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# POWER LINE BETWEEN THE PERDEKRAAL WEST WIND ENERGY FACILITY AND THE KAPPA SUBSTATION, WESTERN CAPE PROVINCE

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## DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

Submitted as part of the Draft Basic Assessment Report

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## PROJECT DETAILS

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- Title** : Environmental Assessment Process  
EMPr for the 132kV Power Line Between the  
Perdekraal West Wind Energy Facility and the Kappa  
Substation, Western Cape Province
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## DEFINITIONS AND TERMINOLOGY

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**Environmental Authorisation (EA):** means the authorisation issued by a competent authority (Department of 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 management plan or any other appropriate environmental instruments introduced by legislation.

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

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

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

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

**Environmental management programme:** An operational plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its ongoing maintenance after implementation.

**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.

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

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

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

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

**Photovoltaic effect:** Electricity can be generated using photovoltaic panels (semiconductors) which are comprised of individual photovoltaic cells that absorb solar energy to produce electricity. The absorbed solar radiation excites the electrons inside the cells and produces what is referred to as the Photovoltaic Effect.

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

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

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

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

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

**Waste:** Any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or 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 of the NEM WA; or any other substance, material or object that is not included in Schedule 3 of the NEM WA that may be defined as a waste by that is identified as waste by the Minister of Environmental Affairs (by notice in the Gazette). Any waste or portion of waste, referred to in the section above, ceases to be a waste:

- (i) once an application for its re-use, recycling or recovery has been approved or, after such approval, once it is, or has been re-used, recycled or recovered;
- (ii) where approval is not required, once a waste is, or has been re-used, recycled or recovered;

- (iii) where the Minister of Environmental Affairs has, in terms of Section 74 of the NEM WA, exempted any waste or a portion of waste generated by a particular process from the definition of waste; or
- (iv) where the Minister of Environmental Affairs has, in the prescribed manner, excluded any waste stream or a portion of a waste stream from the definition of waste.

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- Appendix B:** Principles for Erosion Management
- Appendix C:** Waste Management Plan
- Appendix D:** Alien Plant Management Plan

## PROJECT DETAILS

## CHAPTER 1

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The original EA (DEA reference: 12/12/20/1783) for the Perdekraal Renewable Energy Facility and associated infrastructure was originally authorised on 04 January 2012 for a total potential output of between 230-300MW. A 132kV power line and substation connecting the wind energy facility to the Eskom Kappa Substation was also authorised under the original application (DEA Reference Number: 12/12/20/1783).

The authorisation was then split into two separate wind energy facilities namely: Perdekraal East Wind Project (DEA Reference Number: 12/12/20/1783/2) and Perdekraal West Wind Project (DEA Reference Number: 12/12/20/1783/1).

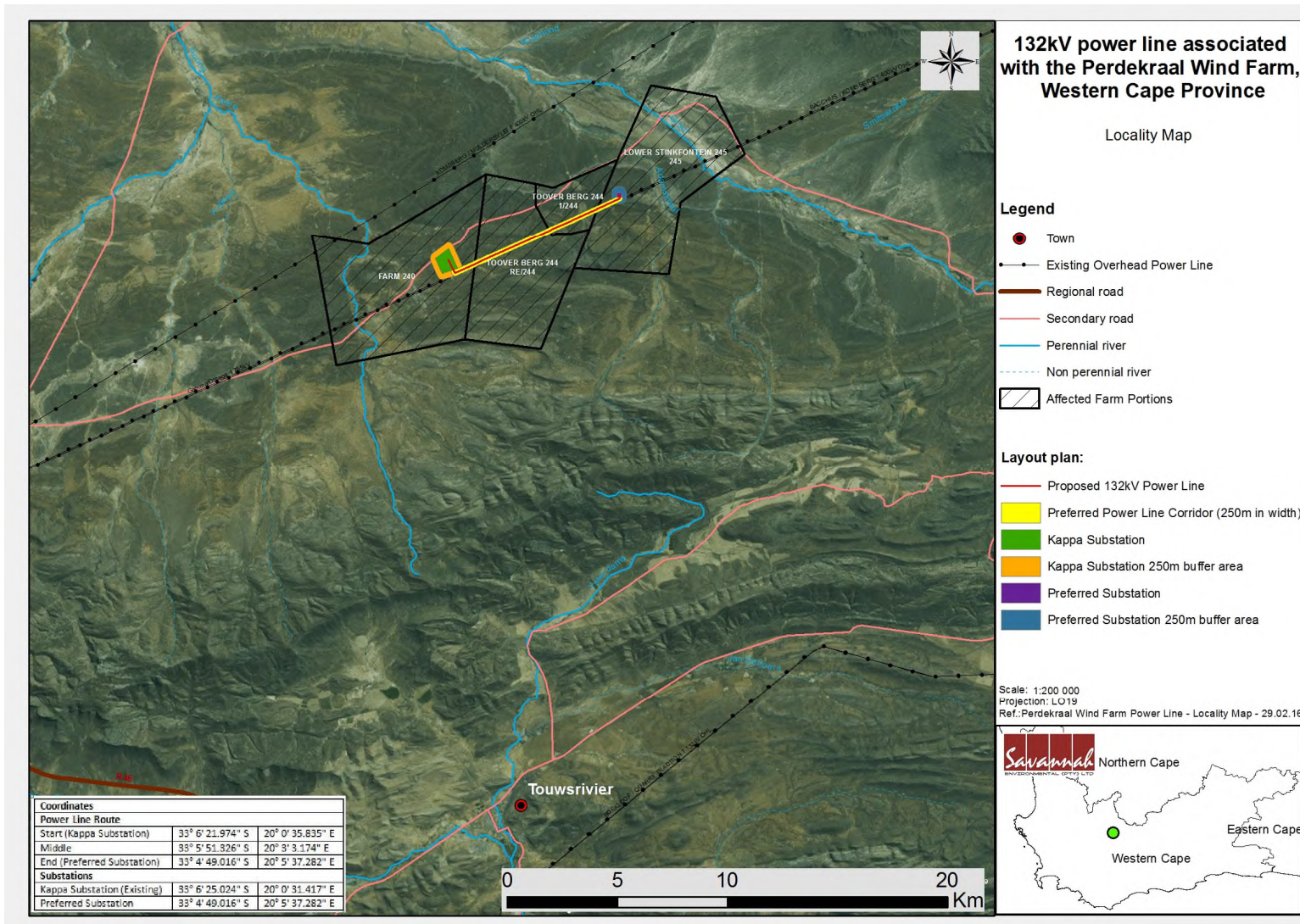
The authorised power line and substation was included in both the Perdekraal West and Perdekraal East Wind Energy Facilities split EAs, however, Perdekraal East Wind Energy Facility has been selected as a Preferred Bidder project under round 4 of the Department of Energy's (DoE) Renewable Energy Independent Power Producers Procurement Programme (REIPPPP) and have begun planning to construct the power line and substation. Due to additional costs associated with a double-circuit power line and the fact that the Perdekraal West Wind Energy Facility is not a Preferred Bidder, Perdekraal East Wind Energy Facility opted for a single-circuit line 132kV power line. The servitude registered for the power line will be 100m wide and will include the provision for three potential power lines.

**Perdekraal West Wind Farm (Pty) Ltd** is the holder of the Perdekraal West Wind Energy Facility EA (DEA Reference Number: 12/12/20/1783/1) and in order to secure a connection to the Eskom Kappa Substation for the Perdekraal West Wind Energy Facility a separate authorisation is now required for the power line with a voltage of 132kV. This is the subject of this application. The proposed power line corridor is located to the west of the Perdekraal West Wind Energy Facility adjacent to the authorised power line route, and will be approximately 8km in length.

Perdekraal West Wind Farm (Pty) Ltd is the holder of the Perdekraal West Wind Energy Facility EA (DEA Reference Number: 12/12/20/1783/1) and in order to secure a connection to the Eskom Kappa Substation for the Perdekraal West Wind Energy Facility a separate environmental authorisation is required for the power line with a voltage of 132kV. This is the subject of this application. The proposed power line corridor is located to the west of the Perdekraal West Wind Energy Facility adjacent to the authorised power line route being constructed for the Perdekraal East Wind Project, and will be approximately 8km in length. Perdekraal East Wind Project was selected as a Preferred Bidder project under

round 4 of the DoE REIPPPP. Perdekraal East Wind Project will construct the entire footprint of the authorised substation (Adamskraal Substation). The Perdekraal West IPP on-site substation will then fall within the existing authorised footprint of the Adamskraal Substation and will occupy one of the IPP feeder bays.

Due to the short length of the power line and the location thereof adjacent to an authorised power line, no alternatives are being considered within this Basic Assessment Report. A corridor of 250m in width is being considered within this Basic Assessment process. For the placement of the power line access roads (of up to 4m in width) will be constructed along the servitude where required. The power line will be owned and operated by Eskom.



**Figure 1.1:** Locality map indicating the preferred power line route to Kappa substation for the proposed Perdekraal Wind Energy Facility grid connection

## 1.1. Potential impacts

Potential impacts that could occur from the proposed power line and (as per the conclusion of the Basic Assessment report) include:

**Impact on ecology:** The overall impact on vegetation and ecological processes and functioning as a result of the construction and operation of the proposed power line is likely to be of Medium to Low significance. The proposed powerline route crosses very homogenous Tankwa Karoo vegetation, which is a Least Threatened vegetation type, and the entire route is of Low botanical sensitivity, with no special habitats (no wetlands or quartz patches). The route crosses a relatively low level ESA (Environmental Support Area), but not a CBA (Critical Biodiversity Area).

**Visual Impact:** Views of sections eastern section of the line may be possible from one homestead to the east of the affected area. This however will be viewed at a distance of approximately 4km through the WEF turbine field and in the context of two HV overhead power lines.

Views of the proposed power line may also be experienced from one homestead at the western end of the affected area. This will be seen at a distance of approximately 2km and is likely to be part screened by the existing Kappa Substation and in the context of two HV overhead power lines.

The only protected area that could be affected is the Vaalkloof Private Nature Reserve which is located approximately 12km from the western end of the proposed 132kV powerline. The distance between the receptor and the development and the fact that other electrical infrastructure is likely to be seen in the foreground screen views towards the proposed power line is likely to mean that there is no impact.

**Impact on Avifauna:** The proposed power line will impact on avifauna as a result of displacement and disturbance during construction, and collisions and electrocution during operation. Impacts are expected to be of high significance.

## 1.2. Activities and Components associated with the Proposed Power Line

### 1.2.1. Construction Phase

The activities associated with the construction of the power line will include site clearance and construction of access roads to facilitate access to the site where required.

Power lines are constructed in the following simplified sequence:

- Step 1: Determination of technically feasible route/s;
- Step 2: EIA input into route selection;
- Step 3: Negotiation of final route with affected landowners;
- Step 4: Survey of the route;
- Step 5: Determination of the conductor type;
- Step 6: Selection of best-suited conductor, towers, insulators, foundations;
- Step 7: Final design of line and placement of towers;
- Step 8: Issuing of tenders, and award of contract to construction companies;
- Step 9: Vegetation clearance and construction of access roads (where required);
- Step 10: Tower pegging;
- Step 11: Construction of foundations;
- Step 12: Assembly and erection of towers;
- Step 13: Stringing of conductors;
- Step 14: Rehabilitation of disturbed area and protection of erosion sensitive areas;
- Step 15: Testing and commissioning.

Construction of the proposed power line will take approximately 12 months to complete.

### **1.2.2. Operation Phase**

The proposed power line will be operational for more than 20 years and will require routine maintenance work throughout this period. The site will be accessed using the access roads established during the construction phase. Operation and maintenance of the power line will be undertaken by Eskom.

### **1.2.3. Decommissioning Phase**

The power line would only be decommissioned once it has reached the end of its economic life or is no longer required. At this stage, the power line would be completely decommissioned and removed from site. The following decommissioning activities are expected to be undertaken:

#### **a) Site Preparation**

Site preparation activities will include confirming the integrity of the access to the site to accommodate the required equipment and the mobilisation of decommissioning equipment.

**b) Disassemble Components**

The components would be disassembled, and reused and recycled (where possible), or disposed of in accordance with regulatory requirements.

**c) Rehabilitation**

Disturbed areas (where infrastructure has been removed) will be rehabilitated, if required, depending on the future land-use of the power line servitude.



## PURPOSE AND OBJECTIVES OF THE EMPr

## CHAPTER 2

An Environmental Management Programme (EMPr) is defined as “an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts associated with the planning, construction, operation and decommissioning of a project are avoided or mitigated, and that the positive benefits of the projects are enhanced.”<sup>1</sup> The objective of this EMPr is to provide consistent information and guidance for implementing the management and monitoring measures established in the permitting process and help achieve environmental policy goals. The purpose of an EMPr is to ensure continuous improvement of environmental performance, reducing negative impacts and enhancing positive effects during the construction and operation. An effective EMPr is concerned with both the immediate outcome as well as the long-term impacts of the project.

The EMPr provides specific environmental guidance for the construction and operation phases of a project, and is intended to manage and mitigate construction and operation activities so that unnecessary or preventable environmental impacts do not result. These impacts range from those incurred during start up (i.e. site clearing and site establishment), during the construction activities themselves (i.e. erosion, noise, dust, and visual impacts), during site rehabilitation (i.e. soil stabilisation, re-vegetation), during operation and during decommissioning (i.e. similar to construction phase activities).

This EMPr has been compiled in accordance with Appendix 4, Section 1 of the EIA Regulations of December 2014 (refer to Table 3.1) and will be further developed in terms of specific requirements listed in any authorisations issued for the proposed project. The EMPr has been developed as a set of environmental specifications (i.e. principles of environmental management), which are appropriately contextualised to provide clear guidance in terms of the on-site implementation of these specifications (i.e. on-site contextualisation is provided through the inclusion of various monitoring and implementation tools).

This EMPr has the following objectives:

- » Outline mitigation measures and environmental specifications which are required to be implemented for the planning, construction and rehabilitation, operation, and decommissioning phases of the project in order to manage and minimise the extent of potential environmental impacts associated with the power line.

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<sup>1</sup> Provincial Government Western Cape, Department of Environmental Affairs and Development Planning: *Guideline for Environmental Management Plans*. 2005

- » Ensure that all the phases of the project do not result in undue or reasonably avoidable adverse environmental impacts, and ensure that any potential environmental benefits are enhanced.
- » Identify entities responsible for the implementation of the measures and outline functions and responsibilities.
- » Propose mechanisms and frequency for monitoring compliance, and preventing long-term or permanent environmental degradation.
- » Facilitate appropriate and proactive responses to unforeseen events or changes in project implementation that was not considered in the EIA process.

The management and mitigation measures identified within the Basic Assessment (BA) process are systematically addressed in this EMPr, and ensure the minimisation of adverse environmental impacts to an acceptable level.

Perdekraal West Wind Farm (Pty) Ltd must ensure that the implementation of the project complies with the requirements of all environmental authorisations, permits, and obligations emanating from relevant environmental legislation. This obligation is partly met through the development and the implementation of this EMPr and through its integration into the contract documentation. Since this EMPr is part of the EIA process, it is important that this document be read in conjunction with the Basic Assessment Report compiled for this project. This will contextualise the EMPr and enable a thorough understanding of its role and purpose in the integrated environmental management process. Should there be a conflict of interpretation between this EMPr and the environmental authorisation, the stipulations in the environmental authorisation shall prevail over that of the EMPr, unless otherwise agreed by the authorities in writing. Similarly, any provisions in legislation overrule any provisions or interpretations within this EMPr.

This EMPr shall be binding on all the parties involved in the construction and operational phases of the project, including Eskom, and shall be enforceable at all levels of contract and operational management within the project.

## STRUCTURE OF THIS EMPR

## CHAPTER 3

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

- » Key legislation applicable to the development;
- » Planning and design activities;
- » Construction activities;
- » Operation activities; and
- » Decommissioning activities.

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

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

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

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

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

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

- » Planned activities change;
- » Modification to or addition to environmental objectives and targets;
- » Relevant legal or other requirements are changed or introduced; or
- » Significant progress has been made on achieving an objective or target such that it should be re-examined to determine if it is still relevant, should be modified, etc.

Any changes made must be approved by DEA prior to implementation thereof.

### 3.1. Project Team

This EMPr was compiled by:

- » *John von Mayer* - an Environmental Consultant and the principle author of this report, holds a BSc Honours in Environmental Studies degree and has 8 years of experience in the environmental field.
- » *Jo-Anne Thomas* - is a registered Professional Natural Scientist and holds a Master of Science degree. She has 17 years' experience consulting in the environmental field. Her key focus is on strategic environmental assessment and advice; management and co-ordination of environmental projects, which includes integration of environmental studies and environmental processes into larger engineering-based projects and ensuring compliance to legislation and guidelines; compliance reporting; the identification of environmental management solutions and mitigation/risk minimising measures; and strategy and guideline development. She is currently involved in undertaking siting processes as well as EIAs for several renewable energy projects across the country.

The Savannah Environmental team has extensive knowledge and experience in EIAs and environmental management, having been involved in EIA processes over the past fourteen years. They have managed and drafted EMPs for other

electricity transmission and distribution projects throughout South Africa, including major Eskom transmission lines.

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## **KEY LEGISLATION APPLICABLE TO THE DEVELOPMENT      CHAPTER 4**

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The following legislation and guidelines have informed the scope and content of this EMPr Report:

- » National Environmental Management Act (Act No 107 of 1998).
- » EIA Regulations, published under Chapter 5 of the NEMA (GNR R982-985 of EIA Regulations of December 2014).
- » Guidelines published in terms of the NEMA EIA Regulations, in particular:
  - \* Public Participation in the EIA Process (DEA).
  - \* Integrated Environmental Management Information Series (published by DEA).

Several other Acts, standards, or guidelines have also informed the project process and the scope of issues addressed and assessed in the BA Report. A review of legislative requirements applicable to the proposed project is provided in Table 4.1.

**Table 4.1:** Relevant legislative and permitting requirements applicable to the proposed power line

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
<b>National Legislation</b>			
<p>National Environmental Management Act (Act No 107 of 1998)</p>	<p>NEMA requires, inter alia, that:</p> <ul style="list-style-type: none"> <li>» Development must be socially, environmentally, and economically sustainable.”</li> <li>» Disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied.”</li> <li>» A risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions.”</li> </ul> <p>EIA Regulations have been promulgated in terms of Chapter 5. Activities which may not commence without an environmental authorisation are identified within these Regulations.</p> <p>In terms of S24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation.</p>	<p>National Department of Environmental Affairs – lead authority.</p> <p>Western Cape (DEA&amp;DP)</p>	<p>The Basic Assessment report is to be submitted to the DEA in support of the application for authorisation for the Perdekraal power line.</p> <p>The DEA&amp;DP will act as a commenting authority.</p>

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	<p>» In terms of GNR 543 of 18 June 2010, a Basic Assessment Process is required to be undertaken for the proposed project.</p>		
<p>National Environmental Management Act (Act No 107 of 1998)</p>	<p>In terms of the Duty of Care provision in S28(1) the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to ensure that any pollution or degradation of the environment associated with this project is avoided, stopped or minimised.</p> <p>In terms of NEMA, it has become the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts.</p>	<p>Department of Environmental Affairs (as regulator of NEMA).</p>	<p>While no permitting or licensing requirements arise directly, the holistic consideration of the potential impacts of the proposed project has found application in the BA process.</p> <p>The implementation of mitigation measures are included as part of the Draft EMP and will continue to apply throughout the life cycle of the project.</p>
<p>National Environmental Management: Waste Act (Act No 59 of 2008)</p>	<p>The purpose of this Act is to reform the law regulating waste management in order to protect health and the environment by providing for the licensing and control of waste management activities.</p> <p>The Act provides listed activities requiring a waste license.</p>	<p>Hazardous Waste – National DEA                      General Waste – WC DEA&amp;DP</p>	<p>As no waste disposal site is to be associated with the proposed project, no permit is required in this regard.</p> <p>Waste handling, storage and disposal during construction and operation is required to be undertaken in accordance with the requirements of this Act and associated Standards, as detailed in the project EMP.</p> <p>The volumes of waste to be generated and stored on the site during construction and operation of the</p>



Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
<p>Environment Conservation Act (Act No 73 of 1989)</p>	<p>In terms of section 25 of the ECA, the national noise-control regulations (GN R154 in Government Gazette No. 13717 dated 10 January 1992) were promulgated. The NCRs were revised under Government Notice No R55 of 14 January 1994 to make it obligatory for all authorities to apply the regulations.</p> <p>Subsequently, in terms of Schedule 5 of the Constitution of South Africa of 1996, legislative responsibility for administering the noise control regulations was devolved to provincial and local authorities. Provincial Noise Control Regulations exist in the Western Cape Province.</p> <p>Allows the Minister of Environmental Affairs to make regulations regarding noise, among other concerns.</p>	<p>National Department of Environmental Affairs                      Western Cape (DEADP)                      Local Municipality</p>	<p>facility will not require a waste license (provided these remain below the prescribed thresholds).</p> <p>There is no requirement for a noise permit in terms of the legislation.</p> <p>Any noisy activities carried out during the construction phase that could present an intrusion impact to the local community should be limited to 6:00am to 6:00pm Monday – Saturday (excluding public holidays). Should these specific activities need to be undertaken outside of these times, the surrounding communities will need to be notified.</p>
<p>National Water Act (Act No 36 of 1998)</p>	<p>Water uses must be licensed unless such water use falls into one of the categories listed in S22 of the Act or falls under general authorisation in terms of S39 and GN 1191 of GG 20526 October 1999.</p> <p>In terms of Section 19, the project proponent</p>	<p>Department of Water Affairs</p>	<p>A water use permit or license is required to be applied for or obtained, if infrastructure such as access roads or cabling cross watercourses, or for infrastructure within 500m of a wetland or watercourse (Section 21 c and i).</p>

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	<p>must ensure that reasonable measures are taken throughout the life cycle of this project to prevent and remedy the effects of pollution to water resources from occurring, continuing or recurring.</p>		
<p>Minerals and Petroleum Resources Development Act (Act No 28 of 2002)</p>	<p>A mining permit or mining right may be required where a mineral in question is to be mined (i.e. materials from a borrow pit) in accordance with the provisions of the Act.</p> <p>Requirements for Environmental Management Programmes and Environmental Management Plans are set out in S39 of the Act.</p> <p>S53 Department of Mineral Resources: Approval from the Department of Mineral Resources (DMR) may be required to use land surface contrary to the objects of the Act in terms of section 53 of the Mineral and Petroleum Resources Development Act, (Act No 28 of 2002): In terms of the Act approval from the Minister of Mineral Resources is required to ensure that proposed activities do not sterilise a mineral resources that might occur on site.</p>	<p>Department of Mineral Resources</p>	<p>If borrow pits are required for the construction of the power line, a mining permit or right is required to be obtained.</p> <p>A S53 application is required to be submitted to DMR Western Cape.</p>
<p>National Environmental Management: Air Quality Act (Act No 39 of 2004)</p>	<p>S18, S19 and S20 of the Act allow certain areas to be declared and managed as "priority areas"</p>	<p>National Department of Environmental Affairs – air quality</p>	<p>While no permitting or licensing requirements arise from this legislation, this Act will find</p>

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	<p>Declaration of controlled emitters (Part 3 of Act) and controlled fuels (Part 4 of Act) with relevant emission standards.</p> <p>Dust Control Regulations promulgated in November 2013 requires the implementation of a dust monitoring plan should this be deemed necessary by the air emissions officer.</p> <p>The Act provides that an air quality officer may require any person to submit an atmospheric impact report if there is reasonable suspicion that the person has failed to comply with the Act.</p>	<p>Local Municipality - Noise</p>	<p>application during the construction phase of the project, specifically with regards to dust management and control (as required by the Dust Control Regulations).</p>
<p>National Heritage Resources Act (Act No 25 of 1999)</p>	<p>S38 states that Heritage Impact Assessments (HIAs) are required for certain kinds of development including</p> <ul style="list-style-type: none"> <li>» The construction of a road, power line, pipeline, canal or other similar linear development or barrier exceeding 300 m in length;</li> <li>» Any development or other activity which will change the character of a site exceeding 5 000 m<sup>2</sup> in extent</li> </ul> <p>The relevant Heritage Authority must be notified of developments such as linear</p>	<p>South African Heritage Resources Agency (SAHRA) – National heritage sites (grade 1 sites) as well as all historic graves and human remains.</p> <p>Heritage Western Cape – Issue of permits for removal or destruction of heritage resources in the Western Cape.</p>	<p>Comment from Heritage Western Cape confirms that no heritage study is required for the power line. The project is not expected to have any impact on heritage resources.</p>

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	<p>developments (i.e. roads and power lines), bridges exceeding 50 m, or any development or other activity which will change the character of a site exceeding 5 000 m<sup>2</sup>; or the re-zoning of a site exceeding 10 000 m<sup>2</sup> in extent. This notification must be provided in the early stages of initiating that development, and details regarding the location, nature and extent of the proposed development must be provided.</p> <p>Standalone HIAs are not required where an EIA is carried out as long as the EIA contains an adequate HIA component that fulfils the provisions of S38. In such cases only those components not addressed by the EIA should be covered by the heritage component.</p>		
<p>National Environmental Management: Biodiversity Act (Act No 10 of 2004)</p>	<p>Provides for the MEC/Minister to identify any process or activity in such a listed ecosystem as a threatening process (S53).</p> <p>A list of threatened and protected species has been published in terms of S 56(1) - Government Gazette 29657.</p> <p>Three government notices have been published, i.e. GN R 150 (Commencement of Threatened and Protected Species</p>	<p>National Department of Environmental Affairs</p>	<p>Specialist flora studies have been undertaken as part of the BA process.</p> <p>A permit may be required should any listed plant or animal species on site be disturbed or destroyed as a result of the proposed development.</p>

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	<p>Regulations, 2007), GN R 151 (Lists of critically endangered, vulnerable and protected species) and GN R 152 (Threatened or Protected Species Regulations).</p> <p>Provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), and vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (National Environmental Management: Biodiversity Act: National list of ecosystems that are threatened and in need of protection, (G 34809, GN 1002), 9 December 2011).</p> <p>This Act also regulates alien and invader species.</p> <p>Under this Act, a permit would be required for any activity which is of a nature that may negatively impact on the survival of a listed</p>		

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	protected species.		
Conservation of Agricultural Resources Act (Act No 43 of 1983)	<p>Prohibition of the spreading of weeds (S5).</p> <p>Classification of categories of weeds &amp; invader plants (Regulation 15 of GN R1048) &amp; restrictions in terms of where these species may occur.</p> <p>Requirement &amp; methods to implement control measures for alien and invasive plant species (Regulation 15E of GN R1048).</p>	Department of Agriculture	<p>While no permitting or licensing requirements arise from this legislation, this Act will find application during the BA and will continue to apply throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies must be developed and implemented. In addition, a weed control and management plan must be implemented.</p> <p>The permission of agricultural authorities will be required if the Project requires the draining of vleis, marshes or water sponges on land outside urban areas.</p>
National Veld and Forest Fire Act (Act 101 of 1998)	<p>Provides requirements for veldfire prevention through firebreaks and required measures for fire-fighting. Chapter 4 places a duty on landowners to prepare and maintain firebreaks, and Chapter 5 places a duty on all landowners to acquire equipment and have available personnel to fight fires.</p> <p>In terms of S21 the applicant would be obliged to burn firebreaks to ensure that should a veldfire occur on the property, that it</p>	National Department of Forestry	<p>While no permitting or licensing requirements arise from this legislation, this act will find application during the operational phase of the project in terms of fire prevention and management.</p>

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	<p>does not spread to adjoining land.</p> <p>In terms of S12 the firebreak would need to be wide and long enough to have a reasonable chance of preventing the fire from spreading, not causing erosion, and is reasonably free of inflammable material.</p> <p>In terms of sS17ection 17, the applicant must have such equipment, protective clothing, and trained personnel for extinguishing fires.</p>		
<p>National Forests Act (Act No 84 of 1998)</p>	<p>In terms of S5 (1) no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a license granted by the Minister to an (applicant and subject to such period and conditions as may be stipulated”.</p> <p>GN 1042 provides a list of protected tree species.</p>	<p>National Department of Forestry</p>	<p>This Act will find application during the BA. In this regard, a permit would need to be obtained for any protected trees that are affected by the proposed project.</p>
<p>Aviation Act (Act No 74 of 1962) 13<sup>th</sup> amendment of the Civil Aviation Regulations (CARS) 1997</p>	<p>Any structure exceeding 45m above ground level or structures where the top of the structure exceeds 150m above the mean ground level, the mean ground level considered to be the lowest point in a 3km</p>	<p>Civil Aviation Authority (CAA)</p>	<p>The report will be sent to CAA for approval and comment on the height of the power line.</p>

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	<p>radius around such structure.</p> <p>Structures lower than 45m, which are considered as a danger to aviation shall be marked as such when specified.</p> <p>Overhead wires, cables etc., crossing a river, valley or major roads shall be marked and in addition their supporting towers marked and lighted if an aeronautical study indicates it could constitute a hazard to aircraft.</p> <p>Section 14 of Obstacle limitations and marking outside aerodrome or heliport – CAR Part 139.01.33 relates specifically to appropriate marking of wind energy facilities.</p>		
<p>Hazardous Substances Act (Act No 15 of 1973)</p>	<p>This Act regulates the control of substances that may cause injury, or ill health, or death by reason of their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products.</p> <p>Group I and II: Any substance or mixture of a</p>	<p>Department of Health</p>	<p>It is necessary to identify and list all the Group I, II, III and IV hazardous substances that may be on the site and in what operational context they are used, stored or handled. If applicable, a license is required to be obtained from the Department of Health.</p>



Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	<p>substance that might by reason of its toxic, corrosive etc., nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared to be Group I or Group II hazardous substance;</p> <ul style="list-style-type: none"> <li>» Group IV: any electronic product;</li> <li>» Group V: any radioactive material.</li> </ul> <p>The use, conveyance or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.</p>		
<b>Provincial Policies / Legislation</b>			
Western Cape Noise Control Regulations: PN 627 of 1998	The control of noise in the Western Cape Province is legislated in the form of Noise Control Regulations promulgated in terms of section 25 of the Environment Conservation Act No. 73 of 1989.	Western Cape DEA&DP	In terms of Regulation 4 of the Noise Control Regulations: "No person shall make, produce or cause a disturbing noise (greater than 50 dBA), or allow it to be made, produced or caused by any person, animal, machine, device or apparatus or any combination thereof".
Western Cape Nature and Environmental Ordinance 19 of 1974, (as amended by the Western Cape Nature Conservation Laws Amendment Act, Act 2 of	The Nature and Environmental Ordinance 19 of 1974, (as amended by the Western Cape Nature Conservation Laws Amendment Act, Act 2 of 2000) defines the protection status of plants as follows: <ul style="list-style-type: none"> <li>» <b>"endangered flora"</b> means flora of</li> </ul>	Cape Nature	Removal or relocation of protected plant or animal species requires a permit to be obtained from the Cape Nature.

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
2000	<p>any species which is in danger of extinction and is specified in Schedule 3 or Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, Washington, 1973; provided that it shall not include flora of any species specified in such Appendix and Schedule 4; (thus all Schedule 3 species).</p> <p>» <b>“protected flora”</b> means any species of flora specified in Schedule 4 or Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, Washington, 1973; provided that it shall not include any species of flora specified in such Appendix and Schedule 3.</p> <p>» <b>“indigenous unprotected flora”</b> means any species of indigenous flora not specified in Schedule 3 or 4;</p>		

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## MANAGEMENT PROGRAMME: PRE-CONSTRUCTION

## CHAPTER 5

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

- » Ensures that the design of the power line and watercourse crossings responds to the identified environmental constraints and opportunities.
- » Ensures that pre-construction activities are undertaken in accordance with all relevant legislative requirements
- » Ensures that adequate regard has been taken of any landowner and community concerns and that these are appropriately addressed through design and planning (where appropriate).
- » Ensures that the best environmental options are selected for the linear components, including the access roads.
- » Enables the construction activities to be undertaken without significant disruption to other land uses and activities in the area.

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

### 5.1. Objectives

***OBJECTIVE 1: Ensure the power line design responds to identified environmental constraints and opportunities***

In order to minimise impacts associated with the construction and operation of the power line, the following is required to be undertaken during the final design phase:

- » Geotechnical survey – this will investigate flood potential, foundation conditions, potential for excavations, and the availability of natural construction materials. This study will serve to inform the type of foundations required to be constructed for the power line, and the extent of earthworks and compaction required in the establishment of the internal access roads.
- » A storm-water management plan – this will detail how storm-water runoff (i.e. over engineered hard surfaces) can be managed to reduce velocities and volumes of water that could lead to erosion and potential sedimentation of drainage systems.

The implementation of the EMPr within this area will minimise and/or mitigate impacts on the environment, specifically on the ecology of the project area.

<b>Project Component/s</b>	» Power line
<b>Potential Impact</b>	» Design fails to respond optimally to the environmental consideration
<b>Activities/Risk Sources</b>	» Positioning of all the facilities components » Construction of the power line » Access road upgrade
<b>Mitigation: Target/Objective</b>	» The design of the power line and watercourse crossings responds to the identified environmental constraints and opportunities. » Site sensitivities are taken into consideration and avoided as far as possible, thereby mitigating potential impacts.

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Plan and conduct pre-construction activities in an environmentally acceptable manner.	Proponent	Pre-construction
Undertake negotiations with affected landowners and agree on landowner-specific conditions for construction and maintenance	Proponent	Project planning
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 minimise the loss of riparian vegetation (small footprint).	Proponent	Design
Undertake a geotechnical pre-construction survey.	Geotechnical specialist	Design
Ecological survey for 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.	Proponent	Design
Obtain any additional environmental permits required (e.g. permit to impact on protected plant species, water use license to cross drainage lines).	Proponent	Project planning
Consider and incorporate design level mitigation measures recommended by the specialists as detailed within the Basic Assessment Report and relevant appendices.	Proponent	Design review
External access point and internal access road to be carefully planned to maximise road user safety.	Proponent	Design
Compile a comprehensive storm water management	Proponent	Design

Mitigation: Action/Control	Responsibility	Timeframe
plan for hard surfaces as part of the final design of the project.		
Include stormwater management systems along the roads that would reduce flow velocities. If erosion is taking place, stormwater and any runoff generated by the hard surfaces should be discharged into retention swales or areas with rock rip-rap. These energy dissipation structures should be placed in manner that flows are managed prior to being discharged back into the natural systems, thus not only preventing erosion, but would support the maintenance of natural base flows within these systems, i.e. hydrological regime (water quantity and quality) is maintained.	Proponent	Design
Bird Diverters are required for the power line.	Proponent	Planning
Bird-friendly power line tower design to be utilised.	Proponent	Design

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» The design meets the objectives and does not degrade the environment.</li> <li>» Design and layouts respond to the mitigation measures and recommendations in the Basic Assessment Report.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Review of the design by the Project Manager and the Environmental Control Officer (ECO) prior to the commencement of construction.</li> </ul>

***OBJECTIVE 2: Minimise storm water runoff (guideline for stormwater management plan)***

Management of storm water will be required during the construction and operational phases of the power line. A detailed storm water management plan is required to be compiled as part of the final design to ensure compliance with applicable regulations and to prevent off-site migration of contaminated storm water or increased soil erosion. The section below provides a guideline for the management of storm water on site and will need to be supplemented with the relevant method statements during the construction and operation phases of the power line.

<b>Project Component/s</b>	<ul style="list-style-type: none"> <li>» Storm water management components.</li> <li>» Any hard engineered surfaces (i.e. access roads).</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Poor storm water management and alteration of the</li> </ul>

	hydrological regime (i.e. drainage lines).
<b>Activities/Risk Sources</b>	» Construction of the power line and access roads (i.e. placement of hard engineered surfaces).
<b>Mitigation: Target/Objective</b>	» Appropriate management of storm water to minimise impacts on the environment.

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
A Method Statement for the management of storm water which also considers the recommendations below is to be submitted to the ECO prior to the commencement of construction. This Method Statement must be approved by the Site Manager/ Site Engineer prior to implementation.	Proponent	Pre-construction
Reduce the potential increase in surface flow velocities and the resultant impact on the localised drainage system through increased sedimentation.	Proponent	Planning and design
Design measures for storm water management needed to allow for surface and subsurface movement of water along drainage lines so as not to impede natural surface and subsurface flows.	Proponent	Planning and design

<b>Performance Indicator</b>	» Appropriate storm water management measures included within the power line and watercourse crossings design. » Sound water quality and quantity management during construction and operation.
<b>Monitoring</b>	» Devise a suitable surface water quality monitoring plan for implementation during construction and operation.

***OBJECTIVE 3: The mitigation and possible negation of visual impacts associated with the planning of the proposed power line***

<b>Project component/s</b>	The power line and associated infrastructure.
<b>Potential Impact</b>	Primary visual impact of the infrastructure due to the presence of the power line and the associated infrastructure in the landscape.
<b>Activity/risk source</b>	The viewing of the above mentioned by observers near the infrastructure as well as within the region.
<b>Mitigation: Target/Objective</b>	Optimal planning of infrastructure so as to minimise visual impact.

Mitigation: Action/control	Responsibility	Timeframe
Implement an environmentally responsive planning approach to roads and infrastructure to limit cut and fill requirements. Plan with due cognisance of the topography.	Proponent	Pre-construction (construction procedure) Pre-operation (operation procedure)
Consolidate infrastructure and make use of already disturbed sites rather than pristine areas.	Proponent	Pre-construction

<b>Performance Indicator</b>	No access roads and other associated infrastructure are visible from surrounding areas.
<b>Monitoring</b>	Not applicable.

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

On-going communication with affected and surrounding landowners is important to maintain during the construction and operational phases of the project. Any issues and concerns raised should be addressed as far as possible in as short a timeframe as possible.

<b>Project component/s</b>	» Power line
<b>Potential Impact</b>	» Impacts on affected and surrounding landowners and land uses
<b>Activity/risk source</b>	» Activities associated with construction of the power line » Activities associated with power line operation
<b>Mitigation: Target/Objective</b>	» Effective communication with affected and surrounding landowners » Addressing of any issues and concerns raised as far as possible in as short a timeframe as possible

Mitigation: Action/control	Responsibility	Timeframe
Implement a grievance mechanism procedure for the public (as outlined in <b>Appendix A</b> ) to be implemented during both the construction and operational phases of the power line. This procedure should include details of the contact person who will be receiving issues raised by interested and affected parties, and the process that will be followed to address issues.	Proponent	Pre-construction (construction procedure) Pre-operation (operation procedure)
Liaison with landowners is to be undertaken	Proponent	Pre-construction

Mitigation: Action/control	Responsibility	Timeframe
prior to the commencement of construction in order to provide sufficient time for them to plan agricultural activities.		

<b>Performance Indicator</b>	» Effective communication procedures in place.
<b>Monitoring</b>	» An incident reporting system should be used to record non-conformances to the EMPr.



## MANAGEMENT PROGRAMME: CONSTRUCTION

## CHAPTER 6

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

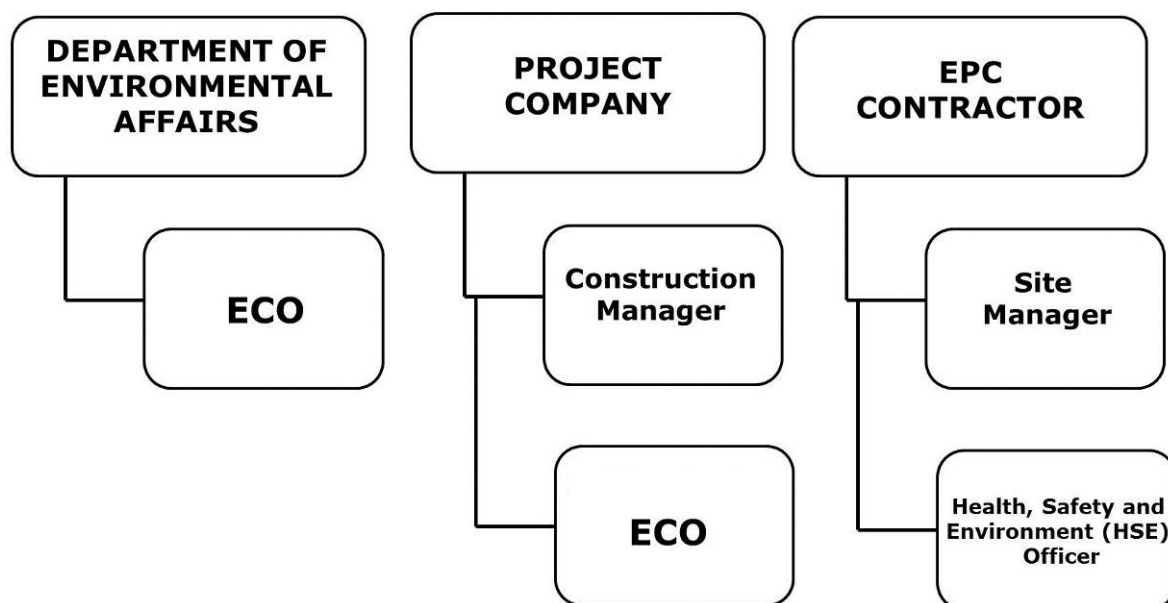
- » Ensures that construction activities are appropriately managed in respect of environmental aspects and impacts.
- » Enables construction activities to be undertaken without significant disruption to other land uses and activities in the area, in particular concerning noise impacts, farming practices,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

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

As the proponent, Perdekraal West Wind Farm must ensure that the project complies with the requirements of all environmental authorisations and permits, and obligations emanating from other relevant environmental legislation. This obligation is partly met through the development of the EMP, and the implementation of the EMP through its integration into the contract documentation. Perdekraal West Wind Farm will retain various key roles and responsibilities during the construction phase.

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

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



**Figure 6.1:** Organisational structure for the implementation of the EMPr

**Construction Manager** will:

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

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

- » Be fully knowledgeable with the contents of the EIA and risk management.
- » Be fully knowledgeable with the contents and conditions of the Environmental Authorisation.
- » Be fully knowledgeable with the contents of the EMPr.
- » Be fully knowledgeable with the contents of all relevant environmental legislation, and ensure compliance with these.
- » Have overall responsibility of the EMPr and its implementation.
- » Conduct audits to ensure compliance to the EMPr.

- » Ensure there is communication with the Technical Director, the ECO, the Internal Environmental Officer and relevant discipline engineers on matters concerning the environment.
- » Be fully knowledgeable with the contents of all relevant licences and permits.
- » Ensure that no actions are taken which will harm or may indirectly cause harm to the environment, and take steps to prevent pollution on the site.
- » Confine activities to the demarcated construction site.

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

- » Be fully knowledgeable with the contents with the EIA.
- » Be fully knowledgeable with the contents with the conditions of the Environmental Authorisation.
- » Be fully knowledgeable with the contents with the EMPr.
- » Be fully knowledgeable of all the licences and permits issued to the site.
- » Be fully knowledgeable with the contents with all relevant environmental legislation, and ensure compliance with them.
- » Ensure that the contents of this document are communicated to the Contractor site staff and that the Site Manager and Contractor are constantly made aware of the contents through discussion.
- » Ensure that the compliance of the EMPr, EA and the legislation is monitored through regular and comprehensive inspection of the site and surrounding areas.
- » Monitoring and verification must be implemented to ensure that environmental impacts are kept to a minimum, as far as possible.
- » Ensure that the Site Manager has input into the review and acceptance of construction methods and method statements.
- » Keep record of all activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken by the ECO.
- » Ensure that the compilation of progress reports for submission to the Technical Director, with input from the Site Manager, takes place on a regular basis, including a final post-construction audit.
- » Ensure that there is communication with the Site Manager regarding the monitoring of the site.
- » Submit independent reports to the DEA and other regulating authorities regarding compliance with the requirements of the EMPr, EA and other environmental permits.

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

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

- » Must be fully knowledgeable on all environmental features of the construction site and the surrounding environment.
- » Be fully knowledgeable with the contents with the conditions of the Environmental Authorisation.
- » Be fully knowledgeable with the contents with the EMPr.
- » Be fully knowledgeable of all the licences and permits issued to the site.
- » Ensure a copy of the Environmental Authorisation and EMPr must be easily accessible to all on-site staff members.
- » Ensure contractor employees are familiar with the requirements of this EMPr and the environmental specifications as they apply to the construction of the proposed facility.
- » Ensure that prior to commencing any site works, all contractor employees and sub-contractors must have attended an environmental awareness included in the induction training which must provide staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
- » Ensure that any complaints received from the public are duly recorded and forwarded to the Site Manager and Contractor
- » Manage the day-to-day on-site implementation of this EMPr, and for the compilation of regular (usually weekly) Monitoring Reports.

- » Keep record of all activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken, including those of the Independent ECO.
- » Staff will be informed of environmental issues as deemed necessary by the Independent ECO.

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

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

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

The Contractor's Safety, Health and Environment Representative should:

- » Be well versed in environmental matters.
- » Understand the relevant environmental legislation and processes.
- » Understand the hierarchy of Environmental Compliance Reporting, and the implications of Non-Compliance.
- » Know the background of the project and understand the implementation programme.

- » Be able to resolve conflicts and make recommendations on site in terms of the requirements of this Specification.
- » Keep accurate and detailed records of all EMPr-related activities on site.

## 6.2 Objectives

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

### **OBJECTIVE 1: Minimise impacts related to inappropriate site establishment**

The Contractor must take all reasonable measures to ensure the safety of the public in the surrounding area.

<b>Project Component/s</b>	<ul style="list-style-type: none"> <li>» Power line infrastructure.</li> <li>» Access roads.</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Hazards to landowners and public.</li> <li>» Damage to indigenous natural vegetation, due largely to ignorance of where such areas are located.</li> <li>» Loss of threatened plant species.</li> </ul>
<b>Activities/Risk Sources</b>	<ul style="list-style-type: none"> <li>» Excavations.</li> <li>» Movement of construction vehicles in the area and on-site.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To secure the site against unauthorised entry.</li> <li>» To protect members of the public/landowners/residents.</li> <li>» No loss of or damage to sensitive vegetation in areas outside the immediate development footprint.</li> </ul>

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Secure site, working areas and excavations in an appropriate manner.	Contractor	Site establishment, and duration of construction
Where necessary control access, fence, and secure area.	Contractor	Site establishment, and duration of construction
Adequate protective measures must be implemented to prevent unauthorised access to the working area and the internal access routes.	Contractor	Site establishment, and duration of construction

Mitigation: Action/Control	Responsibility	Timeframe
Fence and secure contractor's equipment camp.	Contractor	Site establishment
The construction camp used to house equipment must be located in a disturbed area and must be screened off as far as practical during the entire construction phase.	Contractor	Erection: during site establishment Maintenance: for duration of Contract
Establish appropriately bunded areas for storage of hazardous materials (i.e. fuel to be required during construction).	Contractor	Site establishment
Establish the necessary ablution facilities with chemical toilets and provide adequate sanitation facilities and ablutions for construction workers (1 toilet per every 15 workers) at appropriate locations on site.	Contractor	Site establishment, and duration of construction
Ablution or sanitation facilities should not be located within 100 m from a 1:100 year flood line including drainage lines.	Contractor	Site establishment, and duration of construction
Supply adequate waste collection bins at site where construction is being undertaken. Separate bins should be provided for general and hazardous waste. As far as possible, provision should be made for separation of waste for recycling.	Contractor	Site establishment, and duration of construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Site is secure and there is no unauthorised entry.</li> <li>» No members of the public/ landowners injured.</li> <li>» Appropriate and adequate waste management and sanitation facilities provided at construction site.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» An incident reporting system will be used to record non-conformances to the EMPr.</li> <li>» ECO to monitor all construction areas on a continuous basis until all construction is completed. Non-conformances will be immediately reported to the site manager.</li> </ul>

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

It is expected that low skilled and semi-skilled positions will be filled by locals living in and around the area. This will however be dependent on the skills

availability in the area. Workers not living in the area, including those required for skilled positions will be transported to site on a daily basis and will not be housed on site. However, the security team will be required on site at all times.

<b>Project Component/s</b>	<ul style="list-style-type: none"> <li>» Power line</li> <li>» Access roads</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Damage to indigenous natural vegetation and sensitive areas.</li> <li>» Damage to and/or loss of topsoil (i.e. pollution, compaction etc.).</li> <li>» Impacts on the surrounding environment due to inadequate sanitation and waste removal facilities.</li> <li>» Pollution/contamination of the environment.</li> </ul>
<b>Activities/Risk Sources</b>	<ul style="list-style-type: none"> <li>» Vegetation clearing and levelling of equipment storage area/s.</li> <li>» Access to and from the equipment storage area/s.</li> <li>» Ablution facilities.</li> <li>» Contractors not aware of the requirements of the EMPr, leading to unnecessary impacts on the surrounding environment.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» Limit equipment storage within demarcated designated areas.</li> <li>» Ensure adequate sanitation facilities and waste management practices.</li> <li>» Ensure appropriate management of actions by on-site personnel in order to minimise impacts to the surrounding environment.</li> </ul>

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
No vehicles to refuel within drainage lines/ riparian vegetation	Contractor	Construction
The location of this construction camp and lay down areas shall be approved by the project ECO.	Contractor	Pre-construction
As far as possible, minimise vegetation clearing and levelling for equipment storage areas.	Contractor	Site establishment, and during construction
Rehabilitate all disturbed areas at the construction equipment camp as soon as construction is complete within an area.	Contractor	Duration of Contract
Ensure waste storage facilities are maintained and emptied on a regular basis.	Contractor	Site establishment, and duration of construction
The terms of this EMPr and the Environmental Authorisation (once issued) must be included in all tender documentation and Contractors contracts.	Proponent	Tender process



Mitigation: Action/Control	Responsibility	Timeframe
Ensure that all personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm. This can be achieved through the provision of appropriate environmental awareness training to all personnel. Records of all training undertaken must be kept.	Contractor	Duration of construction
Contractors must use chemical toilets/ablution facilities situated at designated areas of the site; no ablution activities will be permitted outside the designated areas. These facilities must be regularly serviced by appropriate contractors. A minimum of one toilet shall be provided per 15 persons at each working area such as the Contractor's camp.	Contractor and sub-contractor/s	Duration of contract
Cooking and eating of meals must take place in a designated area. No fires are allowed on site. No firewood or kindling may be gathered from the site or surrounds.	Contractor and sub-contractor/s	Duration of contract
All litter must be deposited in a clearly marked, closed, animal-proof disposal bin in the construction area. Particular attention needs to be paid to food waste.	Contractor and sub-contractor/s	Duration of contract
No one other than the ECO or personnel authorised by the ECO may disturb flora or fauna outside of the demarcated construction area/s.	Contractor and sub-contractor/s	Duration of contract
Fire-fighting equipment and training must be provided before the construction phase commences.	Contractor and sub-contractor/s	Duration of contract
Draft and implement a code of conduct for construction workers.	Contractor and sub-contractor/s	Pre-construction
Contractors must ensure that all workers are informed at the outset of the construction phase of the conditions contained in the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.	Contractor and sub-contractor/s	Construction

<p><b>Performance Indicator</b></p>	<ul style="list-style-type: none"> <li>» The construction camps have avoided sensitive areas, as approved by the ECO.</li> <li>» Ablution and waste removal facilities are in a good working order and do not pollute the environment due to mismanagement.</li> <li>» All areas are rehabilitated promptly after construction in an area is complete.</li> </ul>
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	<ul style="list-style-type: none"> <li>» Excess vegetation clearing and levelling is not undertaken.</li> <li>» No complaints regarding contractor behaviour or habits.</li> <li>» Appropriate training of all staff is undertaken prior to them commencing work on the construction site.</li> <li>» Code of Conduct drafted before commencement of construction phase.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Regular audits of the construction camps and areas of construction on site by the ECO.</li> <li>» Proof of disposal of sewage at an appropriate licensed wastewater treatment works.</li> <li>» Proof of disposal of waste at an appropriate licensed waste disposal facility.</li> <li>» An incident reporting system should be used to record non-conformances to the EMPr.</li> <li>» Observation and supervision of Contractor practices throughout construction phase by the ECO.</li> <li>» Complaints will be investigated and, if appropriate, acted upon.</li> <li>» An incident reporting system will be used to record non-conformances to the EMPr.</li> </ul>

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

The unemployment rate in the study area is quite high and there are therefore various individuals in the area in search of employment. Employment of locals and the involvement of local SMMEs would enhance the social benefits associated with the project, even if the opportunities are only temporary. The procurement of local goods could furthermore result in positive economic spin-offs.

<b>Project Component/s</b>	<ul style="list-style-type: none"> <li>» Construction and establishment activities associated with the establishment of the power line including infrastructure.</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» The opportunities and benefits associated with the creation of local employment and business should be maximised.</li> </ul>
<b>Activities/Risk Sources</b>	<ul style="list-style-type: none"> <li>» The employment of outside contractors to undertake the work and who make use of their own labour will reduce the employment and business opportunities for locals. Employment of local labour will maximise local employment opportunities.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» Wherever possible, aim to employ low-skilled workers from the local area. This should also be made a requirement for all contractors. Also develop a database of local BEE service</li> </ul>

	providers
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Mitigation: Action/Control	Responsibility	Timeframe
Attempt to employ a majority of the low-skilled workers from the local area.	Proponent	Employment and business policy document that sets out local employment targets to be in place before construction phase commences.
Develop a database of local BEE service providers and ensure that they are informed of tenders and job opportunities.	Proponent	Pre-construction
Identify potential opportunities for local businesses.	Proponent	Pre-construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Employment and business policy document that sets out local employment and targets completed before construction phase commences;</li> <li>» Majority of semi and unskilled labour locally sourced.</li> <li>» Database of potential local BEE services providers in place before construction phase commences.</li> <li>»</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Monitor indicators listed above to ensure that they have been met for the construction phase.</li> </ul>

***OBJECTIVE 4: Minimise impacts related to traffic management and transportation of equipment and materials to site (Traffic Management and Transportation Plan)***

The construction phase of the project will be the most significant in terms of generating traffic impacts; resulting from the transport of equipment and materials and construction crews to the site and the return of the vehicles after delivery of materials. Potential impacts associated with transportation and access relate to works within the site boundary and external works outside the site boundary. The components for the proposed power line and will be transported to site by road. The section below provides a guideline for the Traffic

Management and Transportation Plan on site and will need to be supplemented with the relevant final transport plan devised by the EPC partner during the final design phase of the power line.

<b>Project Component/s</b>	» Delivery of any component required within the construction phase.
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Impact of heavy construction vehicles on road surfaces, and possible increased risk in accidents involving people and animals.</li> <li>» Traffic congestion, particularly on narrow roads or on road passes where overtaking is not permitted.</li> <li>» Deterioration of road pavement conditions (both surfaced and gravel road) due to abnormal loads.</li> </ul>
<b>Activities/Risk Sources</b>	<ul style="list-style-type: none"> <li>» Construction vehicle movement.</li> <li>» Speeding on local roads.</li> <li>» Degradation of local road conditions.</li> <li>» Site preparation and earthworks.</li> <li>» Foundations or plant equipment installation.</li> <li>» Transportation of ready-mix concrete from off-site batching plant to the site.</li> <li>» Mobile construction equipment movement on-site.</li> <li>» Power line construction activities.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» Minimise impact of traffic associated with the construction of the power line on local traffic volume, existing infrastructure, property owners, animals, and road users.</li> <li>» To minimise potential for negative interaction between pedestrians or sensitive users and traffic associated with the power line and watercourse crossings construction.</li> <li>» To ensure all vehicles are roadworthy and all materials/equipment are transported appropriately and within any imposed permit/licence conditions.</li> </ul>

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
The contractor's plans, procedures and schedules, as well as the anticipated intrusion impacts should be clarified with affected parties prior to the commencement of construction activities on site.	Contractor	Pre-construction
Source general construction material and goods locally where available to limit transportation over long distances.	Proponent	Pre-construction and construction
Appropriate dust suppression techniques must be implemented to minimise dust from gravel roads.	Proponent	Construction
Construction vehicles and those transporting materials and goods should be inspected by the contractor or a	Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
sub-contractor to ensure that these are in good working order and not overloaded.		
Strict vehicle safety standards should be implemented and monitored.	Contractor	Construction
A designated access to the proposed site must be created to ensure safe entry and exit.	Contractor	Pre-construction
No deviation from approved transportation routes must be allowed, unless roads are closed for whatever reason outside the control of the contractor.	Contractor	Duration of contract
Appropriate road management strategies must be implemented on external and internal roads with all employees and contractors required to abide by standard road and safety procedures.	Contractor (or appointed transportation contractor)	Pre-construction
Any traffic delays because of construction traffic must be co-ordinated with the appropriate authorities.	Contractor	Duration of contract
The movement of all vehicles within the site must be on designated roadways.	Contractor	Duration of contract
Appropriate maintenance of all vehicles of the contractor must be ensured.	Contractor	Duration of contract
All vehicles of the contractor travelling on public roads must adhere to the specified speed limits and all drivers must be in possession of an appropriate valid driver's license.	Contractor	Duration of contract
Appropriate signs must be placed along construction roads to identify speed limits, travel restrictions and other standard traffic control information. Signage must be maintained on an on-going basis and must be clearly visible to all road users.	Contractor	Duration of contract

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Vehicles keeping to the speed limits on all roads.</li> <li>» Vehicles are in good working order and safety standards are implemented.</li> <li>» Local residents and road users are aware of vehicle movements and schedules.</li> <li>» No construction traffic related accidents are experienced.</li> <li>» Local road conditions and road surfaces are up to standard.</li> <li>» Complaints of residents are not received (e.g. concerning the speeding of heavy vehicles).</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Developer and or appointed ECO must monitor indicators listed above to ensure that they have been implemented.</li> </ul>

**OBJECTIVE 5: To avoid and or minimise the potential impact of the activities during the construction on the safety of local communities and the potential loss of stock and damage to farm infrastructure**

An inflow of workers could, as a worst case scenario and irrespective of the size of the workforce, pose some security risks. Criminals could also use the opportunity due to “outsiders” being in the area to undertake their criminal activities.

<b>Project Component/s</b>	» Construction and establishment activities associated with the establishment of the power line, including infrastructure etc.
<b>Potential Impact</b>	» Impact on safety of farmers and communities (increased crime etc.) and potential loss of livestock due to stock theft by construction workers and also damage to farm infrastructure, such as gates and fences.
<b>Activities/Risk Sources</b>	» The presence of construction workers on the site can pose a potential safety risk to local farmers and communities and may result in stock thefts. The activities of construction workers may also result in damage to farm infrastructure.
<b>Mitigation: Target/Objective</b>	» To avoid and or minimise the potential impact on local communities and their livelihoods.

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Inform all workers of the conditions contained in the Code of Conduct.	Proponent	Pre-construction
If damage is caused by the Contractor then the Contractor must compensate farmers / community members at full market related replacement cost for the damage or losses.	Contractors	Construction phase

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Code of Conduct developed and approved prior to commencement of construction phase.</li> <li>» All construction workers made aware of Code of Conduct within first week of being employed.</li> <li>» Verified compensation claims are settled.</li> </ul>
<b>Monitoring</b>	» Perdekraal West Wind Farm and/or appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase.

**OBJECTIVE 6: To avoid and or minimise the potential impact on current and future farming activities during the construction phase.**

<b>Project component/s</b>	» Construction phase activities associated with the establishment of the power line and associated infrastructure.
<b>Potential Impact</b>	» The footprint of the power line corridor and associated infrastructure will result in a loss of land that will impact on farming activities on the site.
<b>Activities/risk sources</b>	» The footprint occupied by the power line and associated infrastructure.
<b>Mitigation: Target/Objective</b>	» To minimise the loss of land taken up by the power line and associated infrastructure and to enable farming activities to continue where possible, specifically grazing.

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Minimise the footprint of the power line and the associated infrastructure as far as possible.	Contractor and Proponent	Pre-construction
Rehabilitate disturbed areas on completion of the construction phase.	Contractors	Construction

<b>Performance Indicator</b>	» Meeting/s held with farmers during construction phase.
<b>Monitoring</b>	» ECO must monitor indicators listed above to ensure that they have been met for the construction phase.

***OBJECTIVE 7: To avoid and or minimise the potential impacts of safety, noise and dust and damage to roads caused by construction vehicles during the construction phase***

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

<b>Project Component/s</b>	» Construction and establishment activities associated with the establishment of the power line, including infrastructure etc.
<b>Potential Impact</b>	» Heavy vehicles can generate noise and dust impacts. Movement of heavy vehicles can also damage roads.
<b>Activities/Risk Sources</b>	» The movement of heavy vehicles and their activities on the site can result in noise and dust impacts and damage roads.
<b>Mitigation: Target/Objective</b>	» To avoid and or minimise the potential noise and dust impacts associated with heavy vehicles, and minimise damage to roads.

Mitigation: Action/Control	Responsibility	Timeframe
Implement appropriate dust suppression, if high levels of dust are observed, measures can include ensuring that vehicles used to transport building materials are fitted with tarpaulins or covers.	Contractors	Duration of Construction
Ensure that all vehicles are road-worthy; drivers are qualified and are made aware of the potential noise, dust and safety issues.	Contractors	Duration of Construction
Ensure that drivers adhere to speed limits.	Contractors	Duration of Construction
Ensure that damage to internal roads is repaired before completion of construction phase.	Contractors	Duration of Construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Dust suppression measures implemented for all areas that require such measures during the construction phase.</li> <li>» Drivers made aware of the potential safety issues and enforcement of strict speed limits when they are employed.</li> <li>» Road worthy certificates in place for all heavy vehicles at outset of construction phase and up-dated on a monthly basis.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» ECO must monitor indicators listed above to ensure that they have been met for the construction phase.</li> </ul>

***OBJECTIVE 8: Minimisation of development footprint and disturbance to topsoil***

In order to minimise impacts on flora, fauna, and ecological processes, the development footprint should be limited to the smallest area possible.

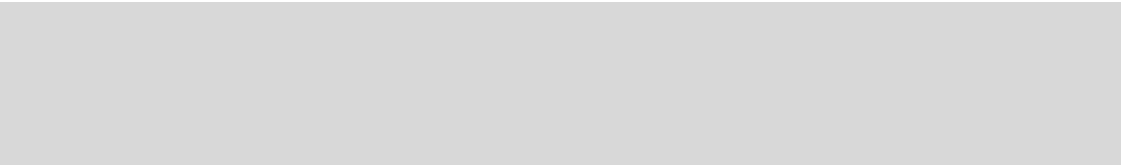
<b>Project Component/s</b>	<ul style="list-style-type: none"> <li>» Power line.</li> <li>» Access roads.</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Impacts on natural vegetation.</li> <li>» Impacts on soil.</li> <li>» Loss of topsoil.</li> </ul>
<b>Activity/Risk Source</b>	<ul style="list-style-type: none"> <li>» Site preparation and earthworks.</li> <li>» Excavation of foundations.</li> <li>» Construction of site access road.</li> <li>» Site preparation (e.g. excavation and compaction).</li> <li>» Construction activities.</li> <li>» Stockpiling of topsoil, subsoil and spoil material.</li> </ul>
<b>Mitigation:</b>	<ul style="list-style-type: none"> <li>» To retain natural vegetation, where possible.</li> </ul>



<b>Target/Objective</b>	<ul style="list-style-type: none"> <li>» To minimise footprints of disturbance of vegetation/habitats.</li> <li>» Remove and store all topsoil on areas that are to be excavated; and use this topsoil in subsequent rehabilitation of disturbed areas.</li> <li>» Minimise spoil material.</li> </ul>
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Mitigation: Action/Control	Responsibility	Timeframe
Areas to be cleared must be clearly marked on-site to eliminate the potential for unnecessary clearing.	Contractor in consultation with Specialist	Pre-construction
The extent of clearing and disturbance to the native vegetation must be kept to a minimum so that impact on flora and fauna and their habitats is restricted.	Contractor	Site establishment & duration of contract
Any fill material required must be sourced from a commercial off-site suitable/permitted source, licensed quarry or borrow pit. Where possible, material from foundation excavations must be used as fill on-site.	Contractor	Duration of contract
Excavated topsoil must be stockpiled in designated areas separate from base material and covered until replaced during rehabilitation.	Contractor	Site establishment & duration of contract
Topsoil must not be stripped or stockpiled when it is raining or when the soil is wet as compaction will occur.	Contractor	Site establishment Maintenance: for duration of contract
As far as possible, the maximum topsoil stockpile height must be limited as far as possible in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen.	Contractor	Duration of contract

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Minimal disturbance outside of designated work areas.</li> <li>» Topsoil appropriately stored.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Observation of soil stripping and soil management activities by ECO throughout construction phase.</li> <li>» Supervision of all clearing and earthworks.</li> <li>» An incident reporting system will be used to record non-conformances to the EMPr.</li> </ul>



**OBJECTIVE 9: Minimise the impacts on and loss of indigenous vegetation and faunal habitat**

All development footprints within areas of natural vegetation (for roads and foundation area) should be surveyed and appropriately fenced off. Only once this has been done can any construction activity proceed. It should be made very clear to all contractors that there is to be no disturbance outside these demarcated areas, at least not without the permission of the ECO.

<b>Project Component/s</b>	» Any infrastructure or activity that will result in disturbance to natural areas.
<b>Potential Impact</b>	» Loss of indigenous natural vegetation due to construction activities, or poor behaviour on the part of the construction team.
<b>Activity/Risk Source</b>	<ul style="list-style-type: none"> <li>» Vegetation clearing.</li> <li>» Introduction of alien invasive plant species</li> <li>» Construction of access roads.</li> <li>» Chemical contamination of the soil by vehicles and machinery.</li> <li>» Operation of construction camps.</li> <li>» Storage of materials required for construction.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» Minimise footprints of disturbance of vegetation/habitats.</li> <li>» Minimise loss of indigenous vegetation.</li> <li>» Minimise loss of species of conservation concern.</li> </ul>

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
A qualified botanist should undertake a site visit at the walk down stage (before construction) in order to ensure that the proposed pylon positions are appropriate, and must confirm in writing that the positions are appropriate and do in fact minimise botanical impact.	Contractor	Pre-Construction
The servitude should be bush-cut according to the Eskom Standards.	Contractor	Construction
Limit unnecessary impacts on surrounding natural vegetation, e.g. driving around in the veld, use access roads only.	Contractor	Construction
A site rehabilitation programme must be developed and implemented.	Contractor in consultation with Specialist	Duration of contract Pre-construction
Affected individuals of protected species which cannot be avoided should be trans located to a safe area on the site or a destruction permit must be obtained prior to construction.	Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
Alien plant clearing where necessary.	Contractor	Construction
Erosion control measures should be implemented in areas where slopes have been disturbed.	Contractor	Construction
Re-vegetation of cleared areas or monitoring to ensure that recovery is taking place.	Contractor	Construction
The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. Personnel should not be allowed to wander off the construction site.	Contractor	Construction
Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared. In particular, a formal road should not be constructed under the power lines, where a simple track can be sufficient.	Contractor	Construction
The ECO should provide environmental induction to all construction staff to ensure that they are aware of this and other environmental sensitivities at the site.	Contractor	Construction
No fuel wood collection should be allowed on-site.	Contractor	Construction
Fauna identified should be removed to a safe location by the ECO or another suitably qualified person/s.		
		Construction
All construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species such as snakes and tortoises.	Contractor	Construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Minimal disturbance outside of designated work areas.</li> <li>» Minimised clearing of existing/natural vegetation and faunal habitats.</li> <li>» Limited impacts on areas of identified and demarcated sensitive habitats/vegetation.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Observation of vegetation clearing activities by ECO throughout construction phase.</li> <li>» Monitoring of vegetation clearing activities in terms of permit conditions.</li> <li>» Supervision of all clearing and earthworks.</li> <li>» An incident reporting system will be used to record non-conformances to the EMP.</li> </ul>

**OBJECTIVE 10: Limit direct and indirect terrestrial faunal and avifaunal impacts**

<b>Project</b>	Construction activities, operational activities and human presence
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<b>component/s</b>	
<b>Potential Impact</b>	Disturbance of faunal communities due to construction as well as poaching and hunting risk from construction staff.
<b>Activity/risk source</b>	Habitat transformation during construction; site fencing, presence of construction and operation personnel.
<b>Mitigation: Target/Objective</b>	Low faunal impact, during construction and operation.

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Environmental induction for all staff	Contractor	Construction & Operation
ECO to monitor and enforce ban on hunting, collecting etc. of all plants and animals or their products.	ECO	Construction & Operation
Fauna identified should be removed to a safe location by the ECO or another suitably qualified person/s.	Contractor	Construction & Operation
Regular surveys of large collision-prone species, especially cranes, flamingos and raptors within the study area to determine the relative importance of local populations of priority taxa.	Contractor	Construction & Operation

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Minimum disturbance outside of designated work areas.</li> <li>» Minimised clearing of existing/natural vegetation and habitats for fauna and avifauna.</li> <li>» Limited impacts on faunal species (i.e. noted/recorded fatalities), especially those of conservation concern.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Monitoring for compliance during the construction phase. All incidents to be noted.</li> </ul>

***OBJECTIVE 11: Minimise the establishment and spread of alien invasive plants (Invasive Plant Management Plan) and manage indigenous invasive plants***

On-going alien and invasive plant monitoring and removal should be undertaken on all areas of natural vegetation within the project lease area on an annual basis. The section below provides a guideline for the Invasive Plant Management Plan.

<b>Project Component/s</b>	<ul style="list-style-type: none"> <li>» Any infrastructure or activity that will result in disturbance to natural areas.</li> </ul>
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<b>Potential Impact</b>	» Invasion of natural vegetation surrounding the site by declared weeds or invasive alien species.
<b>Activities/Risk Sources</b>	» Construction, environmental management.
<b>Mitigation: Target/Objective</b>	» There is a target of no alien plants within project control area during the construction and operation phases, and no additional thickening of indigenous invasive shrubs.

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Avoid creating conditions in which alien plants may become established: » Keep disturbance of indigenous vegetation to a minimum. » Rehabilitate disturbed areas as quickly as possible. » Do not import soil from areas with alien plants. » Remove all alien plants from areas adjacent to or on frequently traversed access routes to prevent dispersal of regenerative material onto site	Contractor	Construction and operation
Establish an on-going monitoring programme to detect and quantify any alien species that may become established and identify the problem species (as per Conservation of Agricultural Resources Act and Biodiversity Act).	Contractor	Construction and operation
Immediately control any alien plants that become established using registered control methods.	Contractor	Construction and operation
DWA approved methodology should be employed for all invasive clearing operations.	Contractor	Construction and operation

<b>Performance Indicator</b>	» For each invasive or alien species: number of plants and aerial cover of plants within project area and immediate surroundings is significantly reduced and alien species are absent from site.
<b>Monitoring</b>	» On-going monitoring of area by ECO during construction. » Annual audit of project area and immediate surroundings » If any alien invasive species are detected then the distribution of these should be mapped (GPS co-ordinates of plants or concentrations of plants), number of individuals (whole site or per unit area), age and/or size classes of plants and aerial cover of plants. » The results should be interpreted in terms of the risk posed to sensitive habitats within and surrounding the project area and used in optimising the control programme. » The ECO should be responsible for driving this process. » Reporting frequency depends on legal compliance framework.

**OBJECTIVE 12: Minimise soil degradation and erosion (Erosion management Plan)**

The soil on site may be impacted in terms of:

- » Soil degradation including erosion (by wind and water) and subsequent deposition elsewhere is of a concern in areas that are underlain by fine grained soil which can be mobilised when disturbed, even on relatively low slope gradients (accelerated erosion).
- » Uncontrolled run-off relating to the construction activity (excessive wetting, uncontrolled discharge, etc.) will also lead to accelerated erosion and possible sedimentation along natural drainage lines or catchment areas.
- » Degradation of the natural soil profile due to excavation, removal of topsoil, stockpiling, wetting, compaction, pollution and other construction activities may affect soil forming processes and associated agricultural potential.

Management of erosion will be required during the construction phase of the power line. An erosion management plan is required to ensure compliance with applicable regulations and to prevent increased soil erosion and sedimentation of the downstream environment. The section below provides a guideline for the management of erosion on site and will need to be supplemented with the principles for erosion management contained in the Erosion Management plan included in **Appendix B**.

<b>Project Component/s</b>	<ul style="list-style-type: none"> <li>» Power line.</li> <li>» Access roads.</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Soil degradation including erosion, dust and siltation.</li> <li>» Reduction in agricultural potential.</li> </ul>
<b>Activities/Risk Sources</b>	<ul style="list-style-type: none"> <li>» Earthworks &amp; activity on site.</li> <li>» Rainfall and concentrated discharge causing water erosion of disturbed areas.</li> <li>» Wind - erosion of disturbed areas.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» Minimise soil degradation (removal, excavation, mixing, wetting, compaction, pollution, etc.).</li> <li>» Minimise erosion.</li> <li>» Minimise sediment transport downstream (siltation).</li> <li>» Minimise dust pollution.</li> </ul>

Mitigation: Action/Control	Responsibility	Timeframe
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Mitigation: Action/Control	Responsibility	Timeframe
Identify areas of high erosion risk (drainage lines/watercourses, existing problem areas). Only special works to be undertaken in these areas to be authorised by ECO and Site Manager.	ECO/ER	At design stage.
Identify construction areas for general construction work and restrict construction activity to these areas.	Contractor	At design stage and during construction
Prevent unnecessary destructive activity within construction areas (prevent over-excavations and double handling).	Contractor	During construction
Access roads to be carefully planned and constructed to minimise the impacted area and prevent unnecessary degradation of soil. Special attention to be given to roads that cross drainage lines and roads on steep slopes (to prevent unnecessary cutting and filling operations).	Contractor	At design stage and during construction
Dust control on construction site through wetting or covering of cleared areas.	Contractor	Daily during construction
Minimise removal of vegetation which aids soil stability.	Contractor	Continuously during construction
Rehabilitate disturbance areas as soon as an area is vacated.	Contractor	Continuously during and after construction
Soil conservation - stockpile topsoil for re-use in rehabilitation phase. Protect stockpile from erosion. Topsoil should be stockpiled for as short a period as possible to ensure survival of the soil seed bank and other soil-borne organisms.	Contractor	Continuously during construction
Control depth of excavations and stability of cut faces/sidewalls.	Contractor	Duration of contract

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Only authorised activity outside construction areas.</li> <li>» No activity in no-go areas.</li> <li>» Acceptable level of activity within construction areas, as determined by ECO.</li> <li>» Limited soil erosion attributable to construction activities around site.</li> <li>» Limited sedimentation along drainage lines as a result of construction activities.</li> <li>» No soil degradation.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Immediate reporting of ineffective sediment control systems.</li> </ul>

- » An incident reporting system will record non-conformances.

### **OBJECTIVE 14: Appropriate handling and management of waste**

The main wastes expected to be generated by the construction of the power line will include general construction waste, hazardous waste (i.e. fuel and oil from the transformers), and liquid waste (including grey water and sewage). In order to manage the wastes effectively, guidelines for the assessment, classification, and management of wastes, along with industry principles for minimising construction wastes must be implemented. A waste management plan is included as **Appendix C** of this EMPr.

<b>Project Component/s</b>	<ul style="list-style-type: none"> <li>» Power line</li> <li>» Access roads.</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Inefficient use of resources resulting in excessive waste generation.</li> <li>» Litter or contamination of the site or water through poor waste management practices.</li> </ul>
<b>Activity/Risk Source</b>	<ul style="list-style-type: none"> <li>» Packaging.</li> <li>» Other construction wastes.</li> <li>» Hydrocarbon use and storage.</li> <li>» Spoil material from excavation, earthworks, and site preparation.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To comply with waste management legislation.</li> <li>» To minimise production of waste.</li> <li>» To ensure appropriate waste storage and disposal.</li> <li>» To avoid environmental harm from waste disposal.</li> <li>» A waste manifests should be developed for the ablutions showing proof of disposal of sewage at appropriate water treatment works.</li> </ul>

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Construction method and materials should be carefully considered in view of waste reduction, re-use, and recycling opportunities.	Contractor	Duration of contract
Construction contractors must provide specific detailed waste management plans to deal with all waste streams.	Contractor	Duration of contract



<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Specific areas must be designated on-site for the temporary management of various waste streams, i.e. general refuse, construction waste (wood and metal scrap), and contaminated waste as required. Location of such areas must seek to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage, and vermin control.	Contractor	Duration of contract
Where practically possible, construction and general wastes on-site must be reused or recycled. Bins and skips must be available on-site for collection, separation, and storage of waste streams (such as wood, metals, general refuse etc.).	Contractor	Duration of contract
Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors.	Contractor	Duration of contract
Untamated waste will be removed at least weekly, or as required, for disposal; other wastes will be removed for recycling/ disposal at an appropriate frequency.	Contractor	Duration of contract
Disposal of waste will be in accordance with relevant legislative requirements, including the use of licensed contractors.	Contractor	Duration of contract
Hydrocarbon waste must be contained and stored in sealed containers within an appropriately bunded area.	Contractor	Duration of contract
Waste must be kept to a minimum and must be transported by approved waste transporters to sites designated for their disposal.	Contractor	Duration of contract
Documentation (waste manifest) must be maintained detailing the quantity, nature, and fate of any regulated waste. Waste disposal records must be available for review at any time.	Contractor	Duration of contract
Regularly serviced chemical toilets facilities will be used to ensure appropriate control of sewage.	Contractor	Duration of contract
Upon the completion of construction, the area must be cleared of potentially polluting materials.	Contractor	Completion of construction
Dispose of all solid waste collected at an appropriately registered waste disposal site. Waste disposal shall be in accordance with all relevant legislation and under no circumstances may waste be burnt on site.	Contractor	Duration of construction
Where a registered waste site is not available close to the construction site, provide a method statement with regard to waste management.	Contractor	Duration of construction

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

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

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

<b>Project Component/s</b>	<ul style="list-style-type: none"> <li>» Storage and handling of chemicals, hazardous substances i.e. oil dam for the cooling of transformers.</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Release of contaminated water from contact with spilled chemicals.</li> <li>» Generation of contaminated wastes from used chemical containers.</li> </ul>
<b>Activity/Risk Source</b>	<ul style="list-style-type: none"> <li>» Vehicles associated with site preparation and earthworks.</li> <li>» Construction activities of area and linear infrastructure.</li> <li>» Hydrocarbon use and storage.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To ensure that the storage and handling of chemicals and hydrocarbons on-site does not cause pollution to the environment or harm to persons.</li> <li>» To ensure that the storage and maintenance of machinery on-site does not cause pollution of the environment or harm to persons.</li> </ul>

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Develop and implement an emergency preparedness	Contractor	Pre-

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
plan during the construction phase.		construction and implement for duration of Contract
Spill kits must be made available on-site for the clean-up of spills and leaks of contaminants.	Contractor	Duration of contract
Corrective action must be undertaken immediately if a complaint is made, or potential/actual leak or spill of polluting substance identified. This includes stopping the contaminant from further escaping, cleaning up the affected environment as much as practically possible and implementing preventive measures.	Contractor	Duration of contract
In the event of a major spill or leak of contaminants, the relevant administering authority must be immediately notified as per the notification of emergencies/incidents.	Contractor	Duration of contract
Spilled cement must be cleaned up as soon as possible and disposed of at a suitably licensed waste disposal site.	Contractor	Duration of contract
Any contaminated/polluted soil removed from the site must be disposed of at a licensed hazardous waste disposal facility.	Contractor	Duration of contract
Routine servicing and maintenance of vehicles must not to take place on-site (except for emergencies). If repairs of vehicles must take place, an appropriate drip tray must be used to contain any fuel or oils.	Contractor	Duration of contract
All stored fuels to be maintained within a bund and on a sealed surface. The bunded area must be provided with a tap-off system through which spillages and leakages that might occur will be removed without any spillage outside the bunded area.	Contractor	Duration of contract
Fuel storage areas must be inspected regularly to ensure bund stability, integrity, and function.	Contractor	Duration of contract
Construction machinery must be stored in an appropriately sealed area.	Contractor	Duration of contract
The storage of flammable and combustible liquids such as oils will be in designated areas which are appropriately bunded, and stored in compliance with Material Safety Data Sheets (MSDS) files.	Contractor	Duration of contract
Any storage and disposal permits/approvals which may be required must be obtained, and the conditions attached to such permits and approvals will be compiled with.	Contractor	Duration of contract

Mitigation: Action/Control	Responsibility	Timeframe
Transport of all hazardous substances must be in accordance with the relevant legislation and regulations	Contractor	Duration of contract
The sediment control and water quality structures used on-site must be monitored and maintained in an operational state at all times.	Contractor	Duration of contract
Upon the completion of construction, the area must be cleared of potentially polluting materials.	Contractor	Completion of construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No chemical spills outside of designated storage areas.</li> <li>» No unattended water or soil contamination by spills.</li> <li>» No complaints received regarding waste on site or indiscriminate dumping.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Implement an effective monitoring system to detect any leakage or spillage of all hazardous substances.</li> <li>» Observation and supervision of chemical storage and handling practices and vehicle maintenance throughout construction phase.</li> <li>» A complaints register must be maintained, in which any complaints from the community will be logged.</li> <li>» An incident reporting system will be used to record non-conformances to the EMPr.</li> </ul>

***OBJECTIVE 16: To avoid and or minimise the potential risk of increased veld fires during the construction phase***

The increased presence of people on the site could increase the risk of veld fires, particularly in the dry season.

<b>Project Component/s</b>	» Construction and establishment activities associated with the establishment of power line including infrastructure etc.
<b>Potential Impact</b>	» Veld fires can pose a personal safety risk to local farmers and communities, and their homes, crops, livestock and farm infrastructure, such as gates and fences.
<b>Activities/Risk Sources</b>	» The presence of construction workers and their activities on the site can increase the risk of veld fires.
<b>Mitigation: Target/Objective</b>	» To avoid and or minimise the potential risk of veld fires on local communities and their livelihoods.

Mitigation: Action/Control	Responsibility	Timeframe
Ensure that open fires on the site for cooking or heating are not allowed except in designated areas.	Proponent and contractors	Duration of construction
Provide adequate firefighting equipment onsite.	Proponent and contractors	Duration of construction
Provide fire-fighting training to selected construction staff.	Contractors	Duration of construction
If a runaway fire, as a result of the Contractor, results in damage the Contractor must compensate farmers / community members at full market related replacement cost for any losses, such as livestock, damage to infrastructure etc.	Contractors	Duration of construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Conditions contained in the Construction EMPr.</li> <li>» Designated areas for fires identified on site at the outset of the construction phase.</li> <li>» Fire-fighting equipment and training provided before the construction phase commences.</li> <li>» Compensation claims settled within 1 month of claim being verified.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Perdekraal West Wind Farm and or appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase.</li> </ul>

### **OBJECTIVE 17: Limit damage to drainage lines**

Construction within drainage lines has been minimised as far as possible. Where impacts are unavoidable, mitigation measures are required to minimise impacts on these systems.

<b>Project Component/s</b>	<ul style="list-style-type: none"> <li>» Power line and associated access road.</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Damage to water course areas by any means that will result in hydrological changes (includes erosion, siltation, dust, direct removal of soil of vegetation, dumping of material within wetlands). The focus should be on the functioning of the watercourse as a natural system.</li> </ul>
<b>Activities/Risk Sources</b>	<ul style="list-style-type: none"> <li>» Construction and operation of power line.</li> <li>» Construction of access roads.</li> </ul>
<b>Mitigation:</b>	<ul style="list-style-type: none"> <li>» No damage to the delineated watercourses within project</li> </ul>

<b>Target/Objective</b>	footprint (i.e. no-go area). » Minimise damage to watercourse areas where crossings are to be built or upgraded.
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Mitigation: Action/Control	Responsibility	Timeframe
Rehabilitate any disturbed areas as soon as possible once construction is completed in an area.	Proponent, Contractors and ECO	Duration of construction
Control storm water and runoff water through the implementation of a storm water management plan for the site.	Contractors, ECO	Duration of construction
Obtain a licence as required in terms of the National Water Act from DWA to impact on any wetland or water resource.	Proponent	Duration of construction

<b>Performance Indicator</b>	» No impacts on water quality, water quantity, riparian vegetation, natural status of watercourses
<b>Monitoring</b>	» Habitat loss in watercourses should be monitored before and after construction. » The presence and development of erosion features downstream of any construction through wetlands must be monitored. » The ECO should be responsible for driving this process. » An incident reporting system must be used to record non-conformances to the EMPr/IWWMP. » Public complaints register must be developed and maintained on site.

### 6.3 Detailing Method Statements

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

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

will produce results in accordance with the Specifications". The Method Statement must cover applicable details with regard to:

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

Specific method statements required may include:

- » Site establishment;
- » Preparation of the site;
- » Soil management/stockpiling and erosion control;
- » Excavations and backfilling procedure;
- » Stipulate norms and standards for water supply and usage (i.e.: comply strictly to licence and legislation requirements and restrictions);
- » Storm water management procedures;
- » Wash bay for the construction vehicles and or machineries;
- » Ablution facilities (placement, maintenance, management and servicing);
- » Solid Waste Management;
- » Liquid waste management;
- » Dust and noise pollution;
- » Hazardous substance storage (Ensure compliance with all national, regional and local legislation with regard to the storage of oils, fuels, lubricants, solvents, wood treatments, bitumen, cement, pesticides and any other harmful and hazardous substances and materials. South African National Standards apply);
- » Fire prevention and management measures on site;
- » Fauna and flora protection process on and off site (i.e. removal to reintroduction or replanting, if necessary);
- » Incident and accident reporting protocol;
- » General administration;
- » Designate access road and the protocol on while roads are in use;
- » Requirements on gate control protocols.

The Contractor may not commence the activity covered by the Method Statement until it has been approved by the ECO and Site Manager, except in the case of

emergency activities and then only with the consent of the Site Manager. Approval of the Method Statement will not absolve the Contractor from their obligations or responsibilities in terms of their contract.

Failure to submit a method statement may result in suspension of the activity concerned until such time as a method statement has been submitted and approved. The ECO should monitor the construction activities to ensure that these are undertaken in accordance with the approved Method Statement.

#### **6.4 Awareness and Competence: Construction Phase**

To achieve effective environmental management, it is important that Contractors are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMP. 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:

- » Employees must have a basic understanding of the key environmental features of the construction site and the surrounding environment.
- » Ensuring that a copy of the EMP is readily available on-site, and that all site employees are aware of the location and have access to the document.
- » Employees shall be familiar with the requirements of the EMP and the environmental specifications as they apply to the construction of the power line.
- » Ensuring that, prior to commencing any site works, all employees and sub-contractors have attended an Environmental Awareness Training course.
- » The course should be sufficient to provide the site staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
- » Awareness of any other relevant environmental matters, which are deemed necessary by the ECO.
- » Ensuring that employee information posters, outlining the environmental "do's" and "don'ts" (as per the environmental awareness training course) are erected at prominent locations throughout the site.
- » Ensure that construction workers have received basic training in environmental management, including the storage and handling of hazardous substances, minimisation of disturbance to sensitive areas, management of waste, and prevention of water pollution.
- » Records must be kept of those that have completed the relevant training.



- » Training should be done either in a written or verbal format but must be appropriate for the receiving audience.

#### **6.4.1 Environmental Awareness Training**

Environmental Awareness Training must take the form of an on-site talk and demonstration by the ECO before the commencement of site establishment and construction on site. The education/awareness programme should be aimed at all levels of management and construction workers within the contractor team. A record of attendance of this training must be maintained by the ECO on site. Proof of awareness training should be kept on record.

#### **6.4.2 Induction Training**

Environmental induction training must be presented to all persons who are to work on the site – be it for short or long durations; Contractor's or Engineer's staff; administrative or site staff; sub-contractors or visitors to site.

This induction training should include discussing the developer's environmental policy and values, the function of the EMP and Contract Specifications and the importance and reasons for compliance to these. The induction training must highlight overall do's and don'ts on site and clarify the repercussions of not complying with these. The non-conformance reporting system must be explained during the induction as well. Opportunity for questions and clarifications must form part of this training. A record of attendance of this training must be maintained by the SHE Officer on site. Proof of induction training should be kept on record.

#### **6.4.3 Toolbox Talks**

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

### **6.5 Monitoring Programme: Construction Phase**

A monitoring programme must be in place not only to ensure conformance with the EMP, but also to monitor any environmental issues and impacts which have

not been accounted for in the EMP that are, or could result in significant environmental impacts for which corrective action is required. The period and frequency of monitoring will be stipulated by the Environmental Authorisation (once issued). The Project Manager will ensure that the monitoring is conducted and reported.

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

- » Monitor and audit compliance with the prescriptive and procedural terms of the environmental specifications.
- » Ensure adequate and appropriate interventions to address non-compliance.
- » Ensure adequate and appropriate interventions to address environmental degradation.
- » Provide a mechanism for the lodging and resolution of public complaints.
- » Ensure appropriate and adequate record keeping related to environmental compliance.

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

All supervisory staff including Foremen, Engineers, and the ECO must be provided the means to be able to submit non-conformance reports to the Site Manager. Non-conformance reports will describe, in detail, the cause, nature and effects of any environmental non-conformance by the Contractor. Records of penalties imposed may be required by the relevant authority within 48 (forty eight) hours.

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

#### **6.5.2. Monitoring Reports**

A monitoring report will be compiled by the ECO on a monthly basis and must be submitted to Proponent for their records. This report should include details of the activities undertaken in the reporting period, any non-conformances or incidents recorded if any, corrective action required, and details of those non-conformances or incidents which have been closed out.

#### **6.5.3. Final Audit Report**

A final environmental audit report must be compiled by the independent ECO and be submitted to DEA upon completion of the construction and rehabilitation

activities (within 30 days of completion of the construction phase i.e. within 30 days of site handover) and within 30 days of completion of rehabilitation activities. This report must indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the environmental authorisation conditions and the requirements of the EMP.

## MANAGEMENT PROGRAMME: REHABILITATION

## CHAPTER 7

**Overall Goal:** Undertake the rehabilitation measures in a way that:

- » Ensures rehabilitation of disturbed areas following the execution of the works, such that residual environmental impacts are remediated or curtailed.

### 7.1. Objectives

In order to meet this goal, the following objective, actions and monitoring requirements are relevant:

***OBJECTIVE 1: Ensure appropriate rehabilitation of disturbed areas such that residual environmental impacts are remediated or curtailed***

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

<b>Project Component/s</b>	<ul style="list-style-type: none"> <li>» Power line</li> <li>» Access roads</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Environmental integrity of site undermined resulting in reduced visual aesthetics, erosion and increased runoff, and the requirement for on-going management intervention.</li> </ul>
<b>Activity/Risk Source</b>	<ul style="list-style-type: none"> <li>» Temporary construction areas</li> <li>» Temporary access roads/tracks</li> <li>» Power line servitudes</li> <li>» Other disturbed areas/footprints</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» Ensure and encourage site rehabilitation of disturbed areas.</li> <li>» Ensure that the site is appropriately rehabilitated following the execution of the works, such that residual environmental impacts (including erosion) are remediated or curtailed.</li> </ul>

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
All temporary facilities, equipment, and waste materials must be removed from site as soon as construction is completed.	Contractor	Following execution of the works
All temporary fencing and danger tape must be removed once the construction phase has been	Contractor	Following completion of

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
completed.		construction activities in an area
The area that previously housed the construction equipment camp is to be checked for spills of substances such as oil, paint, etc. and these should be cleaned up.	Contractor	Following completion of construction activities in an area
All hardened surfaces within the construction equipment camp area should be ripped, all imported materials removed, and the area shall be top soiled and re-vegetated.	Contractor	Following completion of construction activities in an area
Temporary roads must be closed and access across these blocked.	Contractor	Following completion of construction activities in an area
Necessary drainage works and anti-erosion measures must be installed, where required, to minimise loss of topsoil and control erosion.	Contractor	Following completion of construction activities in an area
A rehabilitation plan should be drawn up that specifies the rehabilitation process and should be approved by the ECO.	Contractor, Proponent and ECO	Pre-construction
Where disturbed areas are not to be used during the operation of the proposed power line and watercourse crossings, these areas must be rehabilitated/re-vegetated with appropriate natural vegetation and/or local seed mix. Re-use of native/indigenous plant species removed from disturbance areas in the rehabilitation phase to be determined by a botanist, as applicable.	Contractor in consultation with rehabilitation specialist	Following completion of construction activities in an area
Re-vegetated areas may need to be protected from wind erosion and maintained until an acceptable plant cover has been achieved.	Proponent in consultation with rehabilitation specialist	Post-rehabilitation
Erosion control measures should be used in sensitive areas such as areas with steep slopes.	Proponent in consultation with ECO and rehabilitation specialist (if	Post-rehabilitation

Mitigation: Action/Control	Responsibility	Timeframe
	required)	
On-going alien plant monitoring and removal must be undertaken on all areas of natural vegetation on an annual basis.	Proponent	Post-rehabilitation

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» All portions of site, including construction equipment camp and working areas, cleared of equipment and temporary facilities.</li> <li>» Topsoil replaced on all areas and stabilised where practicable or required after construction and temporally utilised areas.</li> <li>» Disturbed areas rehabilitated and acceptable plant cover achieved on rehabilitated sites.</li> <li>» Completed site free of erosion and alien invasive plants.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» On-going inspection of rehabilitated areas in order to determine effectiveness of rehabilitation measures implemented.</li> <li>» On-going alien plant monitoring and removal should be undertaken on an annual basis.</li> </ul>

## MANAGEMENT PROGRAMME: OPERATION

## CHAPTER 8

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

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

An environmental manager must ensure the implementation of the operational EMPr.

### 8.1. Objectives

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

#### ***OBJECTIVE 1: Minimise Impacts on Vegetation, Soils and Ecology & Avifauna***

The soil on site may be impacted in terms of:

- » Soil degradation including erosion (by wind and water) and subsequent deposition elsewhere is of a concern across the entire site which is underlain by fine grained soil which can be mobilised when disturbed, even on relatively low slope gradients (accelerated erosion).
- » Uncontrolled run-off relating to construction activity (excessive wetting, uncontrolled discharge, etc.) will also lead to accelerated erosion and possible sedimentation of drainage systems.
- » Degradation of the natural soil profile due to pollution.
- » Soil contamination due to use of hazardous substances such as transformer oils.

Management of erosion will be required during the operation phase of the power line. An erosion management plan is required to ensure compliance with

applicable regulations and to prevent increased soil erosion and sedimentation of the downstream environment. The section below provides a guideline for the management of erosion on site and will need to be supplemented with the principles for erosion management contained in the Erosion Management plan included in **Appendix B**.

<b>Project Component/s</b>	<ul style="list-style-type: none"> <li>» Power line.</li> <li>» Access roads.</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Soil degradation.</li> <li>» Soil erosion.</li> <li>» Increased deposition of soil into drainage systems.</li> <li>» Increased run-off over the site.</li> </ul>
<b>Activities/Risk Sources</b>	<ul style="list-style-type: none"> <li>» Poor rehabilitation and/or re-vegetation of cleared areas.</li> <li>» Rainfall - water erosion of disturbed areas.</li> <li>» Wind erosion of disturbed areas.</li> <li>» Concentrated discharge of water from construction activity.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» Ensure rehabilitation of disturbed areas is maintained.</li> <li>» Minimise soil degradation (i.e. wetting).</li> <li>» Minimise soil erosion and deposition of soil into drainage lines.</li> <li>» Ensure continued stability of embankments/excavations.</li> </ul>

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Rehabilitate disturbance areas should the previous attempt be unsuccessful.	The operator	Operation
Maintain erosion control measures implemented during the construction phase (i.e. run-off attenuation on slopes (bags, logs), silt fences, storm water catch-pits, and shade nets).	The operator	Operation
Develop and implement an appropriate stormwater management plan for the operational phase of the power line and if required the watercourse crossings	The operator	Operation
Site access should be controlled and only authorized staff and contractors should be allowed on-site.	The operator	Operation
Notice boards stating that fauna and flora may not be collected, harvested etc. should be placed at the entrances to the site.	The operator	Operation
Any maintenance activities should avoid listed plant species and strive to keep the footprint as low as possible.	The operator	Operation
No herbicides should be used, as far as possible, and if vegetation clearing needs to take place, this should be done by hand.	The operator	Operation
The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden.	The operator	Operation



Mitigation: Action/Control	Responsibility	Timeframe
All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.	The operator	Operation
Spill kits must be kept on-site.	The operator	Operation
Regular monitoring for erosion post-construction to ensure that no erosion problems have developed as result of the past disturbance.	The operator	Operation
Regular monitoring must be undertaken for alien plant invasion, which is likely to occur in previously disturbed areas or in areas receiving runoff from the hardened surfaces of the infrastructure.	The operator	Operation

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Acceptable level of soil erosion around site, as determined by the site manager.</li> <li>» Acceptable level of increased siltation in drainage lines, as determined by the site manager.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Inspections of site on a bi-annual basis.</li> <li>» Water management plan.</li> </ul>

## ***OBJECTIVE 2: Protection of avifauna from collision and electrocution***

During the operation, the threat of collision with the power line is the biggest potential threat to avifauna, particularly sensitive, collision prone species that may occur in the study area. The threat of electrocution while perching on the power line and associated infrastructure serves as a threat to certain sensitive species, depending on the power line structures implemented.

<b>Project Component/s</b>	» Power line.
<b>Potential Impact</b>	» Collision and electrocution events with the overhead power line.
<b>Activities/Risk Sources</b>	» Operation of the power line without appropriate mitigation measures.
<b>Mitigation: Target/Objective</b>	» Maintain a low number of collision, and electrocution events.

Mitigation: Action/Control	Responsibility	Timeframe
Any electrocution and collision events that occur should be recorded, including the species affected and the date. If repeated collisions occur within the same area, then further mitigation and avoidance measures may need to be implemented.	The operator	Operation

<b>Performance Indicator</b>	» Minimal collision, or electrocution events.
<b>Monitoring</b>	» Observation of electrocution or collision events with the power line. » Monitor power line servitude for mortalities.

### **OBJECTIVE 3: Minimise dust and air emissions**

During the operational phase, limited gaseous or particulate emissions are anticipated from exhaust emissions (i.e. from operational vehicles), and from the augmentation plant. Windy conditions and the movement of vehicles on site may lead to dust creation.

<b>Project Component/s</b>	» Hard engineered surfaces. » On-site vehicles.
<b>Potential Impact</b>	» Dust and particulates from vehicle movement to and on-site. » Release of minor amounts of air pollutants (for example NO <sub>2</sub> , CO and SO <sub>2</sub> ) from vehicles and the augmentation plant.
<b>Activities/Risk Sources</b>	» Re-entrainment of deposited dust by vehicle movements. » Wind erosion from unsealed roads and surfaces. » Fuel burning vehicle and construction engines.
<b>Mitigation: Target/Objective</b>	» To ensure emissions from all vehicles are minimised, where possible. » To minimise nuisance to the community from dust emissions and to comply with workplace health and safety requirements.

Mitigation: Action/Control	Responsibility	Timeframe
Roads must be maintained to a manner that will ensure that nuisance to the community from dust is not visibly excessive.	The operator	Operation

Mitigation: Action/Control	Responsibility	Timeframe
Appropriate dust suppression must be applied to the roads as required to minimise/control airborne dust.	The operator	Operation
Speed of vehicles must be restricted on site, as defined by the Environmental Manager.	The operator	Operation
Vehicles and equipment must be maintained in a road-worthy condition at all times.	The operator	Operation

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No complaints from affected residents or community regarding dust or vehicle emissions.</li> <li>» Dust suppression measures implemented for where required.</li> <li>» Drivers made aware of the potential safety issues and enforcement of strict speed limits when they are employed.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Immediate reporting by personnel of any potential or actual issues with nuisance dust or emissions to the Site Manager.</li> <li>» A complaints register must be maintained, in which any complaints from residents/the community will be logged, and thereafter complaints will be investigated and, where appropriate, acted upon.</li> <li>» An incident reporting system must be used to record non-conformances to the EMPr.</li> </ul>

***OBJECTIVE 4: Ensure the implementation of an appropriate fire management plan during the operation phase***

The increased presence of people on the site could increase the risk of veld fires, particularly in the dry season.

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

Mitigation: Action/Control	Responsibility	Timeframe
Join the local Fire Protection Agency.	The operator	Operation

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Provide adequate fire-fighting equipment on site.	The operator	Operation
Provide fire-fighting training to selected operation and maintenance staff.	The operator	Operation
Ensure that appropriate communication channels are established to be implemented in the event of a fire.	The operator	Operation
Fire breaks should be established where and when required. Cognisance must be taken of the relevant legislation when planning and burning firebreaks (in terms of timing, etc.).	The operator	Operation
An emergency evacuation plan must be drawn up to ensure the safety of the staff and surrounding land users in the case of an emergency.	The operator	Operation
Contact details of emergency services should be prominently displayed on site.	The operator	Operation

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Fire-fighting equipment and training provided before the operational phase commences.</li> <li>» Appropriate fire breaks in place and maintained.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Perdekraal West Wind Farm must monitor indicators listed above to ensure that they have been met.</li> </ul>

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## MANAGEMENT PROGRAMME: DECOMMISSIONING

## CHAPTER 9

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It is most likely that decommissioning activities of the infrastructure would comprise the disassembly and removal of the power line from the site.

The EMP for Rehabilitation (chapter 7) is also relevant to the decommissioning of sections of the proposed distribution line and must be adhered to.

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 legislation applicable at that time, which may require this section of the EMP to be revisited and amended.

### 9.1. Objectives

The overall objective of the decommissioning phase is to leave the project area in a condition that minimises adverse impacts on the socio-economic and biophysical environment, with a legacy that contributes to sustainable development.

The objectives of the decommissioning phase of the proposed project are to:

- » Follow a process of decommissioning that is progressive and integrated into the short- and long-term project plans that will assess the closure impacts proactively at regular intervals throughout project life.
- » Implement progressive rehabilitation measures, beginning during the construction phase.
- » Leave a safe and stable environment for both humans and animals and make their condition sustainable.
- » Return rehabilitated land-use to a standard that can be useful to the post-project land user.
- » Where applicable, prevent any further soil and surface water contamination by maintaining suitable storm water management systems.
- » Maintain and monitor all rehabilitated areas following re-vegetation, and if monitoring shows that the objectives have been met, apply for closure.

### 9.2. Approach to the decommissioning phase

It is recommended that planning of the decommissioning of the project and rehabilitation of the site should take place well in advance (at least two years) of

the planned decommissioning activities. Important factors that need to be taken into consideration are detailed below.

### **9.2.1. Identification of structures for post-closure use**

Access roads should be assessed in conjunction with the ultimate land users to determine if these could be used in future. Where not required, these access roads should be decommissioned and rehabilitated.

### **9.2.2. Removal of infrastructure**

All infrastructure must be dismantled and removed. Inert material must be removed from site and disposed of at a registered landfill site. All foundations must be removed to a depth of 1m. Hard surfaced must be ripped to a depth of 1m and vegetated.

### **9.2.3. Soil amelioration**

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

- » The deposited soils must be ripped to ensure reduced compaction;
- » An acceptable seed bed should be produced by surface tillage;
- » Restore soil fertility;
- » Incorporate the immobile fertilisers in to the plant rooting zone before ripping; and
- » Apply maintenance dressing of fertilisers on an annual basis until the soil fertility cycle has been restored.

### **9.2.4. Establishment of vegetation**

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

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

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

### **9.2.5. Maintenance**

Established vegetation requires regular maintenance. If the growth medium consists of low-fertility soils, then regular maintenance will be required until the natural fertility cycle has been restored.

### **9.2.6. Monitoring**

The purpose of monitoring is to ensure that the objectives of rehabilitation are met and that the rehabilitation process is followed. The physical aspects of rehabilitation should be carefully monitored during the progress of establishment of desired final ecosystems.

The following items should be monitored continuously:

- » Erosion status;
- » Surface drainage systems and surface water quality;
- » Vegetation species diversity; and
- » Faunal re-colonisation.

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## **FINALISATION OF THE EMPR**

## **CHAPTER 10**

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The EMPr is a dynamic document, which must be updated to include any additional specifications as and when required. It is considered critical that this draft EMPr be updated to include site-specific information and specifications following the final walk-through survey by specialists of the power line. This will ensure that the construction and operation activities are planned and implemented considering sensitive environmental features.



**Appendix A:**  
Grievance Mechanism for Public  
Complaints and Issues

**Appendix B:**  
Principles for Erosion  
Management

**Appendix C:**  
**Waste Management Plan**