifications for the Construction Phase	Provides all construction phase environmental management requirements applicable to the principal construction contractors, and their subcontractors.
Section 6: Environmental Management Specifications for the Operational Phase	Provides all operational phase environmental management requirements applicable to applicant and any sub-contractors.

Section 7: Management Plan of the Wind Energy Facility	Provides all decommission phase environmental management requirements applicable to applicant and any sub-contractors.

Table 2-1: *Requirements for the Contents of Environmental Management Programmes (EMPrs) in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998): Environmental Impact Assessment Regulations 2014 Appendix 4.*

Aspect	Applicable Section
1.(1) An EMPr must comply with section 24N of the Act and include— *(a) details of–* *(i) the EAP who prepared the EMPr; and* *(ii) the expertise of that EAP to prepare an EMPr;*	Section 1.4
(b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section 1.1.1
(c) a description of the impact management objectives, including management statements, identifying the impacts that need to be avoided, managed and/or mitigated as identified through the environmental impact assessment process for all phases of the development including— *(i) planning and design;* *(ii) pre-construction activities;* *(iii) construction activities;* *(iii) where relevant operation activities; and* *(iv) rehabilitation of the environment after construction and where applicable post closure;*	Sections 3, 4 and 5
(d) a description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph (c);	Sections 3, 4 and 5
(e) a description of impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (c) and (d) will be achieved, and may include actions to — *(i) modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;* *(ii) remedy the cause of pollution or degradation and migration of pollutants;* *(iii) comply with any prescribed environmental management standards or practices;* *(iv) comply with any applicable provisions of the Act regarding closure, where applicable;* *(v) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;*	Sections 3, 4 and 5
(f) the method of monitoring the implementation of the impact management actions contemplated in paragraph (e);	Section 3 and 5.6

(g) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (e);	Section 3 and 5.6
(h) an indication of the persons who will be responsible for the implementation of the impact management actions;	Section 3 and 5.6
(i) the time periods within which the impact management actions contemplated in paragraph (e) must be implemented;	Section 3 and 5.6
(j) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (e);	Section 3 and 5.6
(k) a program for reporting on compliance, taking into account the requirements as prescribed by these Regulations;	Section 3 and 5.6
(l) an environmental awareness plan describing the manner in which— *(i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and* *(ii) risks must be dealt with in order to avoid pollution or the degradation of the environment.*	Section 5.5.13
DFFE Requirements	
• Alien Invasive Management Plan. • Plant Rescue and Protection Management Plan. • Re-Vegetation and Habitat Management Plan. • Transport and Traffic Management Plan. • Open Space Management Plan. • Stormwater Management Plan • Emergency Awareness and Fire Management Plan • Erosion Management Plan • Post Construction Avifaunal Monitoring Plan	Refer to the Appendices (A to I)

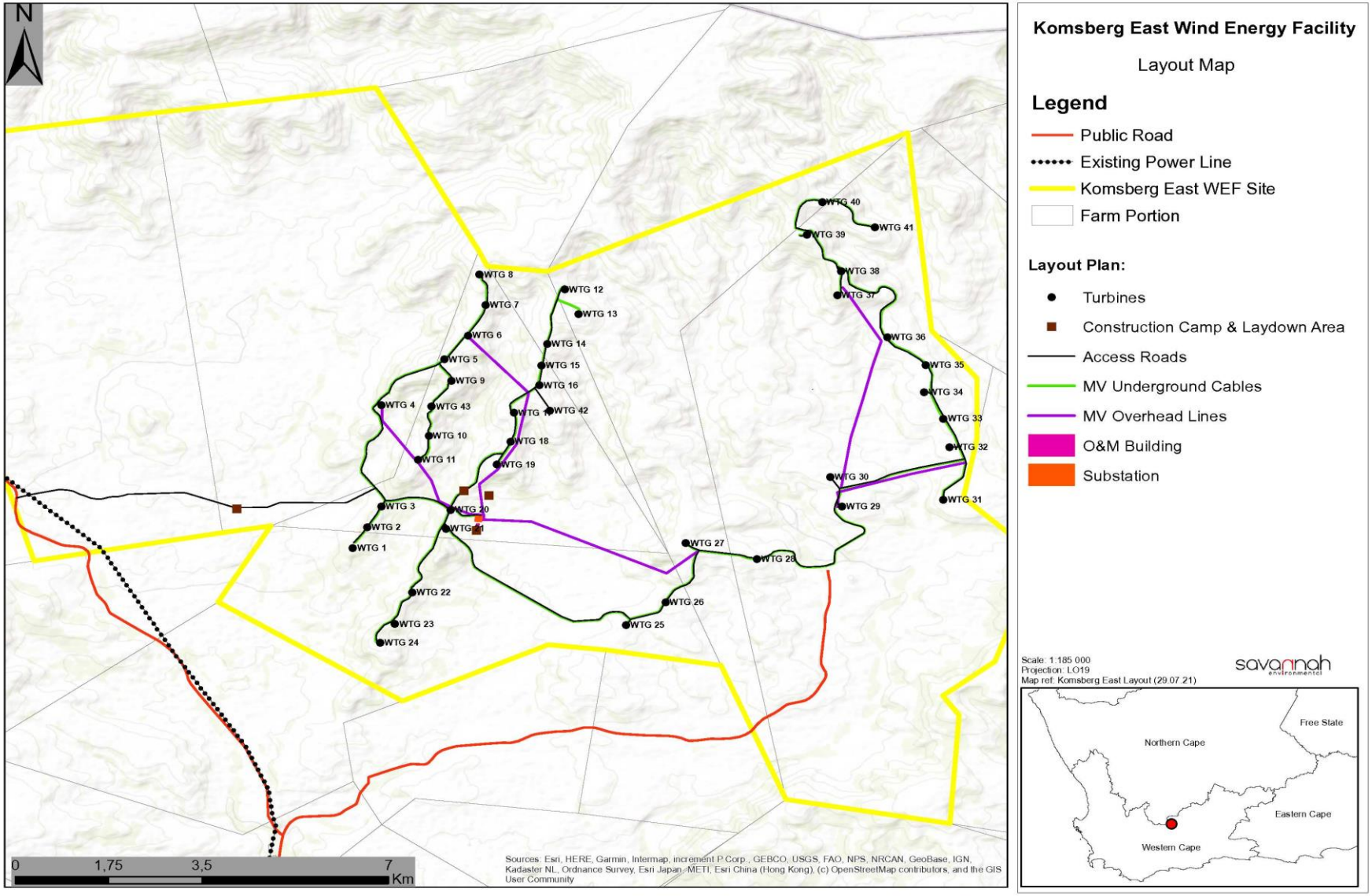

Figure 2.1: Updated final Layout Map

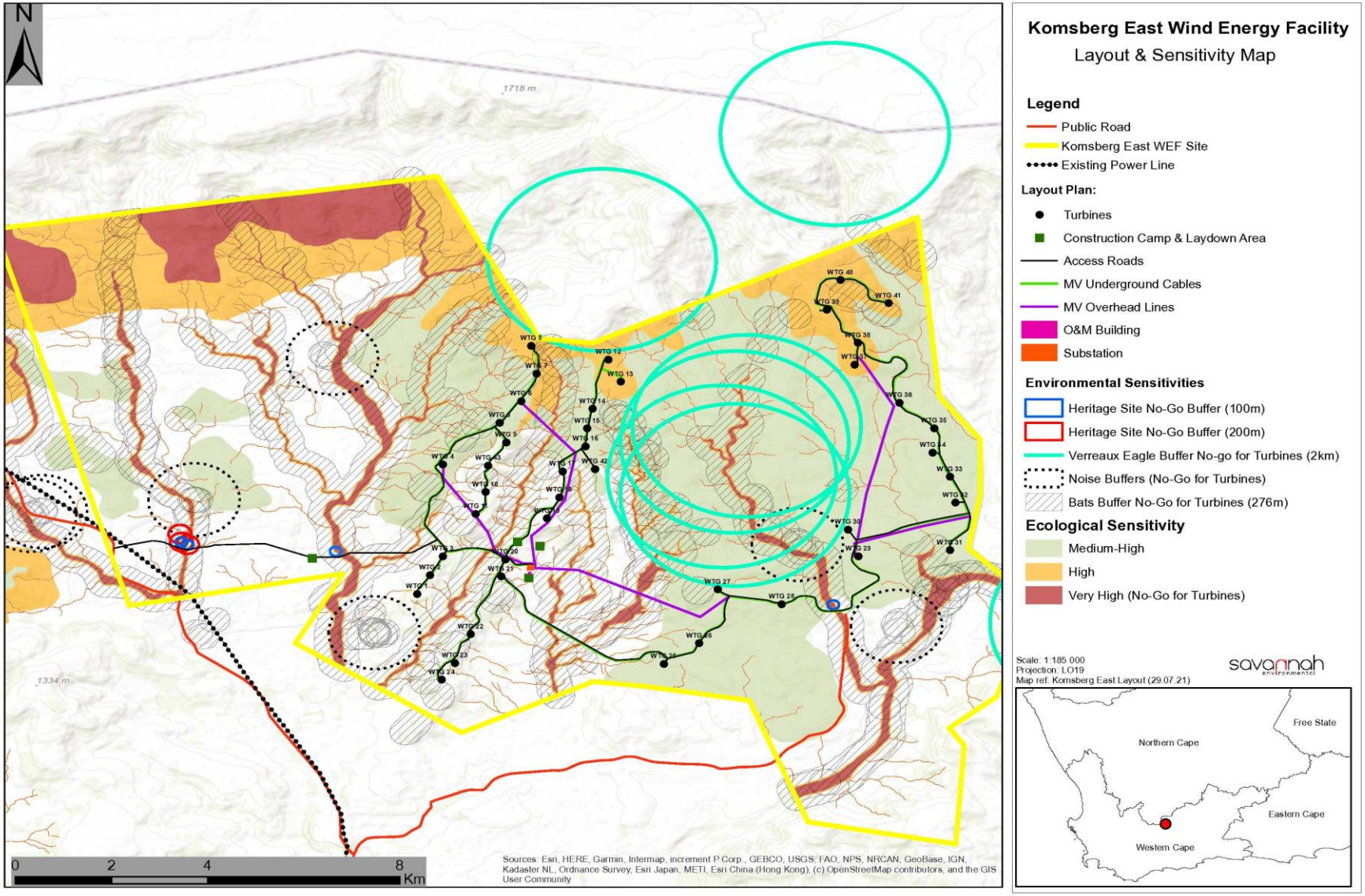

Figure 2.2: Updated combined Layout and Sensitivity Map

3 IMPLEMENTATION OF THE EMPR

3.1 Introduction

This document describes mitigation measures in detail, and is partly prescriptive, identifying specific people or organisations to undertake specific tasks in order to ensure that impacts on the environment are minimised during the lifecycle of this project. The EMP is applicable to all works comprising the pre-construction, construction and operation of the Komsberg East WEF development. It is a living document implying that information gained during pre-construction, construction and operational activities and/or monitoring of procedures on site could lead to changes in the EMPr.

The appointed ECO (Environmental Control Officer) will monitor compliance with the EMPr and other Conditions of Approval as they relate to environmental matters. This EMPr gives direction and guidance to all responsible parties. The responsible parties are expected to co-operate closely to minimise or avoid unnecessary environmental impacts.

Non-compliance penalties are described in this EMPr and are thus to be included into the official contract documentation. The Contractor is obliged to inform the ECO immediately of events that may cause serious environmental damage or breach the requirements of the EMPr. The ECO in turn will immediately inform the project Engineer and Developer and, if necessary the Local, Provincial and or National Authority, of such events.

3.2 Roles and Responsibilities

The key role-players during the construction phase of the development, for the purposes of environmental management on site, include but are not limited to: the Developer, the project Engineer, the main Contractors (direct appointments including civil works contractor, turbine supply and operations contractor, building contractor and their Environmental Site Officers etc.) the Environmental Control Officer, and representatives of the relevant Authority/ies.

Details of the responsibilities of each of the key role-players have been provided in sections 2.2.1 to 2.2.5.

Lines of communication and reporting between the various parties are illustrated in Figure 3.1 below.

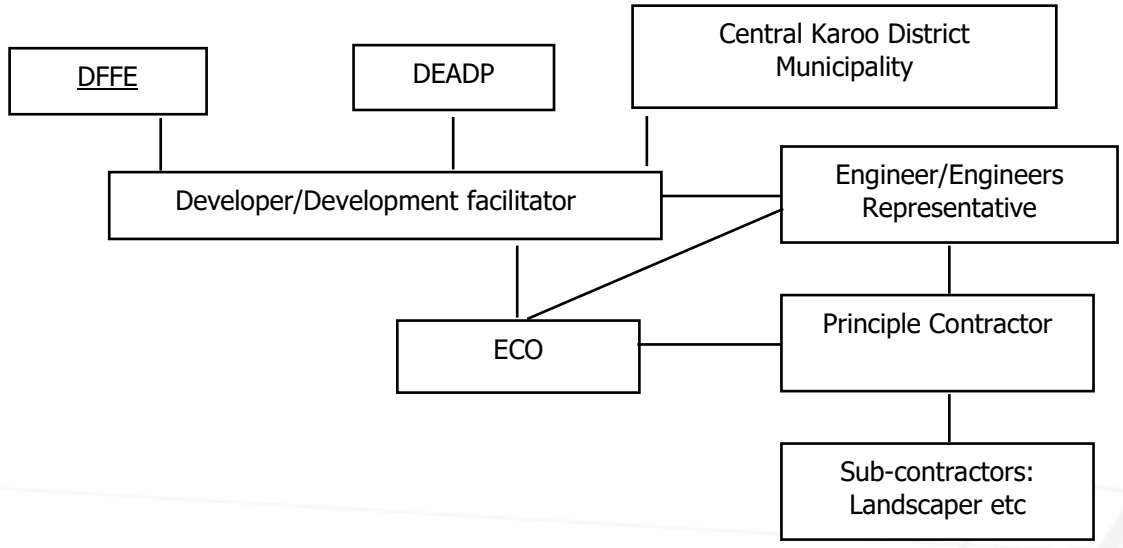

Figure 3.1: Typical communication and reporting structure.

3.2.1 The Developer

For the purpose of this document "the Developer" and its appointed facilitators, refers to those whom permission has been granted to proceed with the Komsberg Wind Farms (Pty) Ltd and who is thus ultimately responsible for compliance with all conditions of approval of the development or any aspect thereof by any authority.

With respect to the pre-construction phase of the development, the developer is to:

» Implement the recommendations outlined in the pre-construction EMPr; and

» Implement as many recommendations as possible that will lessen the total environmental impact of the proposed development from the design stage, through to construction and ultimately the operational phase.

With respect to the construction phase of the Development, the Developer is to:

» Ensure that all relevant approvals and permits have been obtained prior to the start of construction activities on site;

» Ensure that the EMPr has been approved by DFFE prior to the start of construction activities on site;

» Ensure that DFFE has been notified of the date on which construction activities will be starting, prior to commencement of the activity;

» Ensure that all conditions of approval have been complied with;

» Appoint all the required specialists to make input into the pre-construction/design phase (refer to section 3.1.2.2); and

» Appoint a suitably qualified or experienced environmental control officer prior to the start of construction activities on site, and for the duration of the construction phase.

» With respect to the operational phase of the development, the developer is to:

» Ensure that operation of the WEF is undertaken in line with the requirements of the operational phase EMPr; and

» Continuously seek to improve any negative environmental impacts which result from the operational phase.

3.2.2 The Project Engineer

For the purposes of this document, "The Engineer" refers to the engineer for the development, or any other person or group of people authorised by the Developer, to be responsible for the technical and contractual implementation of the works to be undertaken.

The responsibilities of the Engineer are to:

» Ensure that the requirements as set out in this EMPr and by the relevant Authorities are adhered to and implemented;

» Assist the ECO in ensuring that the conditions of the EMPr are being adhered to and promptly issuing instructions requested by the ECO, to the Contractor. All site instructions relating to environmental matters issued by the Engineer are to be copied to the ECO;

» Assist the ECO in making decisions and finding solutions to environmental problems that may arise during the construction phase;

» Review and approve construction method statements with input from the ECO;

» Order the removal of person(s) and/or equipment not complying with the specifications (as required by the ECO or otherwise);

» Issue of penalties for transgressions of Environmental Specifications; and

» Provide input into the ECO's ongoing internal review of the EMPr.

3.2.3 The Contractor

For the purposes of this document "The Contractor" refers to any directly appointed (by the Developer) company or individual undertaking the implementation of the works.

The Contractor is to:

» Ensure implementation of all applicable Environmental Specifications, including all additional requirements related with approved method statements, during all works on site, failing which penalties, as outlined in the Environmental Specifications may be imposed by the ECO via the Engineer;

» Ensure that all of its sub-contractors', employees, suppliers, agents or servants etc. are fully aware of the environmental requirements detailed in the Environmental Specifications;

» Must appoint a suitably qualified Environmental Site Officer (ESO);

» Liaise closely with the Engineer and the ECO and ensure that the works on site are conducted in an environmentally sensitive manner;

» Inform the Engineer as well as the ECO should environmental issues on site go wrong, e.g. dumping, pollution, littering and damage to vegetation; and

» Carry out instructions issued by the Engineer, on request of the ECO, required to fulfil his/her compliance with the CEMP.

3.2.4 The Environmental Control Officer (ECO)

During the construction phase of the project, the ECO is to:

» Ensure that the Contractor has a copy of the ~~CEMP~~ EMPr and all agreed method statements;

» Undertake monthly site inspections (frequency may change as required) to monitor compliance of all parties with the requirements of the EMPr;

» Advise/recommend on actions or issues impacting on the environment to the Engineer, who shall issue any required Site Instructions to the Contractor;

» Environmentally educate and raise the awareness of the Contractor and his staff as to the sensitivity of the Site and to facilitate the spread of the correct attitude during works on Site;

» Review and approve construction/landscape method statements together with the Engineer/Landscape Architect;

» Assist the Contractor in finding environmentally responsible solutions to problems;

» Recommend to the Engineer the issuing of a penalty for any environmental damage caused on site, or non-compliance with the Environmental Specifications;

» Recommend to the Engineer the removal of person(s) and/or equipment not complying with the Specifications;

» Undertake photographic monitoring of the construction site;

» Keep records of all activities/ incidents on Site in a Site Diary concerning the environment;

» Complete temporary and permanent site closure checklists;

» Take immediate action on Site to stop works where significant and irreparable damage is being inflicted on the environment, and to inform the Engineer immediately of the occurrence and action taken; and

» Undertake a continual internal review of the EMPr and make recommendations to the Engineer and Developer.

The ECO has the authority to recommend to the Developer and/or DFFE that works be stopped, if in his/her opinion serious harm to, or impact on the environment is imminent, is likely to occur or has occurred and such actual or potential harm or impact is in contravention of the EMPr, and which is, or may be, caused by construction, or related works.

Upon failure by the Contractor or contractor's employee to show adequate consideration to the environmental aspects of this contract, the ECO may recommend to the Engineer and the project management team to have the Contractor's representative or any employee(s) removed from the site or work suspended until the matter is remedied. No extension of time will be considered in the case of such suspensions and all costs will be borne by the Contractor.

The ECO shall keep a site diary in which events and concerns of environmental significance are to be recorded. The ECO will compile a monthly report of such events, concerns and general compliance of the Contractor with the construction phase of the EMP. This report will be submitted to the Engineer and if required, to the DFFE, the DEADP and the Central Karoo District Municipality. The ECO is also required to attend regular site meetings of the project management team to report on environmental issues and minute requirements.

The ECO will be responsible for the compilation of a final completion checklist for the project, completed when all construction works related to the project have been completed and the site has been cleared of all construction related debris, materials or equipment not forming part of the permanent works. This checklist will audit the Contractor's compliance with the construction phase of the EMPr throughout the duration of the construction phase and this checklist, together with a final written report will be submitted to the DFFE, the DEADP and the Central Karoo District Municipality in order to achieve "environmental closure" for the construction phase of the project.

3.3 Site meetings during construction phase

The ECO is required to attend regular site meetings of the project management team to facilitate the transfer of information and to update all parties on the environmental compliance of the project as a whole, and minute requirements.

The ECO will present a summary report outlining the main construction activities that relate to the environment, at this meeting.

The minutes of these meetings will form part of the construction phase of the EMPr records. These minutes will reflect environmental queries, agreed actions and dates of eventual compliance by the Contractor.

The following people should attend these meetings:

» Developer's Representative;

» Engineer;

» The ECO; and

» Contractor(s) representative.

3.4 Environmental education and awareness

The Contractor in consultation with the ECO shall arrange for a presentation to site staff to familiarise them with the environmental aspects of the construction phase of the EMPr within seven days from the commencement date of construction. This presentation should take cognizance of the level of education, designation and language preferences of the staff. General site staff would commonly receive a basic environmental awareness course highlighting general environmental "do's and don'ts" and how they relate to the site. Management on site e.g. site agents and foremen, who require more detailed knowledge about the environmental sensitivities on site and the contents and application of the construction phase of the EMPr document itself, will benefit from a separate presentation dealing with these issues. The ECO may call upon the services of a specialist environmental education translator should this be required.

The manner in which the environmental awareness is undertaken with site staff may vary depending on the sensitivity of the site, scale of the project and availability of an environmental site officer (ESO) appointed by the contractor, do conduct the awareness training during site inductions.

3.5 Method Statements

The Contractor shall provide Method Statements for approval by the ECO and the Engineer prior to work commencing on aspects of the project deemed or identified to be of greater risk to the environment and/or which may not be covered in sufficient detail in the construction phase of the EMPr, when called upon to do so by the Engineer or ECO.

A Method Statement is a "live document" in that modifications are negotiated between the Contractor and the ECO/project management team, as circumstances unfold. All Method Statements will form part of the construction phase of the EMPr documentation and are subject to all terms and conditions contained within the construction phase of the EMPr.

Note that a Method Statement is a 'starting point' for understanding the nature of the intended actions to be carried out and allows for all parties to review and understand the procedures to be followed in order to minimise risk of harm to the environment.

Changes to, and adaptations of Method Statements can be implemented with the prior consent of all parties.

A Method Statement describes the scope of the intended work in a step-by-step description in order for the ECO and the Engineer to understand the Contractors intentions. This will enable them to assist in devising any mitigation measures, which would minimize environmental impact during these tasks.

For each instance where it is requested that the Contractor submit a Method Statement to the satisfaction of the Engineer and ECO, the format should clearly indicate the following:

» What - a brief description of the work to be undertaken;

» How - a detailed description of the process of work, methods and materials;

» Where - a description/sketch map of the locality of work (if applicable); and

» When - the sequencing of actions with due commencement dates and completion date estimates.

» Who – The person responsible for undertaking the works described in the Method Statement; and

» Why – a description of why the activity is required.

All Method Statements are to be to the satisfaction of the ECO, Engineer and, where practical and deemed necessary, should be endorsed as being acceptable by the environmental representative of the Relevant Authority.

A list of some of the Method Statements that the Contractor may need to submit during the course of the construction contract has been provided in Section 4, along with an indication of those which the ECO may require the Contractor to provide prior to the start of works on site (refer to **Appendix M** for a Method Statement Template).

3.6 ECO Site Diary Entries

The ECO will maintain a site diary that relates to environmental issues as they occur on site for record keeping purposes. Comments from this diary will form part of reports presented at site meetings by the ECO.

3.7 Site Memo Entries

Site memo's, stipulating recommended actions required to improve compliance with the construction phase of the EMPr by the contractor, will be issued by the ECO to the Engineer, who in turn will ensure that the Contractor is informed of the said instruction.

Comments made by the ECO in the Site Memo book are advisory and all Site Instructions required may only be issued by the Engineer. Site Memo's will also be used for the issuing of stop work orders for the purposes of immediately halting any particular activity(ies) of the Contractor deemed to pose immediate and serious risk of unnecessary damage to the environment.

3.8 Legislative Framework

Obligations imposed by the EMPr are legally binding in terms of environmental statutory legislation (i.e. the Environmental Authorisation in terms of the National Environmental Management Act #107 of 1998, as amended) and in terms of amendments to the Particular Conditions of Contract that pertain to this project.

The requirements of this EMPr do not release the Developer from the requirements of any legislation that may be applicable to the project.

A list of Legislation applicable to the project (although not limited to those listed) has been provided below for guidance:

- Constitution of the Republic of South Africa, 1996 (Act No. 108, 1996);
- National Environmental Management Act, 1998 (Act No. 107 of 1998);
- National Heritage Resources Act, 1999 (Act No. 25 of 1999);
- National Water Act (Act No. 36 of 1998);
- Occupational Health and Safety Act, 1993 (Act No. 385 of 1993);
- Hazardous Substances Act, 1977 (Act No. 63 of 1977);
- Conservation of Agricultural Resources, 1983 (Act No. 43 of 1983);
- The Environment Conservation Act, 1989 (Act No.73 of 1989);
- The National Noise Control Regulations: GN R154 of 1992;
- National Dust Control Regulations (GN R827 of 1 November 2013);
- Western Cape Provincial Noise Control Regulations: PN 200 of 2013;
- National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004);
- National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) – Threatened or Protected Species List;
- National Environmental Management: Waste Act, 2008 (Act No. 59, 2008);
- National Roads Act, 1998 (Act No. 7, 1998); and
- Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).

3.9 Dispute Resolution

Any disputes or disagreements between role players on Site (with regard to environmental management) will firstly be referred to the Engineer during the construction phase, or to a the developer's environmental officer during the operational phase. If no resolution on the matter is possible then the matter will be referred to the DFFE for clarification.

Where a dispute still persists this shall be referred for arbitration to a panel of persons consists of one specialist environmental consultant, one qualified engineer, one official of the DFFE and one legal practitioner of no less than four years of experience in environmental issues whose decision by simple majority will be final and binding on the parties. This arbitration will be informal ("the informal arbitration") and will be finalised within a period of 48 hours from the date of the declaration of a dispute, the purpose being to ensure that disagreements are rapidly resolved and thereby to limit any prejudice to the contractor or the other parties to this agreement in the construction process or during the operation of the development. In the event of a deadlock in the aforesaid panel, the legal practitioner forming part of the panel will have a casting vote.

3.10 Social Responsibility

The Developer and Contractors shall encourage and implement wherever possible the procurement of locally based labour, skills and materials.

3.11 Recycling

Wherever possible, materials used or generated by construction and operation shall be recycled. Containers for glass, paper and metals shall be provided separate to general waste bins. During construction, office and camp areas are particularly suited to this form of recycling process. Where possible and practical, such as at stores and offices, waste shall be sorted for recycling purposes. Recycling protocols shall sort materials into the following categories:

- Paper / cardboard
- Any packaging materials suitable for re-use
- Plastics
- Aluminium
- Metals (other than aluminium
- Wood
- Organic waste
- Glass
- Clean Building Rubble

Recycling ensures that we do not waste valuable resources.

Recycling can also create employment opportunities.

4 PRE-CONSTRUCTION EMPR

4.1 Scope

This section covers the mitigation measures and recommendations that may be considered in the preconstruction and design stage of the project.

4.2 Application

This Specification covers the requirements for mitigating the impact on the environment during the detailed design phase of the Komsberg East WEF development.

4.3 Pre-Construction Requirements

4.3.1 General

A pre-construction walkthrough of the approved MV Powerlines, turbine positions by a bat specialist, avifaunal specialist and ecologist, must be conducted to ensure that the micro-setting of the turbines have the least possible impacts.

4.3.2 Pre-construction monitoring data

4.3.2.1 Bats

» All pre-construction monitoring data and reports shall be submitted to the South African Bat Assessment Association.

4.3.3 Directives in respect of the micro-siting process

The preferred site layout (including the location of construction camps) must be finalised through a micro-siting process, which will include a detailed site assessment of the final site layout by various specialists as stipulated in the EA and this EMPr. Relevant authorities will be given the opportunity to comment on the final design layout and this layout must be approved by the DFFE A method for finalising the design layout is outlined below.

4.3.4 Considerations for final design

4.3.4.1 Visual

» Avoid locating wind turbines and related structures on prominent elevations, especially peaks, which are important markers in the landscape and therefore visually sensitive.

» A lighting engineer must be consulted to assist in the planning and placement of lighting fixtures in order to reduce visual impacts associated with glare and light trespass.

» Lighting of main structures (turbines) and ancillary buildings must be designed to minimise light pollution without compromising safety, and turbines must be lit according to Civil Aviation Regulations.

» Signage on or near wind turbines must be avoided unless they serve to inform the public about the construction process underway, or to inform the public about wind turbines and their function.

» Commercial messages and graffiti on turbines are prohibited.

» Avoid slopes steeper than 1:5 gradient, where possible, being highly sensitive. Slopes steeper than 1:10 require special measures in the siting of roads and structures to avoid visually unsightly cut and fill embankments, and possible erosion.

» Avoid cultural landscapes or valuable cultivated land, particularly because of the scarcity of the latter.

» Apply setbacks for wind turbines as indicated in the VIA report.

» Locate substations in unobtrusive, low-lying areas, away from roads and habitations, and screened by the topography if possible. Avoid ridgelines. Screen substation structures with earth berms and tree-planting if possible.

» Consolidate operations/ maintenance buildings and parking areas in unobtrusive areas to avoid the sprawl of buildings in the open landscape.

» Locate access roads in sympathy with the grain of the landscape and the contours, and avoid drainage courses. Keep roads as narrow as possible to minimise cut and fill on steeper slopes.

» Should any occupied farm buildings be affected by shadow flicker, the holder of this Environmental Authorisation must provide mitigation measures to reduce the impact to an acceptable level as advised by a suitably qualified specialist. Final Site Assessment by specialists.

»

4.3.4.2 Avifauna

» The current 3km 'adjusted buffer' around the Verreaux's Eagle nest on Komsberg East was advised by good data collected over a one-year period, and the method used to advise the buffer was also informed by consultations with BirdLife South Africa and the Birds and Renewable Energy Specialist Group (BARESG). It is now recommended that a 2km radial No-go buffer be established around this site (in addition to the current adjusted 3km buffer).

» The final design must ensure that all turbines remain outside of the avifauna no-go areas as identified by the specialist following a detailed site walkthrough, and as shown in **Figure 2.2**.[4]

» All turbines are to be constructed outside of avifaunal no-go areas and set back at least 70m (but preferably 90m) from the boundary of the no-go area.

» A 750m buffer for Jackal Buzzard nests, 500m for Pale Chanting Goshawk, 1000m for Hamerkop, and 250m for Corvid nests must be implemented. These buffers are slightly softer (High sensitivity rather than No-go) since these species are not Red Listed. Turbines may infringe upon these buffers slightly if absolutely necessary.

4.3.4.3 Bats

» A minimum buffer of 200m to blade tip must be used as per the sensitivity map on the Final EIA Report (Arcus, 2016) is applicable. The bat sensitivity buffers were updated according to the turbine dimensions being applied for which is a hub height of up to 150 m and a rotor diameter of up to 180 m, which resulted in 248m buffers to turbine base[5]. No turbines are currently located within the No Go buffers. When the final turbine dimensions are chosen, these buffers should be recalculated to make sure that no turbines are located within the no go buffers.

» The facility must be designed in a manner that prevents infrastructure components from being used as perching or roosting substrates by birds and bats, as such is prohibited.

[4] Komsberg East Wind Farm: Final layout avifaunal walkthrough, June 2021, Wild Skies Ecological services

[5] Buffer distances were calculated using the Mitchell Jones formula as per bat specialist report.

4.3.4.4 Vegetation, wetlands and water resources/ Ecology:

» Existing road infrastructure must be used as far as possible for providing access to the proposed turbine positions. Where no road infrastructure exists, new roads must be placed within existing disturbed areas or environmental conditions must be taken into account to ensure the minimum amount of damage is caused to natural habitats.

» Signs must be placed along construction roads to identify speed limits, travel restrictions, and other standard traffic control information to minimize impacts on possible faunal species.

» The areas identified as 'high' and 'very high' sensitivity by the final mitigated biodiversity layout must be regarded as 'no-go' areas.

» The `no-go' areas of the development property must be clearly demarcated and must be excluded from the final layout plan.

» All watercourses are regarded as sensitive. All developments within 500m of watercourses must comply with the National Water Act.

» Relevant permits must be obtained from relevant authorities for any removal or destruction of Threatened or Protected Species (TOPs).

» Before the clearing of the site, the appropriate permits must be obtained from the Department of Agriculture, Forestry and Fisheries (DAFF) for the removal of plants listed in the National Forest Act and from the relevant provincial department for the destruction of species protected in terms of the specific provincial legislation. Copies of the permits must be kept by the ECO.

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4.3.4.5 Noise

» The noise impact assessment shall be reviewed in detail should the developer select a wind turbine generator with a sound power emission level exceeding 108.4 dBA and additional mitigation measures must be recommended, if required, to ensure that there will be no significant impact to the identified Noise Sensitive Developments.

» The holder of this authorisation must ensure that all equipment and machinery are well maintained and equipped with silencers.

4.3.4.6 Heritage

» Pre-construction archaeological monitoring is required. The appointed archaeologist must keep a list documenting all identified features of archaeological significance which may be impacted by the development, and which must be demarcated as no-go areas.

As mentioned, a final walk-through of the site was conducted by various specialists in order to determine whether additional mitigation measures or final layout changes are required based on Komsberg Wind Farms (Pty) Ltd's proposed refined layout. A list of specialists to be appointed by Komsberg Wind Farms (Pty) Ltd is provided below, together with an outline of tasks to be performed (the mitigation measures from the walkthrough reports form part of this EMPr):

4.3.4.7 Ecological Specialist:

» Pre-construction walk-though of the development footprint to ensure that sensitive habitats and species can be avoided. Some search and rescue may be required.

» The botanical specialist must prepare a short report at the conclusion of the micro-siting process summarizing their input into the process, including tasks performed and any recommendations or additional required mitigation measures for the construction phase.

4.3.4.8 Avifaunal Specialist:

» A habitat and nest survey (the latter focussed on searching for Martial Eagle and Verreaux's Eagle nests) was conducted pre-construction, in winter or spring to confirm that there has been no significant change in the receiving environment since the original assessment. The results of this survey informed whether any additional pre-construction monitoring is warranted to update the avifaunal baseline for operational comparison. The additional monitoring informed the final micro-siting of the WEF, if applicable, and/or to advise whether any additional mitigation measures are recommended.

» While not in the vicinity of any planned infrastructure the active Verreaux's Eagle nest site on the Komsberg East WEF as well as one to the north of the project site (on the proposed Suurplaat WEF), must, prior to construction commencing, be revisited by an avifaunal specialist during the eagle breeding season (e.g. approximately June-September) to confirm the activity of the nest site. Once the above has been completed, the specialist must advise any additional recommendations and/or mitigations which may have an influence on the timing and scheduling of construction activities, if applicable. Determining the yearly breeding status of these nests sites gives important information to feed into the long-term monitoring of the project, in order to determine possible impacts to the species. Therefore, these nests sites must be re-visited and regularly surveyed to determine the breeding success of eagles. This activity could be incorporated into field work for any additional pre-construction monitoring (if recommended) and should continue into the construction phase of the project, and throughout the operational lifespan of the project in accordance with the applicable best practise guidelines.

» The avifaunal specialist must review the detailed design of all pylons and power lines associated with the proposed development and confirm that they comply with the "bird friendly" design recommendations contained within the Ecological Specialist Report contained within the Final EIR report.
» In the event that the avifaunal specialist identifies any areas of the detailed design that are not sufficiently bird friendly, the specialist must make relevant recommendations to the design team.
» The avifaunal specialist must prepare a brief report at the conclusion of the micro-siting process outlining their input into the process, and confirming that the final detailed design meets the relevant "bird friendly" criteria.
» Comments and mitigation measures from specialists will be fed back to the Komsberg Wind Farms (Pty) Ltd team, who will make adjustments if required.

4.3.5 Final Layout Approval Process

Should a positive Environmental Authorisation be obtained, and after the findings of the specialists' on-site walk-throughs which occurs after authorisation (it should be noted that the walkthrough by the varies specialists and teir findings informed the final layouts), a possibly refined site layout, together with the relevant specialist short reports mentioned within section 3.3.3 will be distributed to registered Interested & Affected Parties, including the following authorities, for their records and comment if necessary:

» DFFE; and
» Any other department as detailed in the Environmental Authorisation.

This final detailed design layout, together with comments received from the above-mentioned authorities, will be submitted to the DFFE for final approval. No works may proceed on site until such time as DFFE approves the final site layout.

4.3.6 Permit Requirements

Activities undertaken during site preparation, construction and operation may require additional permits, over and above the Environmental Authorisation. Komsberg Wind Farms (Pty) Ltd is responsible for ensuring that they hold the necessary permits in order to comply with national and local regulations. Additional permit requirements are described below.

4.3.6.1 Borrow Pits

A borrow pit refers to an open pit where material (soil, sand or gravel rock) is removed for use at another location. Komsberg Wind Farms (Pty) Ltd or their contractors may want to use borrow pits for certain earthworks operations, such as the construction of roads, embankments, bunds, berms, and other structures.

The establishment of borrow pits is regarded as a mining activity and is legislated in terms of the Mineral and Petroleum Resources Development Act, 2002 (No. 28 of 2002) (MPRDA). A mining permit must be obtained from the Department of Minerals and Energy prior to the establishment of borrow pits on the site.

4.3.6.2 Water Use

There are licensing procedures that need to be followed for particular "water uses". Water uses that may be of relevance to the development of the WEF and associated road construction include the following:

» Taking of water from a water resource, including a water course, surface water, estuary or aquifer (i.e. borehole);
» Altering the bed, banks, course or characteristics of a water course; and/or
» Impeding or diverting of a flow in a water course.

Under the National Water Act, 1998 (Act No. 36 of 1998), either General Authorisation or a Water Use Licence must be applied for by Komsberg Wind Farms (Pty) Ltd.

4.3.6.3 Vegetation Search and Rescue

Under the Forests Act, 1998 (Act No. 84 of 1998) (NFA), a license must be applied for from the Department of Agriculture, Forestry and Fisheries (DAFF) for the removal or disturbance of any protected trees on the site, in terms of the List of Protected Tree Species promulgated under the NFA. The disturbance, destruction and/or relocation, whichever is more relevant, of these species identified would require the relevant permits from the DEA&DP (provincial authority).

4.3.6.4 Tender Documentation

» Komsberg Wind Farms (Pty) Ltd shall ensure that this EMPr is included within the tender documents for all contractors tendering to undertake any aspect of the construction phase of the project.
» In the adjudication of any tenders to undertake any aspect of the construction or operation of the proposed project, Komsberg Wind Farms (Pty) Ltd (or Komsberg Wind Farms (Pty) Ltd s' agent in this regard) must ensure that the costs of compliance with the Environmental Management Program have been adequately allowed for within the winning tender.

4.3.7 Additional Pre-construction requirements

» Notify all registered I&APs and key stakeholders of the Environmental Authorisation opportunity and appeal procedure.
» Notify DFFE prior to commencement of construction in accordance with the conditions of the EA.
» A health and safety plan in accordance with the Occupational Health & Safety Act must be developed prior to the commencement of construction to identify and avoid work related accidents.

- Komsberg Wind Farms (Pty) Ltd should endeavour to establish a recruitment and procurement policy which sets reasonable targets for the employment of South African and local residents /suppliers.
- A Code of Conduct must be developed for all workers (Komsberg Wind Farms (Pty) Ltd and contractors including their workers) directly related to the project. The objective of the code of conduct is to limit, where possible, social ills brought about by the construction and operation of the renewable energy facility.

5 CONSTRUCTION ENVIRONMENTAL SPECIFICATION

5.1 Scope

This Specification covers the requirements for controlling the impact on the environment of all construction activities for the Komsberg East WEF project. All construction activities shall observe the requirements of this specification as well as any relevant environmental legislation and in so doing shall be undertaken in such a manner as to minimize impacts on the natural and social environment.

5.2 Application

This Specification contains clauses that are generally applicable to the undertaking of civil engineering works in areas where it is necessary to impose pro-active controls on the extent to which the construction activities impact on the environment. The roles and responsibilities in terms of the application and implementation of this Specification have been outlined in section 2 above.

5.3 Specific conditions for operational aspects:

Avifauna and bats:

- Ensure the implementation of an operational monitoring plan to survey impacts resulting from the infrastructure on the bird communities with focus on assessing the displacement and disturbance effects of the development on the bird communities, as well as bird collisions and continue to gather information on the bird communities present in the area and monitor the effectiveness of the mitigation measures for a minimum duration of at least three years.
- All overhead MV line must be installed with bird flappers or a similar line marking device, to mitigate for bird collision. The exact pole design for the overhead MV line is not yet known. The final pole design must adhere to the Eskom/EWT guidelines in terms of bird friendly structures. Once available the final pole design be shown to a suitably qualified avifaunal specialist prior to construction to confirm that it will suitably prevent bird electrocution risk.
- All bird monitoring must be conducted in accordance with the latest BirdLife South Africa/Endangered Wildlife Trust: Best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in Southern Africa.
- A bat monitoring program to determine the actual impacts on the bat community for a minimum of two years must be implemented.
- The results of this monitoring must be made available to the DFFE, Birdlife South Africa (BLSA) and the South African Bat Assessment Advisory Panel (SABAAP) and must further advise the EMPr where necessary

Vegetation, wetlands and water resources:

- Vegetation clearing should occur in in a phased manner in accordance with the construction programme to minimise erosion and/or run-off.
- All construction materials including fuels and oil should be stored in demarcated areas that are contained within berms / bunds to avoid spread of any contamination. Washing and cleaning of equipment should also be done in berms or bunds, in order to trap any cement and prevent excessive soil erosion. Mechanical plant and bowsers must not be refuelled or serviced within or directly adjacent to any channel. It is therefore suggested that all construction camps, lay down areas, batching plants or areas and any stores should outside of any demarcated water courses.

- All cleared areas must be re-vegetated after construction has been completed.
- All alien plant re-growth (mostly forbs) must be monitored, and should it occur, these plants should be eradicated. The scale of the operation does however not warrant the use of a Landscape Architect and / or Landscape Contractor.
- Removal of alien invasive species or other vegetation and follow-up procedures must be in accordance with the Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983).
- Contractors and operation workers must be clearly informed of the no-go areas.
- Wetlands, rivers and river riparian areas must be treated as "no-go" areas and appropriately demarcated as such. No vehicles, machinery, personnel, construction material, fuel, oil, bitumen or waste must be allowed into these areas without the express permission of and supervision by the ECO, except for rehabilitation work in these areas.
- No discharge of effluents or polluted water must be allowed into any rivers or wetland areas.
- Workers must be made aware of the importance of not polluting rivers or wetlands and of not undertaking activities that could result in such pollution, and this awareness must be promoted.
- All turbine towers, plant / vehicles and or buildings inclusive of windows must be closed when not being occupied. Solid waste and in particular any food waste must be disposed of into the appropriate bins. These bins must be located in waste areas that can be located using primate proof cages. This especially on Sundays or R&R periods when there are limited numbers of staff thus movement and disturbance on site. This will discourage the animals from entering the construction camps in search of food, if the waste is not accessible.
- Confronting wild animals such as baboons is not recommended, as this usually escalates fear within the primates, which typically become defensive, attack and or bite. Particularly if large males or females with young individuals are present.

- Construction activities must be restricted to demarcated areas to restrict the impact on sensitive environmental features.
- All areas of disturbed soil must be reclaimed using only indigenous grass and shrubs. Reclamation activities shall be undertaken according to the rehabilitation plan to be included in the final EMPr.
- Topsoil from all excavations and construction activities must be salvaged and reapplied during reclamation.
- No exotic plants may be used for rehabilitation purposes; only indigenous plants of the area may be utilised.
- No activities will be allowed to encroach into a water resource without a water use license being in place from the Department of Water and Sanitation.
- Cleared alien vegetation must not be dumped on adjacent intact vegetation during clearing but must be temporarily stored in a demarcated area.
- Removal of alien invasive species or other vegetation and follow-up procedures must be in accordance with the Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983).
- Contractors and construction workers must be clearly informed of the no-go areas.
- Where roads pass right next to major water bodies, provisions must be made for fauna such as toads to pass under the roads by using culverts or similar structures.
- Bridge design must be such that it minimises impact to riparian areas with minimal alterations to water flow and must allow the movement of fauna and flora.
- The final development area should be surveyed for species suitable for search and rescue, which should be trans-located prior to the commencement of construction.
- Electric fencing should not have any strands within 30cm of the ground, which should be sufficient to allow smaller mammals, reptiles and tortoises to pass through, but still remain effective as a security barrier.

- » Disturbed areas must be rehabilitated as soon as possible after construction with locally indigenous plants to enhance the conservation of existing natural vegetation on site.
- » Workers must be made aware of the importance of not destroying or damaging the vegetation along rivers and wetland areas and this awareness must be promoted throughout the construction phase.
- » Freshwater ecosystems located in close proximity to the construction areas must be inspected on a regular basis by the ECO for signs of disturbance from construction activities. If signs of disturbance are noted, immediate action must be taken to remedy the situation and, if necessary, a freshwater ecologist must be consulted for advice on the most suitable remediation measures.
- » No discharge of effluents or polluted water must be allowed into any rivers or wetland areas.
- » If construction areas are to be pumped of water (e.g. after rains), this water must be pumped into an appropriate settlement area, and not allowed to flow into any rivers or wetland areas.
- » Freshwater ecosystems located in close proximity to the site must be inspected on a regular basis (but especially after rainfall) by the Contractor's ESO and/or ECO for signs of sedimentation and pollution. If signs of sedimentation or pollution are noted, immediate action must be taken to remedy the situation and, if necessary, a freshwater ecologist must be consulted for advice on the most suitable remediation measures.

Noise:

- Routine noise measurements must be conducted during the operation of the facility and a complaints register must be opened and made available to affected parties and to the Department on request.
- The holder of this Authorisation must ensure that the National Noise Control Regulations and SANS10103:2008 are adhered to and measures to limit noise from the work site are implemented.
- The holder of this Authorisation must ensure that all equipment and machinery are well maintained and equipped with silencers.

Visual resources:

- » Lighting of main structures (turbines) and ancillary buildings must minimise light pollution without compromising safety, and turbines must be lit according to Civil Aviation Regulations.
- » Signage on or near wind turbines must be avoided unless they serve to inform the public about wind turbines and their function.
- » Commercial messages and graffiti on turbines are prohibited.

Heritage

- » Do not disturb any old stone kraals or ruins, do not remove stone from walls, or artefacts from the earth or earth surface.
- » Adhere to the findings and recommendations of the VIA.
- » Should any heritage resources or fossil finds be discovered during the course of construction activities, work with the vicinity of the resource must cease and HWC (in the Western Cape) must be contacted regarding an appropriate way forward. The responsible ECO, followed by the reporting to Heritage Western Cape/SAHRA.
- » Safeguarding the chance fossil finds (preferably in situ) during the construction phase by the responsible ECO or Contractor's ESO, followed reporting of finds to Heritage Western cape in line with the attached fossil finds Procedure (attached as Appendix 1 of the Heritage Walkthrough Report).

Human health and safety:

- A health and safety programme must be developed to protect both workers and the general public during operation of the energy facility. The programme must establish a safety zone for wind turbines from residences and occupied buildings, roads, right-of-ways and other public access areas that is sufficient to prevent accidents resulting from the operation of the wind turbines.
- Potential interference with public safety communication systems (e.g. radio traffic related to emergency activities) must be avoided.
- The holder of this Authorisation must ensure that the operation of the wind facility complies with the relevant communication regulations or guidelines relating to electromagnetic interference, e.g. microwave, radio and television transmissions.
- The holder of this Authorisation must train safety representatives, managers and workers in workplace safety.

Hazardous materials and waste management:

» Areas around fuel tanks must be bunded or contained in an appropriate manner as per the requirements of SABS 089:1999 Part 1.
» Leakage of fuel must be avoided at all times and if spillage occurs, it must be remedied immediately.
» Hazardous waste such as bitumen, oils, oily rags, paint tins etc. must be disposed of at an approved waste landfill site licensed to accept such waste.
» No dumping or temporary storage of any materials may take place outside designated and demarcated laydown areas, and these must all be located within areas of low environmental sensitivity.
» Hazardous substances must not be stored where there could be accidental leakage into surface or subterranean water.
» Hazardous and flammable substances must be stored and used in compliance to the applicable regulations and safety instructions. Furthermore, no chemicals must be stored nor may any vehicle maintenance occur within 350m of the temporal zone of wetlands, a drainage line with or without an extensive floodplain or hillside wetlands.
» Temporary bunds must be constructed around chemical storage to contain possible spills.
» Spill kits must be made available on-site for the clean-up of spills.
» An integrated waste management approach must be implemented that is based on waste minimisation and must incorporate reduction, recycling and re-use options where appropriate. Where solid waste is disposed of, such disposal shall only occur at a landfill licensed in terms of section 20(b) of the National Environment Management Waste Act, 2008 (Act 59 of 2008).
» The holder of this Authorisation must provide sanitation facilities for the operation staff.

Air emissions:

- Appropriate dust suppression techniques must be implemented on all exposed surfaces during periods of high wind. Such measures may include wet suppression, chemical stabilisation, the use of a wind fence, covering surfaces with straw chippings and re-vegetation of open areas.

5.4 Method Statements

Any Method Statement required by the Engineer or the Environmental Specification shall be produced within such reasonable time as the Engineer shall specify or as required by the Specification. The Contractor shall not commence the activity until the Method Statement has been approved and shall, except in the case of emergency activities, allow a period of two weeks for approval of the Method Statement by the Engineer. Such approval shall not unreasonably be withheld.

The Engineer or ECO may request a Method Statement for any activity they believe may impact on the environment. The Engineer in consultation with the ECO may also require changes to a Method Statement if the proposal does not comply with the Specification or, if in the reasonable opinion of the Engineer, the proposal may result in, or carry a greater than reasonable risk of damage to the environment in excess of that permitted by the Specifications.

Approved Method Statements shall be readily available on the site and shall be communicated to all relevant personnel. The Contractor shall carry out the Works in accordance with the approved Method Statement. Approval of the Method Statement shall not absolve the Contractor from any of his obligations or responsibilities in terms of the Contract.

The following Method Statements shall be provided by the Contractor and submitted to the Engineer and ECO at least seven working days before site establishment:

5.4.1 Site establishment

The location, layout and method of establishment of the construction camp (including all buildings, offices, lay down yards, vehicle wash areas, fuel storage areas, batching areas and other infrastructure required for the running of the project).

5.4.2 Vegetation clearing

Method of vegetation clearing during site establishment and disposal procedure for cleared material.

5.4.3 Topsoil/Sub soil stockpiling

Method of clearing topsoil/sub soil and location of topsoil/sub soil stockpiles including erosion protection.

5.4.4 Storm water management

Storm water is to be managed during the construction phase of the project. This should include erosion and sedimentation control measures. A storm water management plan is included in **Appendix F**.

5.4.5 Solid Waste management

Expected solid waste types, quantities, methods of recycling to be employed, monitoring and record keeping procedures, staff responsible for the oversight of waste management and recycling and frequency of collection and disposal of the non-recycled component, as well as location of disposal sites.

5.4.6 Concrete mixing and batch plant

Location, layout and preparation of cement/ concrete mixing areas including, the methods employed for the mixing of concrete and particularly the containment of runoff water from such areas and the method of transportation of concrete.

5.4.7 Access and haul roads

Details, including a drawing, showing where and how the access points and routes will be located and managed, including traffic safety measures.

5.4.8 Hazardous substance (including fuel and oil)

Details of any hazardous substances / materials to be used, together with the transport, storage, handling and disposal procedures for the substances.

5.4.9 Contaminated water

Methods of minimizing, controlling, collecting and disposing of contaminated water.

5.4.10 Environmental incident reporting

Method and process to be followed in the event of an environmental incident on site.

5.4.11 Emergency response plan (to include fire prevention and response)

Emergency procedures for fire and accidental leaks and spillages of hazardous substances (including fuel and oil). Include details of risk reduction measures to be implemented, such as firefighting equipment, fire prevention procedures and spill kits (materials and compounds used to reduce the extent of spills and to breakdown or encapsulate hydrocarbons).

5.4.12 Other method statements

Emergency procedures for fire and accidental leaks and spillages of hazardous substances (including fuel and oil) shall be developed in accordance with the requirements of section 30 of NEMA, or the applicable legislation in force at the time of implementation. The emergency response plan shall include details of risk reduction measures to be implemented, such as firefighting equipment, fire prevention procedures and spill kits (materials and compounds used to reduce the extent of spills and to breakdown or encapsulate hydrocarbons). It shall also include reporting requirements, as well as the contact details for Mr Hein Rust, Manager: Disaster Management at the Central Karoo District Municipality (Tel: 082 925 7953 or e-mail: hein@skdm.co.za) and the Directorate: Pollution and Chemicals Management of the Department of Environmental Affairs and Development Planning at telephone (021) 483 0752/ 2571. These contact details shall be updated regularly to ensure that incidents are reported timeously.

5.5 Site Establishment

5.5.1 Site Division

The Contractor shall restrict all activities, materials, equipment and personnel to within the area specified, and shall restrict activities to only those areas that are necessary to undertake the works.

A Method Statement detailing the layout and method of establishment of the construction camp (including all buildings, offices, lay down yards, vehicle wash areas, fuel storage areas, batching areas and other infrastructure required for the running of the project) shall be submitted.

Disturbed areas rather than pristine or intact landscape areas should preferably be used for the construction camp.

5.5.2 Site Demarcation

The Contractor shall erect and maintain permanent and/ or temporary fences of the type and in the locations directed by the Engineer. Such fences shall, if so specified, be erected before undertaking designated activities.

The construction camp, material stores and lay-down areas should be screened and sited as far as possible from the local roads.

Demarcate all areas to be cleared with construction tape or similar material. However, caution should be exercised to avoid using material that might entangle fauna.

5.5.3 Site Clearance

5.5.3.1 Vegetation Clearance

Vegetation clearance should preferably be phased as required to work in certain areas, rather than clearing of the entire site initially. If this is not practical and the entire site is cleared at the start of the contract, it is to be stabilized immediately to control dust. Wherever possible, vegetation shall be trimmed rather than cleared.

Cleared vegetative material is not to be dumped anywhere other than an approved waste disposal site or an area as agreed to with the ECO.

Wherever possible and where the material is suitable, the material should be chipped for later use as mulch in landscaped areas or for stabilization purposes or it should be dumped at a green waste recycling depot for compost production.

Invasive alien plant species, which are removed from the site, are not to be chipped for mulch if they are in a seed-bearing state. Such material is to be disposed of at a suitable waste disposal site. Wherever possible, suitable larger stumps should be made available to the local community as firewood.

Plant material removed from the site is not to be burnt for disposal on site unless a burning permit has been obtained from the local authority.

Sensitive ecosystems in the vicinity of the areas of construction should be demarcated (e.g. using danger tape or droppers) prior to any construction activities, so that these can be avoided.

Removal of vegetation should be kept to a minimum, and cleared areas must be re-vegetated after clean-up. A detailed planting plan should be developed, in consultation with a landscaper and ecologist.

Minimise the development footprint as far as possible and rehabilitate disturbed areas that are no longer required by the operational phase of the development.

Clear demarcation during the construction phase of all undisturbed areas that are not within the direct footprint of the Renewable Energy Facility to ensure that there is no uncontrolled access by construction vehicles and labourers.

An alien control and monitoring program must be developed to ensure that the site is cleared of alien plants (as listed under the Conservation of Agricultural Resources Act 43 of 1983 - as amended/updated) and kept free from alien plants for the duration of the construction phase.

A low cover of vegetation should be left wherever possible within the construction footprint to bind the soil, prevent erosion and promote post-disturbance recovery of an indigenous ground cover.

5.5.3.2 Topsoil

Topsoil / top material shall be removed from all areas cleared of vegetation and retained for future landscaping use, where feasible. Top material should exclude litter, building rubble, alien plant material or any other waste.

All topsoil, and specifically any topsoil from areas which are likely to contain bulbs, must be stripped and stockpiled for re-use in rehabilitated areas. This will constitute at least a 300mm layer.

Topsoil shall be stored in areas demarcated by the ECO and Engineer and in piles not higher than 2m, and may not be removed from site, or used for any purpose other than in the rehabilitation of the site post-construction. The stockpiles shall not be compacted or disturbed, and shall be domed at the top to promote runoff. The period between the stockpiling of topsoil and its utilization shall be as short as possible, and ideally

the topsoil should be transferred to its intended site of use immediately following site clearance and stockpiling. This would also avoid double handling.

Stockpiles that are to be stored for less than three months should be covered with shade-cloth or Geotech fabrics or similarly suitable material to prevent erosion. If stockpiles are to be stored for more than 3 months a protective vegetation layer must be established to cover topsoil stockpiles in order to protect them against erosion and desiccation. Vegetation may not consist of weeds, but must comprise grass or ground covers.

5.5.3.3 Water Courses, Drainage Lines and Ephemeral Pans

Where water course crossings are required, the engineering team must provide an effective means to minimise the potential upstream and downstream effects of sedimentation and erosion (erosion protection) as well as minimise the loss of riparian vegetation (small footprint).

No vehicles to refuel or be maintained within drainage lines/ riparian vegetation.

5.5.4 Access Routes/ Haul Roads

The Contractor shall control the movement of all vehicles including that of his suppliers so that they remain on designated routes, are distributed so as not to cause an undue concentration of traffic and that all relevant laws are complied with. In addition, such vehicles shall be so routed and operated as to minimise disruption to regular users of the routes not on the Site. The vehicles of the Contractor and his suppliers shall not exceed a speed of 40 km/h on gravel or earth roads on Site and within 500m of the Site.

During construction, arrangements and routes for abnormal loads (if required) must be agreed in advance with the relevant authorities and the appropriate permit must be obtained for the use of public roads.

Access roads and routes should avoid sensitive environments as far as possible for the completion of the works.

5.6 General requirements

5.6.1 General conditions required for operational aspects:

» A copy of this environmental authorisation, the audit and compliance monitoring reports, and the approved EMPr, must be made available for inspection and copying-
  - at the site of the authorised activity;
  - to anyone on request; and
  - where the holder of the environmental Authorisation has a website, on such publicly accessible website.

» National government, provincial government, local authorities or committees appointed in terms of the conditions of this Authorisation or any other public authority shall not be held responsible for any damages or losses suffered by the holder of the Authorisation or his/her successor in title in any instance where construction or operation subsequent to construction be temporarily or permanently stopped for reasons of non-compliance by the holder of the Authorisation with the conditions of Authorisation as set out in this document or any other subsequent document emanating from these conditions of authorisation.

5.6.2 Materials Handling and Storage

The Contractor shall ensure that any delivery drivers are informed of all procedures and restrictions (including "no go" areas) required to comply with the Specifications. The Contractor shall ensure that these delivery

drivers are supervised during off loading, by someone with an adequate understanding of the requirements of the Specifications.

Materials shall be appropriately secured to ensure safe passage between destinations. Loads including, but not limited to, sand, stone chip, fine vegetation, refuse, paper and cement, shall have appropriate cover to prevent them spilling from the vehicle during transit. The Contractor shall be responsible for any clean-up resulting from the failure by his employees or suppliers to properly secure transported materials.

All manufactured and/ or imported material shall be stored within the Contractor's camp. All lay down areas outside of the construction camp shall be subject to the Engineer's approval.

All building materials should be stored away (at least 50m) from aquatic ecosystems and the areas bunded appropriately such that there will be no runoff from these areas towards aquatic systems. All building materials should be removed after construction.

Ensure that lay-down and other temporary infrastructure are within low sensitivity areas, preferably previously transformed areas if possible.

5.6.3 Fuel (Petrol and Diesel) and Oil

All fuel is to be stored within a demarcated area in the Contractor's Camp. No refuelling of vehicles or machinery is to take place outside of this demarcated area unless authorised by the Engineer. The Engineer shall be advised of the area that the Contractor intends using for the storage of fuel.

The Contractor shall ensure that all liquid fuels (petrol and diesel) are stored in tanks with lids, which are kept firmly shut. Only empty and externally clean tanks may be stored on the bare ground. All empty and externally dirty tanks shall be sealed and stored on an area where the ground has been protected.

Tanks containing fuels shall be situated on a smooth impermeable surface (plastic or concrete) base with a bund (if plastic, it must have sand on top to prevent perishing) to contain any possible spills and prevent infiltration of fuel into the ground. The impermeable lining shall extend to the crest of the bund and the volume inside the bund shall be 110% x the total capacity of all the storage tanks.

The floor of the bund shall be sloped towards an oil trap or sump to enable any spilled fuel to be removed. A hydrocarbon absorption/remediation product approved by the ECO shall be installed in the sump to reduce the risk of pollution. Bulk fuel storage and bunded areas shall have overhead cover to prevent rain from entering the bunded area.

The Contractor shall keep fuel under lock and key at all times.

If fuel is dispensed from 200 litre drums, the proper dispensing equipment shall be used, and the drum shall not be tipped in order to dispense fuel. The dispensing mechanism of the fuel storage tank shall be stored in a waterproof container when not in use.

During fuel tanker delivery, the tanker driver must be present at all times during offloading of product. An emergency cut off switch must be installed to immediately stop fuel delivery should an accident occur. An anti-flash nozzle must be installed at the end of the vent pipe with a fuel dispenser equipped with an automatic cut off switch to prevent fuel tank overfills.

Vehicles using the temporary fuel storage tanker must be located on a concrete hard standing area for fuel containment.

No smoking shall be allowed in the vicinity of the stores. Symbolic safety signs depicting "No Smoking", "No Naked Lights" and "Danger" are to be provided, and are to conform to the requirement of SABS 1186. The volume capacity of the tank shall be displayed. The product contained within the tank shall be clearly identified; using the emergency information system detailed in SABS 0232 part 1. Any electrical or petrol-driven pump shall be equipped and positioned, so as not to cause any danger of ignition of the product.

Areas for storage of fuels and other flammable materials shall comply with standard fire safety regulations and may require the approval of the Municipal Fire Prevention Officer.

The Contractor shall ensure that there is adequate fire-fighting equipment at the fuel stores.

Where reasonably practical, plant shall be refuelled at a designated re-fuelling area or at the workshop as applicable. If it is not reasonably practical, then the surface under the temporary refuelling area shall be protected against pollution to the reasonable satisfaction of the Engineer prior to any refuelling activities. The Contractor shall ensure that there is always a supply of appropriate material readily available to absorb/ breakdown and where possible be designed to encapsulate minor hydrocarbon spillage. The quantity of such materials shall be able to handle a minimum of 200l of hydrocarbon liquid spill. This material must be approved by the Engineer prior to any refuelling or maintenance activities.

5.6.4 Solid Waste Management

For the purposes of these Environmental Specifications, solid waste includes all debris and waste (e.g. litter, food waste, cable pieces, vegetation and tree stumps, building rubble, etc), including hazardous waste (e.g. oils) resulting from any demolition and construction activities on site.

The Contractor shall be responsible for the establishment of a waste control system (Waste Management Plan) that is acceptable to the Engineer and ECO, and a method statement is required in this regard. The contractor shall keep detailed records of all waste removed from site, together with proof of recycling or legal disposal at a registered landfill site (disposal certificates).

NO REFUSE OR WASTE MATERIAL WILL BE DISPOSED OF BY BURYING.

5.6.4.1 Refuse control

The Contractor shall provide labourers to clean up the Contractor's camp and working areas on a daily basis.

Litter and waste materials (excluding rubble and hazardous waste materials) shall be disposed of into scavenger- and weather-proof bins. The Contractor shall provide sufficient bins with lids on Site to store the waste produced on a daily basis. In order to facilitate recycling it is recommended that a number of bins be provided at each location, and that such bins be clearly marked according to the category of waste being recycled (e.g. paper, metals, plastics, glass etc) Bins shall not be allowed to become overfull and shall be emptied a minimum of once daily. The waste may be temporarily stored on Site in a central waste area that is weatherproof and scavenger-proof, and which the Engineer has approved. The Contractor shall then remove the refuse collected from the working areas, from Site at least once a week. Any refuse not being re-cycled must be disposed of at a registered waste disposal facility.

The Contractor shall ensure that waste and surplus food, food packaging and organic waste are not deposited by employees anywhere on the site except in refuse bins.

5.6.4.2 Empty cement bags

Empty cement bags must be collected from the construction area by the end of every day and before rain events and shall be stored in bins that are either placed under cover or have been fitted with lids. This prevents the bags getting wet and the cement powder leaching into the environment.

5.6.4.3 Hazardous waste

Petroleum, chemical, harmful and hazardous waste is to be stored in an enclosed and bunded area. The location of these sites is to be approved by the Engineer and the ECO. This waste shall be disposed of at a registered hazardous waste disposal site. The Contractor shall submit copies of receipts from such waste

disposal sites to the Engineer and ECO as proof of proper disposal. Storage and disposal is also controlled through other relevant legislation which must be complied with e.g. Occupational Health & Safety Act.

5.6.4.4 Builders' rubble

The Contractor shall provide labourers to clean up the Contractor's camp and working areas of rubble generated in the course of construction work at least once a week.

Rubble shall be temporarily stockpiled in a waste skip or a central stockpile. Any rubble not being recycled (e.g. sent for crushing) or reused shall be removed from site to an approved landfill site as soon as it constitutes a practical load for removal and before temporary closure of the site. No plastics, shrink wrap, paint buckets or any other debris that does not constitute clean building rubble, shall be stored at such stockpile sites.

5.6.5 Ablution facilities

Washing, whether of the person or of personal effects, and acts of excretion and urination are strictly prohibited other than at the facilities provided.

Latrine and ablution facilities and first-aid services shall comply with the regulations of the local authority concerned and shall be maintained in a clean and sanitary condition to the satisfaction of the Engineer.

The Contractor shall provide suitable sanitary arrangements at the Contractor's Camp and approved points around the designated work area to allow easy access to all employees on site. No staff is permitted to commence with work on a site without suitable toilet facilities available for them. Sanitary facilities shall be located within 100 m from any point of work, but not closer than 50 m to any water body. One chemical toilet is to be provided on site for every 15-contract personnel at each working area. These toilets must have doors and locks and shall be secured to prevent them blowing over. Toilet paper shall be provided.

The Contractor shall ensure that suitable sanitation facilities are provided for or by all his sub-contractors on site.

Toilets are to be emptied prior to builders' holidays. The contractor shall ensure that no spillage occurs when the toilets are cleaned or emptied and that the contents are removed from site. Discharge of waste from toilets into the environment and burial of waste is strictly prohibited.

The Contractor shall keep the toilets in a clean, neat and hygienic condition. If the Contractor fails to provide and/or maintain all site sanitation facilities in a clean and hygienic condition, the Engineer may order the Contractor to suspend any or all work on the site until these requirements are met. No payment shall be made for any delays or disruption of the Works caused thereby nor shall extensions of time be granted for such delays.

5.6.6 Eating Areas

The Contractor shall designate eating areas to the approval of the Engineer which shall be clearly demarcated. Sufficient bins, as specified in 4.5.4a shall be present in this area. Any cooking on Site shall be done on well-maintained gas cookers with fire extinguishers present.

5.6.7 Drinking water

The Contractor shall ensure that drinking water is available for all staff on site. If no potable water source is available on site then the Contractor shall import drinking water to the site.

5.6.8 Contaminated water

Potential pollutants of any kind and in any form shall be kept, stored, and used in such a manner that any escape can be contained and the water table not endangered. Water containing such pollutants as cements, concrete, lime, chemicals, fuels and hydrocarbons shall be contained and discharged into an impermeable storage facility for removal from the site or for recycling. This particularly applies to water emanating from concrete batching plants and concrete swills, and to runoff from fuel depots/workshops/truck washing areas.

Wash down areas shall be placed and constructed in such a manner so as to ensure that the surrounding areas are not polluted. The Contractor shall notify the Engineer immediately of any pollution incidents on Site.

If construction areas are to be pumped of water (e.g. after rains), this water must first be pumped into a settlement area, and not directly into a natural ecosystem.

A Method Statement shall be required for all wash areas where hydrocarbon and hazardous materials, and pollutants are expected to be used. This includes, but is not limited to, vehicle washing, workshop wash bays and paint equipment cleaning. Wash areas for domestic use shall ensure that the disposal of contaminated "grey" water is sanctioned by the Engineer.

5.6.9 Hazardous Substances

Hazardous chemical substances (as defined in the Regulations for Hazardous Chemical Substances) used during construction shall be stored in secondary containers. The relevant Material Safety Data Sheets (MSDS) shall be available on Site. Procedures detailed in the MSDS shall be followed in the event of an emergency situation.

If potentially hazardous substances are to be stored on site, the Contractor shall provide a Method Statement detailing the substances/ materials to be used, together with the storage, handling and disposal procedures of the materials.

No paint products and chemical additives and cleaners such as thinners and turpentine, may be disposed of on Site. Brush / roller wash facilities shall be established to the satisfaction of the Engineer. A Method Statement, approved by the Engineer, is required.

5.6.10 Site Structures

The Contractor shall supply and maintain adequate and suitable sheds for the storage of materials. Sheds for the storage of materials that may deteriorate or corrode if exposed to the weather shall be weatherproof, adequately ventilated and provided with raised floors.

All site establishment components (as well as equipment) shall be positioned to limit visual intrusion on neighbours and the size of the area disturbed. The type and colour of roofing and cladding materials to the Contractor's temporary structures shall be selected to reduce reflection. The contractors' camp shall be fenced with a fence height of at least 1.8m, and the camp area shall be screened via the attachment of shade cloth to the fence surrounding the site camp.

5.6.11 Lights

The Contractor shall ensure that any lighting installed on the site for his activities does not interfere with road traffic or cause a reasonably avoidable disturbance to the surrounding community or other users of the area.

If any parts of site such as construction camps must be lit at night, this should be done with low-UV type lights (such as most LEDs), which do not attract insects and which should be directed downwards.

5.6.12 Workshops, Equipment, Maintenance and Storage

Where practical, all maintenance of plant on Site shall be performed in the workshop. If it is necessary to do maintenance outside of the workshop area, the Contractor shall obtain the approval of the Engineer prior to commencing activities.

The Contractor shall ensure that in his workshop and other plant maintenance facilities, including those areas where, after obtaining the Engineer's approval, the Contractor carries out emergency plant maintenance, there is no contamination of the soil or vegetation. The workshop shall have a smooth impermeable floor either constructed of concrete or thick plastic covered with sufficient sand to protect the plastic from damage. The floor shall be bunded and sloped towards an oil trap or sump to contain any spillages of substances (e.g. oil). A Method Statement detailing the design and construction of the workshop must be submitted.

When servicing equipment, drip trays shall be used to collect the waste oil and other lubricants. Drip trays shall also be provided in construction areas for stationary plant (such as compressors) and for "parked" plant (such as scrapers, loaders, vehicles).

All vehicles and equipment shall be kept in good working order and serviced regularly. Leaking equipment shall be repaired immediately or removed from the Site.

The washing of equipment shall be restricted to urgent or preventative maintenance requirements only. All washing shall be undertaken in the workshop or maintenance areas, and these areas must be equipped with a suitable impermeable floor and sump/oil trap. The use of detergents for washing shall be restricted to low phosphate and nitrate containing and low sudsing-type detergents.

5.6.13 Noise

The Contractor shall ensure compliance with the Western Cape Noise Control Regulations (Provincial Notice 200/2013) of 20 June 2013 (as may be amended or superseded) and limit noise levels (e.g. install and maintain silencers on machinery). When working in built-up areas, or any areas within audible distance of residents whether in urban, peri-urban or rural areas, the Contractor shall provide and use suitable and effective silencing devices for pneumatic tools and other plant that would otherwise cause a noise level exceeding 85 dB(A) during excavations and other work.

Appropriate directional and intensity settings are to be maintained on all hooters and sirens.

No amplified music shall be allowed on Site. The use of radios, tape recorders, compact disc players, television sets etc shall not be permitted unless the volume is kept sufficiently low as to avoid any intrusion on members of the public within range. The Contractor shall not use sound amplification equipment on Site unless in emergency situations.

The Contractor's attention is drawn to the Noise Regulations as promulgated in terms of the Environment Conservation Act and relevant Local Authority bylaws.

Construction works should be avoided on Sundays, especially around homesteads, unless absolutely necessary.

5.6.14 Environmental Awareness Training

Environmental awareness training sessions shall be run for all personnel on site. Courses shall be run in the morning during normal working hours at a suitable venue provided by the Contractor. All attendees shall remain for the duration of the course and sign an attendance register on completion that clearly indicates participant's names, a copy of which shall be handed to the Engineer.

The environmental awareness training content must be approved by the ECO.

Environmental awareness training can be incorporated into the site inductions and presented by the ESO or health and Safety Officer, with the approval of the ECO.

Environmental awareness training must occur within seven days of commencement of work on site.

Notwithstanding the specific provisions of this clause it is incumbent upon the Contractor to convey the sentiments of the EMPr to all personnel involved with the works.

5.6.15 Contractor's Environmental Site Officer (ESO)

The Contractor shall appoint an Environmental Site Officer who shall be responsible for undertaking a daily site inspection to monitor compliance with this Specification. The Contractor shall submit the name of the Contractor's Environmental Site Officer to the Engineer for his approval seven days prior to the date of the environmental awareness training course.

5.6.16 "No-Go Areas"

For work to be carried out in these areas, a method statement must be submitted.
Sensitive drainage areas near to the construction activities should demarcated as no-go areas.

5.6.17 Construction Personnel Information Poster

The Contractor shall erect and maintain information posters for the information of his employees depicting actions to be taken to ensure compliance with aspects of the Specifications. Such posters shall be erected at the eating areas and any other locations specified by the Engineer.

5.6.18 Fire Control

No fires may be lit on site. Any fires, which occur, shall be reported to the Engineer immediately. Smoking shall not be permitted in those areas where it is a fire hazard. Such areas shall include the workshop and fuel storage areas and any areas where the vegetation or other material is such as to make liable the rapid spread of an initial flame. In terms of the Atmospheric Pollution Prevention Act, burning is not permitted as a disposal method.

The Contractor shall appoint a Fire Officer who shall be responsible for ensuring immediate and appropriate actions in the event of a fire and shall ensure that employees are aware of the procedure to be followed. The Contractor shall forward the name of the Fire Officer to the Engineer for his approval seven days prior to the date of the environmental awareness training course.

The Contractor shall ensure that there is basic firefighting equipment available on Site at all times.

5.6.19 Concrete and Cement work

Cement powder has a high pH. Spillage of dry cement powder and concrete slurry will affect both soil and water pH adversely. Careless handling of cement products resulting in spillage can have detrimental effects on the surrounding environment.

The permitted location of the batching plant (including the location of cement stores and sand and aggregate stockpiles) shall be indicated on the Site layout plan and approved by the ECO. A Method Statement indicating the layout and preparation of this facility is required in this regard.

Cement is to be stored in a secure weatherproof location to avoid contamination of the environment.

All runoff from batching areas shall be strictly controlled so that contaminated water does not enter storm water, or groundwater. Dagga boards and mixing trays should be used at all mixing and supply points. Cleaning of equipment and flushing of mixers shall not result in pollution of the surrounding environment:

Suitable screening and containment shall be in place to prevent windblown contamination associated with bulk cement silos, loading and batching.

All visible remains of excess concrete shall be physically removed to an approved Municipal waste site on completion of the plaster or concrete pour section and disposed of.

5.6.20 Emergency Procedures

The Contractor shall submit Method Statements covering the procedures for the following emergencies:

a) Fire

The Contractor shall advise the relevant authority of a fire as soon as one starts and shall not wait until he can no longer control it. The Contractor shall ensure that his employees are aware of the procedure to be followed in the event of a fire.

b) Accidental leaks and spillages

The Contractor shall ensure that his employees are aware of the procedure to be followed for dealing with spills and leaks, which shall include notifying the Engineer and the relevant authorities. The Contractor shall ensure that the necessary materials and equipment for dealing with spills and leaks is available on Site at all times.

Treatment and remediation of the spill areas shall be undertaken to the reasonable satisfaction of the Engineer.

In the event of a hydrocarbon spill, the source of the spillage shall be isolated, and the spillage contained. The area shall be cordoned off and secured.

5.6.21 Safety

The Contractor shall at all times observe proper and adequate safety precautions on the Site. Telephone numbers of emergency services, including the local firefighting service, shall be posted conspicuously in the Contractor's office near the telephone.

No unauthorised firearms are permitted on Site.

The Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) and in particular the requirements of the Construction Regulations issued in July 2003, must be complied with.

5.6.22 Security

With the possible exception of any security staff who may be required to stay overnight at the Contractor's Camp, no personnel will be permitted to live on site. Security staff must be provided with heating and cooking facilities (in order that they do not need to light fires) access to toilet facilities and communication equipment.

Any security lighting at the Contractor's Camp is to be placed in such a way as to not cause a nuisance to residents of the area and traffic on adjacent roads.

5.6.23 Community Relations

The Contractor shall erect and maintain information boards in the position, quantity, design and dimensions specified. Such boards shall include contact details for complaints by members of the public in accordance with details provided by the Engineer.

All interactions with the surrounding community shall be undertaken in terms of the Community Engagement Plan developed by Komsberg Wind Farms (Pty) Ltd in terms of clause 2.6 of this document.

The Contractor shall keep a "Complaints Register" on Site. The Register shall contain all contact details of the person who made the complaint, and information regarding the complaint itself. All grievances raised shall be dealt with in accordance with the Komsberg Wind Farms (Pty) Ltd Grievance Procedure which is to be developed in accordance with clause 3.6 of this document.

5.6.24 Protection of Natural Features

The Contractor shall not deface, paint, damage or mark any natural features (e.g. rock formations) situated in or around the Site for survey or other purposes unless agreed beforehand with the Engineer. Any features affected by the Contractor in contravention of this clause shall be restored/ rehabilitated to the satisfaction of the Engineer.

The Contractor shall not permit his employees to make use of any natural water sources (e.g. springs, streams, and open water bodies) for the purposes of swimming, personal washing and the washing of machinery or clothes.

5.6.25 Protection of Flora and Fauna

Except to the extent necessary for the carrying out of the Works, flora shall not be removed, damaged or disturbed nor shall any vegetation be planted.

Trapping, poisoning and/ or shooting of animals is strictly forbidden by contractors and their labourers. No domestic pets or livestock are permitted on Site during the construction phase. Where the use of herbicides, pesticides and other poisonous substances has been specified, the Contractor shall submit a Method Statement.

During construction any fauna directly threatened by the construction activities should be removed to a safe location by the ESO, ECO or other suitably qualified person.

All construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species such as snakes and tortoises as well as the Riverine Rabbit. Speed limits should apply within the facility as well as on the public gravel access roads to the site.

No protected tree species may be disturbed or removed without a license from the Department of Agriculture, Forestry and Fisheries (DAFF). Several provincially protected Plants were identified and relevant permits will need to be obtained from the DEA&DP.

5.6.26 Erosion and Sedimentation Control

The Contractor shall take all reasonable measures to limit erosion and sedimentation due to the construction activities. Where erosion and/or sedimentation, whether on or off the Site, occurs despite the Contractor complying with the foregoing, rectification shall be carried out in accordance with details specified by the Engineer. Where erosion and/or sedimentation occur due to the fault of the Contractor, rectification shall be carried out to the reasonable requirements of the Engineer.

Any runnels or erosion channels developed during the construction period or during the maintenance period shall be backfilled and compacted. Stabilisation of cleared areas to prevent and control erosion shall be actively managed. Consideration and provision shall be made for various methods, namely, brush-cut packing, mulch or chip cover, straw stabilising (at a rate of one bale/square metre and rotorvated into the top 100 mm of the completed earthworks), watering, soil binders and anti-erosion compounds, mechanical cover or packing structures (e.g. Hessian cover).

Traffic and movement over stabilised areas shall be restricted and controlled, and damage to stabilized area shall be repaired and maintained to the satisfaction of the Engineer.

5.6.27 Aesthetics

The Contractor shall take reasonable measures to ensure that construction activities do not have an unreasonable impact on the aesthetics of the area.

5.6.28 Dust Control

The Contractor shall ensure compliance with the National Dust Control Regulations (GN R827 of 1 November 2013) and take all reasonable measures to minimise the generation of dust as a result of construction activities to the satisfaction of the Engineer and ECO. Dust control measures may include the stabilization of disturbed areas via the rotorvation of straw into the soil surface. In extreme instances, the use of specific dust suppressant additives such as "Dustex" may be necessary in order to limit dust generation from haul roads.

Should the dustfall rate exceed the acceptable threshold of Regulation 3 of the National Dust Control Regulations (GN R827 of 1 November 2013) (see Table 1 below) or the applicable legislation in force at the time, the Directorate: Air Quality Management of the Department of Environmental Affairs and Development Planning shall be contacted to determine the need for a dustfall monitoring programme.

Table 2: Acceptable dust fall rates in terms of Regulation 3 of the National Dust Control Regulations (GN R827 of 1 November 2013).

Restriction Areas	Dustfall rate (D) (mg/m2/day, 30-days average)	Permitted frequency of exceeding dust fall rate
Residential area	D<600	Two within a year, not sequential months
Non-residential area	600<D<1200	Two within a year, not sequential months

During high wind conditions, the Contractor shall comply with the Engineers instructions regarding dust suppression measures. The Engineer may request the temporary cessation of all construction activities where wind speeds are unacceptably high, and until such time as wind speeds return to acceptable levels.

5.6.29 Pollution

The Contractor shall take all reasonable measures to minimize any dust nuisance, pollution of streams and inconvenience to or interference with the public (or others) as a result of the execution of the Works. A method statement may be required in this regard as determined by the Engineer and ECO.

Washing of vehicles and machinery should take place within 50m from any watercourse. All machinery should be regularly checked for leaks. No runoff shall enter any watercourse.

5.6.29.1 Archaeology and Palaeontology

Colonial period heritage – that is buildings and historical sites of significance have been identified within the boundaries of the study area.

» Do not disturb and old stone kraals or ruins, do not remove stone from walls, or artefacts from the earth or earth surface.

» Do not demolish without HWC authorisation, ideally reuse old structures and cottages, care for the fabric but change it as little as possible.

During the construction phase a chance-finds procedure should be applied should substantial fossil remains such as vertebrate bones, teeth or trackways, plant-rich fossil lenses or dense fossil burrow assemblages be exposed by excavation or discovered within the development footprint. The responsible Environmental Control Officer should safeguard the fossils, preferably *in situ*, and alert the responsible heritage management authority (Heritage Western Cape for the Western Cape, SAHRA for the Northern Cape) so that appropriate action can be taken by a professional palaeontologist, at the developer's expense. Mitigation would normally involve the scientific recording and judicious sampling or collection of fossil material as well as associated geological data (e.g. stratigraphy, sedimentology, taphonomy) by a professional palaeontologist. Should a specialist confirm a genuine artefact and recommend further study of the area, work in the area of any artefact or fossil is to cease until further notice and the South African Heritage Resources Agency (SAHRA) is to be informed forthwith by the archaeologist. A maximum of 30 days should be set aside in the construction program for the recovery of archaeological material where/if discovered. The contact details for the SAHRA are as follows:

111 Harrington Street, Cape Town, 8001

P O Box 4637, Cape Town, 8000

Tel: (021) 462 4502

Fax: (021) 462 4509

Email: director@sahra.org.za

5.6.30 Working Hours

Working hours in terms of the planning approval shall be adhered to. If works are to take place outside of normal working hours, the ECO and the Engineer are to be notified and disturbance to the surrounding residents or land users is to be prevented. The Engineer will, where required, in turn notify the Relevant Authority of work done outside of normal working hours.

5.6.31 Excavation and Trenching

During excavation and trenching activities, care is to be taken to ensure that the stockpiling of top material is kept separate from sub-soils. Top material thus saved is to be replaced as top material and is to be the final layer when back-filling. The Contractor shall reinstate all working areas to the satisfaction of the Engineer.

Areas opened for trenching should be restricted to the minimum required to be worked in and closed up as soon as possible or as dictated by technical requirements such as length of pipe or cable, in order to prevent them from posing safety hazards to people, traffic and animals and to prevent rainwater erosion. Trenches shall be refilled to the same level as (or slightly higher to allow for settlement) the surrounding land surface to minimise erosion. Excess soil shall be stockpiled in an appropriate manner. No stockpiling must occur within 50 m of a water course.

In the event of material removed during trenching being excessive after backfilling or being unsuitable as overburden, the excess material must be removed from the construction site to a site agreed upon by the Engineer and, where applicable, the Local Authority.

5.7 Temporary Site Closure

If the Site is closed for a period exceeding one week, a checklist procedure shall be carried out by the Contractor in consultation with the ECO.

Contractor's Safety Officers (in terms of the Occupational Health and Safety Act) are to check, the Site and report to the Engineer regarding the following:

5.7.1 Fuels / flammables / hazardous materials stores:

- Ensure fuel stores as low in volume as possible;
- No leaks;
- Outlet secure / locked;
- Bund empty;
- Fire extinguisher serviced and accessible;
- Secure area from accidental damage e.g. vehicle collision;
- Emergency and Management telephone numbers to be available and displayed; and
- Adequate ventilation.

5.7.2 Other:

- All trenches and manholes secured;
- Fencing and barriers in place per the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993);
- Notice boards applicable and secured;
- Security persons briefed and have facility for contact;
- Night hazards checked e.g. reflectors, lighting, traffic signage;
- Fire hazards identified – local authority notified of any potential threats e.g. large brush stockpiles, fuels etc.;
- Pipe stockpile wedged / secured;
- Scaffolds secure; and
- Inspection schedule and log by security or contracts staff.

The ECO and/or ESO is to check and report to the Engineer regarding the following issues:

- Wind and dust mitigation in place e.g. straw, brush packs, irrigation;
- Slopes and stockpiles at stable angle;
- Landscape areas watering schedules & supply secured;
- Fuels/hazardous substances stores secure;
- Cement and materials stores secured;
- Toilets empty and secured;
- Refuse bins empty and secured (lids);
- Bunding clean and treated e.g. Spill Sorb or Enretech #1 powder;
- Drip trays empty & secure (where possible); and
- Structures vulnerable to high winds secure.

The Contractor is to ensure that all temporary closure requirements are met before leaving the Site.

5.8 Site Clean-Up and Rehabilitation

5.8.1 Site Clean-Up

The Contractor shall ensure that all temporary structures, equipment, materials, waste and facilities used for construction purposes are removed upon completion of the project. The site clean-up shall be to the satisfaction of the Engineer and the ECO.

5.8.2 Rehabilitation

Where appropriate, the contractor shall employ a suitably qualified person (a botanist with experience in restoration of karoo areas) to rehabilitate areas damaged by construction activities during the course of the project. The Contractor shall be responsible for rehabilitating areas identified by the ECO and the Engineer, or recommended by the aforementioned botanist. The Contractor's procedure for rehabilitation shall be approved by the ECO and the Engineer and, where required, the Local Authority environmental representative.

5.9 Penalties and Bonuses

Where the Contractor inflicts damage upon the environment or fails to comply with any of the Environmental Specifications contained within this EMP, he may be liable to pay a penalty for breach of the conditions of the Environmental Specifications which form part of the works contract.

The Contractor is deemed NOT to have complied with this Specification if:

» There is evidence of contravention of the Specification within the boundaries of the site, site extensions and haul/ access roads;

» Environmental damage ensues due to negligence;

» The Contractor fails to comply with corrective or other instructions issued by the Engineer within a specific time; or

» The Contractor fails to respond adequately to complaints from the public.

Penalties may be issued per incident and per individual for the Contractor's responsibility. The amount of the penalty shall be determined by the Engineer, in consultation with the ECO and Contractor prior to work starting on site. The Engineer shall inform the Contractor of the contravention and he shall notify the consulting quantity surveyor to deduct such a penalty from monies due under the Contract prior to the issuing of the monthly payment certificates.

Payment of any penalties in terms of the contract shall not absolve the offender from being liable from prosecution in terms of any law.

The following penalties (not an exclusive list) in addition to remedial costs incurred could attract penalties:

Table 5-3: Penalties

a.	An individual entering a "no-go" area by foot (without Engineer's/ ECO's permission)	R 500
b.	An individual failing to adhere to speed limit	R 500
c.	An individual driving a vehicle in a no-go area	R2000
d.	An individual driving any earthmoving plant in a no–go area	R2000 – R5000
e.	A plant operator ignoring a written warning to have an oil leak from his machinery repaired	R 1000
f.	An individual littering on site	R100
g.	An individual not making use of the ablution facilities	R500
h.	An individual making an illegal fire on site	R500 – R10 000
j.	An individual/contractor causing unnecessary damage to flora and fauna on site	R500 – R5000
j.	An individual/team wasting water	R500 – R5000

All monies collected through penalties can be held in an environmental fund by the Developer and can be used in the local development programs. A summary page is to be included with the monthly payment certificates as a record of penalties issued to date.

5.10 Tolerances

Environmental management is concerned not only with the final results of the Contractor's operations to carry out the Works but also with the control of how those operations are carried out. Tolerance with respect to environmental matters applies not only to the finished product but also to the standard of the day-to-day operations required to complete the Works.

It is thus required that the Contractor shall comply with the environmental requirements on an ongoing basis and any failure on his part to do so will entitle the Engineer to certify the imposition of a fine subject to the details set out in the Environmental Specification.

6 OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAM (OEMP)

6.1 Scope

This Specification covers the requirements for controlling the impact on the environment of operational activities.

6.2 Aim and Purpose of the OEMP

This OEMP aims to provide Komsberg Wind Farms (Pty) Ltd and their contractors with the necessary tools to ensure that the potential impacts on the environment during the operation of the development are minimised. Moreover, it aims to ensure that the infrastructure is operated and maintained according to Best Practice. The OEMP aims to ensure that the development is maintained and operated in an environmentally sensitive and sustainable manner, and that the operation of the development does not result in reasonably avoidable environmental impacts.

The OEMP is a working document that may be amended to enhance its effectiveness for environmental control.

Therefore not all specifications and details are prescribed here but should be discussed and the best possible practicable application made by the responsible parties.

6.3 Application

The application and implementation of the Operational Environmental Management Plan (OEMP) shall be the responsibility of Komsberg Wind Farms (Pty) Ltd. Komsberg Wind Farms (Pty) Ltd is to appoint an Environmental Site Manager (ESM) to ensure that relevant requirements of the OEMP document are implemented, and that the site is suitably managed. Komsberg Wind Farms (Pty) Ltd may appoint a suitably qualified and experienced person from within the existing staff to fulfil the role of ESM.

Komsberg Wind Farms (Pty) Ltd may also form an Environmental Liaison Committee (ELC) to facilitate the implementation of the OEMP. If the ELC is formed, many of the responsibilities of Komsberg Wind Farms (Pty) Ltd may be delegated to the ELC. The ELC should consist of at the very least the following:

» Representative of Komsberg Wind Farms (Pty) Ltd;

» Environmental Site Manager; and

» Representative of the local authority.

Other members may include an external environmental control officer (ECO) or representatives from community based organisations or environmental groups.

Should Komsberg Wind Farms (Pty) Ltd sub-contract the running of the WEF to a third party, the OEMP must be part of the contract and must be binding.

The roles and responsibilities of each of the above-mentioned environmental management bodies have been detailed below:

6.3.1 Environmental Liaison Committee (ELC)

The ELC is a representative body of various key role players involved in development and environment-related organisations, which have a particular interest in the Komsberg East WEF development. Members of this committee will not remain constant, and may vary over time.

The ELC will play an advisory role, and provide a forum for democratic decisions regarding OEMP implementation during the operational phase of the development, as well as periodically reviewing the

OEMP in terms of its applicability to management requirements on site. They are to meet periodically to receive a report back on environmental management. This frequency may need to be reviewed following the first year of operation, but should not be less than twice a year.

All members of the ELC will be expected to attend the meetings, and are to provide the chairperson of the committee with a written apology if unable to attend. In such a case, the member will receive minutes of the meeting, and may be expected to respond to certain issues.

6.3.2 Komsberg Wind Farms (Pty) Ltd

The implementation of the OEMP, as well as the adherence to any conditions within the Environmental Authorisation relating to the operational phase of the development, shall be the responsibility of Komsberg Wind Farms (Pty) Ltd.

Komsberg Wind Farms (Pty) Ltd will appoint an Environmental Site Manager and various specialists as required to ensure that the specifications of this document as they relate to general site management and maintenance, as well as environmental audits are suitably implemented on site.

6.3.3 Environmental Site Manager (ESM) (or internal role managed by SM)

A suitably qualified and trained individual appointed by Komsberg Wind Farms (Pty) Ltd prior to the operation of the WEF, will fulfil the role of the Environmental Site Manager (ESM). The primary roles and responsibilities of the ESM will be to:

- Oversee and monitor the implementation of the EMPr on site;
- visit the site on a monthly basis and advise on areas of environmental management, or compliance with the OEMP, requiring attention;
- visit the site more regularly during the first three months of operation, during which more frequent monitoring may be required for the establishment of certain programmes or aspects of environmental management;
- be called to site in the case of any emergency situation which may impact on the local environment;
- liaise with various specialists and the local authorities if required, regarding issues relating to environmental management;
- report on compliance with the OEMP specifications to the ELC/ Komsberg Wind Farms (Pty) Ltd;
- facilitate environmental audits and ensure that they are undertaken, as required;
- keep a comprehensive record of environmental management, issues of non-compliance and minutes of ELC meetings for audit purposes; and
- undertake any other tasks outlined in this document, on the behalf of Komsberg Wind Farms (Pty) Ltd.

6.3.4 Independent Environmental Control Officer (ECO)

Since provision has been made for the ESM to be an internal Komsberg Wind Farms (Pty) Ltd appointment, Komsberg Wind Farms (Pty) Ltd must employ an independent Environmental Professional with a post graduate degree in environmental studies and a minimum of five years of relevant experience to act as the independent environmental auditor for the site. The ECO is to be employed upon completion of the first year of operation, and is to perform an annual formal audit on the management plan, and its implementation by the relevant parties for the duration for the operational phase of the project. Specific audit requirements are contained within section 5.6.5.

6.4 Financing for Environmental Management

The budget for the implementation of the OEMP shall come out of Komsberg Wind Farms (Pty) Ltd's operational budget. Komsberg Wind Farms (Pty) Ltd must review the OEMP and allocate the requisite funds to facilitate compliance. Since many of the items addressed in the OEMP relate to required preventative maintenance, operator legal compliance, and responsible environmental management, this cost should not represent significant additional expenditure.

6.5 Detailed Operational Environmental Specifications

6.5.1 Litter and Waste Management

A litter and waste management system must be established by Komsberg Wind Farms (Pty) Ltd. Litter and waste management should address the following:

6.5.1.1 Recycling

It is recommended that a recycling program be established for the site as a whole, but specifically for the administration and maintenance buildings and all site occupants. This may achieved via an agreement with the waste management contractor for the site. Komsberg Wind Farms (Pty) Ltd must make adequate staff resources available to implement and manage the recycling program. Waste separation is best conducted at source, and the recycling waste storage area must at a minimum separate waste into the following categories:

» Paper products;
» Cardboard;
» Glass;
» Plastics; and
» Metals.

Recycling will involve greater effort, but offers the reward of environmentally sustainable practices and potential employment opportunities. The ELC/ Komsberg Wind Farms (Pty) Ltd should establish what recycling facilities are available within the broader area and determine a recycling program that can support any community efforts already underway.

6.5.1.2 Solid Waste

A distinction should be made between dry solid waste and wet solid waste. These should be separated and collected in different containers for storage at a central waste depot before removal to a recognised municipal waste facility.

All waste storage areas are to be kept in a clean and hygienic condition to prevent odours, spreading of litter, and scavengers.

The frequency of collection must be determined and specified by the ELC/ Komsberg Wind Farms (Pty) Ltd in this OEMP.

Refuse and litter management is to be monitored visually by the ESM. Findings are to inform changes in the waste management procedures to eliminate litter problems.

6.5.1.3 Hazardous Waste

Should any hazardous waste be generated by the WEF, this must be disposed of at a hazardous waste facility and adhere to any health and safety requirements for the storage, transport and disposal of hazardous waste.

6.5.2 Noise

Noise generated by the WEF shall be limited to ensure compliance with the Western Cape Noise Control Regulations (Provincial Notice 200/2013) of 20 June 2013, or the applicable legislation in force at the time.

6.5.3 Vegetation Management

All rehabilitated areas related with the development are to be maintained and be kept clear of invasive alien vegetation species, as listed under the Conservation of Agricultural Resources, 1983 (Act No. 43 of 1983) (as amended/updated)) and in terms of the requirements of National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004):

» The use of pesticides and herbicides is to be limited to a bare minimum and are to be strictly controlled, and limited to only biodegradable, natural substances. Application should be not prior to the imminent arrival of rain, or within at least 5 days after the passing of a significant rain event.

» On-site employees, farm workers and visitors to the site will be educated about the conservation of vegetation. This will include strict guidelines for remaining on existing roads while on site to avoid unnecessary destruction or damage to undisturbed and rehabilitated vegetation.

» Any cutting or clearing of vegetation shall be kept to the minimum necessary to facilitate the ongoing operation of the WEF.

» The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden by anyone expect landowners with the appropriate permits where required.

6.5.4 Alien Plant Management

» Wherever excavation is necessary, topsoil should be set aside and replaced after construction to encourage natural regeneration of the local indigenous species.

» The recovery of the indigenous shrub/grass layer should be encouraged through leaving some areas intact through the construction phase to create a seed source for adjacent cleared areas.

» Due to the disturbance at the site as well as the increased runoff generated by the hard infrastructure, alien plant species may be a long-term problem at the site and a long-term control plan will need to be implemented. Problem woody species such as *Prosopis* 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 as there are also likely to be prone to invasion problems.

» 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.

6.5.5 Fauna

» Any potentially dangerous fauna such snakes or fauna threatened by the maintenance and operational activities should be removed to a safe location.

» The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden by anyone expect landowners with the appropriate permits where required.

» 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.

» If parts of the facility 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.

» If 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), which do not attract insects.

6.5.6 Avifauna

» Operational monitoring data (including that from the recommended operational programme for the Komsberg East WEF) should be made available to appropriate agencies such as Bird Life SA and the Endangered Wildlife Trust, as well as avifaunal specialists through the BARESG, to promote more accurate and detailed cumulative assessments in the future.

6.5.7 Bats

» Operational acoustic monitoring and carcass searches for bats must be performed to monitor mortality levels for a minimum of two years and according to current (or updated) best practise guidelines (Aronson et al. 2014). Acoustic monitoring should include monitoring at height and at ground level at more than one location. Records of bat fatality must be shared with the relevant bodies, specifically the South African Bat Assessment Association.

» If mortality does occur, the level of mortality should be considered by a bat specialist/s to determine if this is at a level where further mitigation needs to be considered (taking into consideration the latest bat fatality threshold guideline). Mitigation options may include using ultrasonic deterrents, raising the cut-in speeds of turbines, turbine blade feathering and using targeted curtailment during specific seasons and time periods for specific turbines.

» Bat carcasses shall be disposed of in accordance with the applicable guidelines in force at the time.

» It is advised that both pre-construction and operational monitoring data are used to confirm the need for above mentioned mitigation measures such as curtailment and to determine when during WEF operation such mitigation needs to be implemented, if at all.

» All monitoring data and reports (pre-construction and operational) shall be submitted to the South African Bat Assessment Association.

6.5.8 Soil Erosion

» Erosion management at the site should take place according to the Erosion and Rehabilitation Plan.

» 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.

» Regular monitoring for erosion after construction to ensure that no erosion problems have developed as result of the disturbance.

» All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques.

» All cleared areas should be revegetated with indigenous perennial shrubs and grasses from the local area. These can be cut when dry and placed on the cleared areas if natural recovery is slow.

6.5.9 Water courses

» During the operational phase, monitor culverts to see if erosion issues arise and if any erosion control is required.

» Where possible culvert bases must be placed as close as possible with natural levels in mind so that these don't form additional steps / barriers.

6.5.10 Maintenance Development

This section refers to both internal and external maintenance of the centre.

» Komsberg Wind Farms (Pty) Ltd must monitor borehole usage, and any other specific parameters required by conditions of the Water Use Licence, and ensure adherence thereto.

» Komsberg Wind Farms (Pty) Ltd must notify the ESM of any external maintenance to be undertaken. Any significant structural maintenance should require compliance with the EMPr.

» The ESM must specify any additional environmental procedures necessary to prevent contamination of the environment.

» Komsberg Wind Farms (Pty) Ltd is responsible for notifying the maintenance contractor of the conditions.

6.5.11 Emergency Procedures

An appropriate and timeous response to emergency situations will ensure that the environmental consequences of such situations are managed and curtailed. Since the fire is seen as the most likely foreseeable emergency for the site, the emergency procedure for fire is provided below. In the event of a fire occurring, the requisite procedure shall be implemented. To ensure preparedness, all key staff on site shall be trained in terms of the requirements of this emergency procedure.

Komsberg Wind Farms (Pty) Ltd shall ensure that the fire control system is maintained according to the relevant SANS requirements.

Komsberg Wind Farms (Pty) Ltd shall ensure that all measures to avoid the risk of fire according to the Environmental Regulations for Workplaces promulgated by Government Notice No. R2281 of 16 October 1987, as amended, is adhered to.

Fire hydrants and hoses to be visible.

6.5.11.1 Emergency procedure in the event of a fire:

» Contact relevant parties as well as local fire department and report the location and details of the fire.
» Alert other staff by calling "Fire".
» Attend to human life in danger and remove all combustible items in the vicinity (where possible), guide people away from danger area.
» If trained, personal to attempt to extinguish the fire without endangering life.
» If uncertain or unable to extinguish the fire, leave the area and wait for assistance.

6.5.11.2 Emergency contact details

A list of emergency services contact numbers shall be posted on site. As a minimum, the following emergency services shall be included on the list:

» Environmental Department: 053 807 7416
» Fire Department: 10111
» Disaster Management: 107
» Ambulance Services: 10177
» South African Police Services: 10111

6.5.12 OEMP Review and Audit

6.5.12.1 OEMP Review

A schedule for the review of the OEMP should be established by the ELC/Komsberg Wind Farms (Pty) Ltd. It is recommended that the effectiveness of the OEMP be reviewed on an annual basis, and possibly bi-annually in the first year of operation.

Any proposed changes are to be submitted by the ESM to the DFFE for approval prior to implementation.

Amendments or additions made to the document (with the approval of the relevant authorities) are to be included as annexure's, distributed to all relevant parties, and should be considered OEMP specifications to which all relevant parties are bound.

Results of environmental audits (refer to section 5.6.5.2) are to inform the ELC/Komsberg Wind Farms (Pty) Ltd of changes required to the EMPr documentation.

6.5.12.2 OEMP Audit

Audits of the OEMP implementation in the development should be undertaken on a regular basis. Internal audits (by the ESM) should be done on a quarterly basis with an external audit conducted by an independent consultant undertaken as specified below.

An independent environmental auditor (ECO) is to be employed after the first year of operation, and annually thereafter, to perform a formal audit on the management plan, and its implementation by the relevant parties.

Each audit is to be based on site visits by the auditor as well as a review of any records of environmental management to be kept by the ESM. The audit must also determine whether the OEMP is adequately dealing with the range of environmental impacts on the site, i.e. whether the plan is still appropriate, or whether it needs to be extended.

The audit report is to include recommendations of changes required to the OEMP document, management practices etc to improve environmental management of the site. The results of this audit are to be submitted to the provincial and local environmental authority, and DFFE.

6.6 Summary of Operational Specifications

In this section of the document, specifications for environmental management on site have been summarized to facilitate easy reference, and implementation.

This section clearly lays out the management requirements, who is responsible for undertaking the required actions, time frames within which they are required, as well as requirements for monitoring, or where applicable approval of the required action. Further details of how each of these actions is to be undertaken (where applicable) have been included in section 5.6. Relevant references to these details have been provided in the tables below.

Where Komsberg Wind Farms (Pty) Ltd has been identified as the responsible party, this should be read as Komsberg Wind Farms (Pty) Ltd, or a suitable individual/organisation employed by them to undertake such task. Where another party has been identified as responsible for undertaking a management action, they are to fulfil this requirement, although the Komsberg Wind Farms (Pty) Ltd will ultimately be held responsible for any requirements or specifications of this document which are not fulfilled.

Komsberg Wind Farms (Pty) Ltd holds the responsibility of ensuring that the action is undertaken according to the specifications of this document.

6.6.1 Visual Impacts

Management Objectives	Actions required	Responsible Party	Frequency/Time frame	Approval and Monitoring Procedures	Monitoring Party	Ref for further details
Minimize the visual impacts during the operation phase.	Signage related to the REF must be discrete and confined to entrance gates.	Komsberg Wind Farmss (Pty) Ltd	Throughout operation	Visual Monitoring / Photographic evidence	ESM	N/A
	The footprint of the maintenance facilities, as well as parking and vehicular circulation, should be clearly defined, and not be allowed to spill over into other areas of the site.	Komsberg Wind Farms (Pty) Ltd	Throughout operation	Visual Monitoring / Photographic evidence	ESM	N/A
	The maintenance and storage areas should be screened by buildings, walls, hedges and/or tree planting, and should be kept in a tidy state to minimise visual impact	Komsberg Wind Farmss (Pty) Ltd	Throughout operation	Visual Monitoring / Photographic evidence	ESM	N/A

6.6.2 Litter, Waste & Effluent Management

Management Objectives	Actions required	Responsible Party	Frequency/Time frame	Approval and Monitoring Procedures	Monitoring Party	Ref. for further details
Recycling	Recycling programme to be established on site. To include cardboard, glass, plastic, paper, & metals	Komsberg Wind Farms (Pty) Ltd	Within first 3 months of operation	Visual inspection	ESM	5.5.1
	Separation/ deposition of suitable materials in recycling containers	Komsberg Wind Farms (Pty) Ltd Contracted cleaning service providers	On-going	Visual inspection, random monthly checks on recycling waste storage area	ESM	5.5.1
	Emptying of recycling containers	Recycling companies / Waste Contractor, as arranged by Komsberg Wind Farms (Pty) Ltd	As required-Komsberg Wind Farms (Pty) Ltd/ELC to determine frequency	Visual inspection	ESM	5.5.1
Refuse disposal	Refuse agreement entered with Council or private contractor	Komsberg Wind Farms (Pty) Ltd	Prior to start of operation			5.5.1
	Provision of suitable waste disposal containers at operations and maintenance buildings	Komsberg Wind Farms (Pty) Ltd	Prior to start of operation	Visual inspection	ESM	5.5.1

	Temporary waste storage area to be weather proof to prevent dispersion of waste through e.g. wind or rain	Komsberg Wind Farms (Pty) Ltd	Ongoing	Visual inspection	ESM	5.5.1
	Emptying of waste disposal containers	As arranged by Komsberg Wind Farms (Pty) Ltd	As required	Visual inspection	ESM	5.5.1
Prevention of Soil or groundwater pollution.	Any hydrocarbons or other hazardous substances stored on site must be stored in an impervious container, within a bunded area.	Komsberg Wind Farms (Pty) Ltd	Monthly Inspection	Visual Inspection	ESM	5.5.1
Management of hazardous substance spillage	Any spillage of hazardous substance to be reported to ESM and Council	Komsberg Wind Farms (Pty) Ltd	Immediately following spillage	Visual inspection of incident to evaluate potential threat for contamination of water course/ephemeral pan/ groundwater.	ESM	5.5.1
	Suitable mitigation actions to be recommended	ESM	As soon as required to prevent further damage	Report to Council/ relevant State Department.	ESM	5.6.1
	Implementation of recommended actions	Komsberg Wind Farms (Pty) Ltd /ESM to coordinate	As required by recommended mitigatory actions	Visual inspection	ESM	5.5.1
	Detailed records kept of all such incidents	Komsberg Wind Farms (Pty) Ltd/ESM	Immediately following each incident	Report to appropriate level of government as required by legislation	ESM	5.5.1

6.6.3 Erosion Management / Loss of Topsoil

Management Objectives	Actions required	Responsible Party	Frequency/Time frame	Approval and Monitoring Procedures	Monitoring Party	Ref. for further details

Erosion Management	Bi-annual monitoring of erosion in the vicinity of the roads, buildings and other hard-standing surfaces to be conducted to ensure erosion sites can be identified early and remedied.	ESM	Before and after the rainy season	Visual inspection for erosion	ESM	5.5.4
	Determine cause of erosion	ESM	As required	Visual inspection for erosion	ESM	5.5.4
	Implementation of suitable repair and mitigation	Komsberg Wind Farms (Pty) Ltd, ESM	Within a month following request for mitigation by ESM	Visual inspection of mitigation measures to ensure that they are preventing further erosion	ESM	5.5.4

6.6.4 Vegetation Management

Management Objectives	Actions required	Responsible Party	Frequency/Time frame	Approval and Monitoring Procedures	Monitoring Party	Ref. for further details
Minimize unnecessary damage to or loss of vegetation	On-site employees, farm workers and visitors to the site will be educated about the conservation of vegetation. This will include strict guidelines for remaining on existing roads while on site to avoid unnecessary destruction or damage to undisturbed and rehabilitated vegetation.	Komsberg Wind Farms (Pty) Ltd	Ongoing	Erection of signage at the Admin Building and site entrance.	ESM	5.5.3
Vegetation management during	Any cutting or clearing of vegetation shall be kept to	Komsberg Wind Farms (Pty) Ltd	Ongoing	Visual Inspection.	ESM	5.5.2

general maintenance	the minimum necessary to facilitate the ongoing operation of the WEF.					
Control of Alien Species	Alien control and monitoring program must be developed to ensure that the site is kept free from alien plants.	Komsberg Wind Farms (Pty) Ltd	Bi-annually	Visual Inspection	ESM or botanist/ horticulturalist if the ESM is not adequately skilled.	5.5.2

6.6.5 Maintenance of WEF

Management Objectives	Actions required	Responsible Party	Frequency/Time frame	Approval and Monitoring Procedures	Monitoring Party	Ref. for further details
Ensure compliance with conditions of water use licence	Monitor borehole usage, and any specific parameters required by the Water Use Licence, and ensure adherence thereto.	Komsberg Wind Farms (Pty) Ltd	Prior to operation/ ongoing	Borehole Water Use Licence/ Registration	Komsberg Wind Farms (Pty) Ltd/ESM	5.5.6
Environmental management during general maintenance	Notify ESM of external maintenance to be undertaken	Komsberg Wind Farms (Pty) Ltd	Prior to starting work	Visual inspection of area	ESM	5.5.6
	Specify environmental procedures to prevent environmental contamination. CEMP (section 4 of this document) to be applicable to significant maintenance activities.	ESM	Prior to starting work	Visual monitoring of maintenance to ensure compliance with specification Reports of transgressions to ELC/ Komsberg Wind Farms (Pty) Ltd	ESM ESM	5.5.6
Minimize any traffic impact	During operation, if abnormal loads are required for maintenance, the	Komsberg Wind Farms (Pty) Ltd	Throughout Operation of the facility	Permit if required	ESM	N/A

	appropriate arrangements will be made to obtain the necessary transportation permits and the route agreed with the relevant authorities to minimise the impact of other road users. All internal and access roads that will be used by Komsberg Wind Farms (Pty) Ltd during the operational phase of the project will be maintained by Komsberg Wind Farms (Pty) Ltd throughout the life of the Project.					

6.6.6 *Electromagnetic Interference*

Management Objectives	Actions required	Responsible Party	Frequency/Time frame	Approval and Monitoring Procedures	Monitoring Party	Ref. for further details
Prevent EMI effects	Appropriate mitigation measures for reducing noise in electronic systems may include the shielding, cancellation, filtering and suppression.	Komsberg Wind Farms (Pty) Ltd, with input from relevant specialist.	Throughout operation, but only if such impacts occur.	Installation reports	Komsberg Wind Farms (Pty) Ltd/ESM	N/A

6.6.7 *Dust Minimization*

Management Objectives	Actions required	Responsible Party	Frequency/Time frame	Approval and Monitoring Procedures	Monitoring Party	Ref. for further details
Prevention of excessive dust generation	Komsberg Wind Farms (Pty) Ltd to ensure:	Komsberg Wind Farms (Pty) Ltd.	Throughout operation.	Visual monitoring and as per the requirements of the National Dust	Komsberg Wind Farms (Pty) Ltd/ESM	N/A

	- compliance with the National Dust Control Regulations (GN R827 of 1 November 2013); and - that vehicles related to the WEF travelling on gravel roads should not exceed a speed of 40 km/h. Komsberg Wind Farms (Pty) Ltd to erect signage and undertake driver education in this regard.			Control Regulations (GN R827 of 1 November 2013)		

6.6.8 Emergency Procedures

Management Objectives	Actions required	Responsible Party	Frequency/Time frame	Approval and Monitoring Procedures	Monitoring Party	Ref. for further details
To ensure a reduced risk to human life and of damage if a fire were to take place	Fire control system to be maintained according to the relevant SANS requirements.	Komsberg Wind Farms (Pty) Ltd	As required by SANS requirements	Records of maintenance to be kept	Komsberg Wind Farms (Pty) Ltd/ESM	5.5.7
	All measures to avoid the risk of fire according to the Environmental Regulations for Workplaces promulgated by Government Notice No. R2281 of 16 October 1987, as amended should be adhered to.	Komsberg Wind Farms (Pty) Ltd	As required	Maintenance records to be kept	Komsberg Wind Farms (Pty) Ltd	5.5.7
	Fire hydrants and hoses to be visible	Komsberg Wind Farms (Pty) Ltd	Prior to operation	Records of incidents to be kept	Komsberg Wind Farms (Pty) Ltd/ESM	5.5.7

	Emergency contact numbers always visible.					
	Ensure all site occupants adequately trained in evacuation and other procedures in the event of an emergency.	Komsberg Wind Farms (Pty) Ltd	As required	Records of emergency drills to be kept	Komsberg Wind Farms (Pty) Ltd/ESM	5.5.7

6.6.9 *Audits and EMP Reviews*

Management Objectives	Actions required	Responsible Party	Frequency/Time frame	Approval and Monitoring Procedures	Monitoring Party	Ref. for further details
Environmental Audit	Audit relevance of management plan and its implementation	Independent Environmental auditor (ECO)	Annually, commencing 1 year after start of operation.	Audit report to be presented to ELC, Komsberg Wind Farms (Pty) Ltd and the DFFE if required.	ESM / Komsberg Wind Farms (Pty) Ltd to ensure that Independent Audit is undertaken.	5.5.8
	Recommend changes to OEMP/ implementation of OEMP required	Independent Environmental auditor (ECO)	Following each audit	Recommended changes discussed with ELC, Komsberg Wind Farms (Pty) Ltd and the DFFE.	ESM	5.5.8
Review of OEMP	Evaluate relevance of OEMP, and identify additional issues requiring management and changes recommended by auditor	Komsberg Wind Farms (Pty) Ltd, ELC	Annually and following each audit		ESM	5.5.8

	Submit proposed changes to local authority, and DFFE for approval	ESM	Prior to implementation	Obtain written approval from DFFE	ESM	5.5.8
	Effect changes; include approved amendments as annexure to OEMP where appropriate	ESM	Within month of receipt of all approvals	Distribution of annexure/ amended OEMP to all relevant parties	ESM	5.5.8

7 MANAGEMENT PLAN FOR THE WIND ENERGY FACILITY: DECOMMISSIONING

The turbine infrastructures which will be utilised for the proposed wind energy facility are expected to have a lifespan of 20 - 25 years (with maintenance). Equipment associated with this 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 facility would comprise the disassembly and replacement of the turbines with more appropriate technology/infrastructure available at that time. The relevant mitigation measures contained under the construction section should be applied during decommissioning and therefore is not repeated in this section. It must be noted that decommissioning activities will need to be undertaken in accordance with the relevant legislation applicable at that time, which may require this section of the EMPr to be revisited and amended.

7.1 Site Preparation

Site preparation activities will include confirming the integrity of the access to the site to accommodate required abnormal load equipment and lifting cranes, preparation of the site (e.g. lay down areas, construction platform) and the mobilisation of construction equipment.

7.2 Disassemble Turbines

The wind (turbine and tower sections) of the proposed facility will be disassembled once it reaches the end of its economic lifespan. A large crane would be required for disassembling the turbine and tower sections. Once disassembled, the components will be reused, recycled, or disposed of in accordance with regulatory requirements at the time (such as NEMA / NEM:WA currently). All parts of the turbine would be considered reusable or recyclable except for the blades.

7.3 Rehabilitation of the Site

In order to minimise the extent of rehabilitation activities required during the decommissioning phase, the project Developer must ensure that constant effort is applied to rehabilitation activities throughout the construction, operation and maintenance phases of the project.

In decommissioning of the facility the Proponent must ensure that:

- All sites, not already vegetated, are to be vegetated as soon as possible after operation ceases with species appropriate to the area.
- Any fauna encountered during decommission should be removed to safety by a suitably qualified person.
- All structures, foundations (to at least 750mm below ground level) and sealed areas are demolished, removed and waste material disposed of at an appropriately licensed waste disposal site.
- All access/service roads not required to be retained by landowners are closed and fully rehabilitated.

- All vehicles to adhere to low speed limits (40km/h max) on the site, to reduce risk of faunal collisions as well as reduce dust.
- All disturbed areas are compacted, sloped and contoured to ensure drainage and runoff and to minimise the risk of erosion.
- All rehabilitated areas are monitored for erosion.
- Components of the facility are removed from the site and disposed of appropriately.
- Retrenchments should comply with South African Labour legislation of the day.

The section on Rehabilitation (**Appendix D**) is also relevant to the decommissioning of sections of the proposed Project and must be adhered to.