



# **ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)**

**PROPOSED SOUTRIVIER NORTH WIND ENERGY FACILITY,  
NORTHERN CAPE PROVINCE.**

**DFFE REFERENCE NUMBER: 14/12/16/3/3/2/2190**

**JANUARY 2023**

**SOUTRIVIER NORTH WIND ENERGY FACILITY,  
NORTHERN CAPE PROVINCE.**

*DFFE Reference Number: 14/12/16/3/3/2/2190*

**DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)**

**PREPARED FOR:**



**SOUTRIVIER NORTH WIND ENERGY FACILITY RF (PTY) LTD**

*A subsidiary of*

**WKN-WINDCURRENT SA (PTY) LTD**

**PREPARED BY:**



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**JANUARY 2023**

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**DEFINITIONS**

For the purposes of this Environmental Management Programme report (EMPr), the following terms, abbreviations and descriptions apply:

TERMS	DESCRIPTION
<b>Alien Vegetation</b>	Alien vegetation is defined as undesirable plant growth which shall include, but not be limited to all declared category 1 and 2 listed invader species as set out in the Conservation of Agricultural Resources Act (CARA) regulations. Other vegetation deemed to be alien shall be those plant species that show the potential to occupy in number, any area within the defined construction area and which are declared to be undesirable. This includes plant species identified as Alien and invasive species in the National Environmental Management Biodiversity Act of 2004, Alien and Invasive Species Regulations, 2014.
<b>Cement-laden water</b>	Cement laden water refers to water containing cement or concrete arising from the Contractor’s activities.
<b>Contaminated water</b>	Contaminate water refers to water that has been contaminated by the Contractor’s activities such as with hazardous substances, hydrocarbons, paints, solvents and runoff from plant, workshop or personnel wash areas but excludes water containing cement/ concrete or silt.
<b>Construction Camp</b>	Construction camp (site camps) refers to all storage and stockpile sites, site offices, container sites, workshops and testing facilities and other areas required to undertake construction activities.
<b>Environment</b>	Environment refers to the surroundings within which humans exist and that could be made up of:- <ul style="list-style-type: none"> <li>(i) The land, water and atmosphere of the earth;</li> <li>(ii) Micro-organisms, plant and animal life;</li> <li>(iii) Any part or combination of (i) and (ii) and the interrelationships among and between them; and</li> <li>(iv) The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.</li> </ul>
<b>Environmental Aspect</b>	An environmental aspect is any component of a Contractor’s construction activity that is likely to interact with the environment.
<b>Environmental Authorisation (EA)</b>	An Environmental Authorisation (EA) refers to a written statement from the relevant environmental authority, with or without conditions, that records the approval (partial approval or refusal) of a proposed project and the mitigating measures required to prevent or reduce the effects of environmental impacts during the lifespan of a contract.
<b>Environmental Control Officer (ECO)</b>	An Environmental Control Officer (ECO) refers to a suitably qualified and experienced person or entity appointed for the construction and/or operation of works, to perform the obligations specified in the EA.
<b>Environmental Impact</b>	An impact or environmental impact is the change to the environment, whether desirable or undesirable, that will result from the effect of a construction activity. An impact may be the direct or indirect consequence of a construction activity.
<b>Environmental Management Plan/Programme (EMP/EMPr)</b>	An Environmental Management Plan (EMP) or Programme (EMPr) is an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning specific to a project are prevented; and that the positive benefits of the project are enhanced.

TERMS	DESCRIPTION
<b>Environmental Management System (EMS)</b>	The internationally accepted and recognized environmental management system (EMS) which enables companies, organizations and operations to systematically manage, prevent and reduce environmental problems and associated costs. In terms of ISO 14001 an EMS is defined as, <i>“that part of the overall management system that includes organizational structure, planning activities, responsibilities, procedures, processes and resources for developing, implementing, reviewing and maintaining the environmental policy.”</i>
<b>Environmental Policy</b>	Environmental Policy is a statement (or statements) by the organisation of its intentions and principles in relation to its overall environmental performance which provides a framework for action and for the setting of its environmental objectives and targets.
<b>Environmental Site Officer (ESO)</b>	An Environmental Site Officer (ESO) refers to the site-based designated person responsible for implementing the environmental provisions of the construction contract and is appointed by the service provider that carries out construction activities.
<b>External Auditor</b>	An External Auditor is a suitably qualified and experienced independent expert as per the required auditor qualifications (ISO 14012).
<b>Independent Environmental Consultant (IEC)</b>	An Independent Environmental Consultant (IEC) is a suitably qualified and IEC appointed by the Engineer to perform the obligations specified in the Contract. The IEC must provide reports to the regulatory authority, the Engineer and any other parties as specified by the regulatory authority.
<b>Interested and/or Affected Party (I&amp;AP)</b>	An Interested and/or Affected Party (I&AP) is contemplated in Section 24(4)(d) of the NEMA (1998, Act No. 107) and which, in terms of that section, includes – <i>(i) Any person, groups of persons, organisation interested in or affected by an activity, and;</i> <i>(ii) Any organ of state that may have jurisdiction over any aspect of the activity.</i>
<b>ISO 14001 Environmental Management System (ISO 14001)</b>	The internationally accepted and recognised Environmental Management System as reflected in the document SABS ISO 14001: 1996; the most recent being the ISO 14001:2015.
<b>Method Statement (MS)</b>	A Method Statement (MS) is a written submission by the Contractor to the ECO in response to the EMPr or to a request by the ECO, setting out the plant (construction equipment), materials, labour and method the Contractor proposes to carry out an activity, identified by the relevant specification or the ECO when requesting the Method Statement. The MS should be in such detail that the ECO is able to assess whether the Contractor's proposal is in accordance with the EMPr and/or will produce results in accordance with the EMPr.
<b>Mitigate/Mitigation</b>	Mitigate (or mitigation) refers to the implementation of practical measures to reduce the adverse impacts, or to enhance beneficial impacts of a particular action.
<b>No-Go Area</b>	A no-go area refers to an area in which construction activities are prohibited.
<b>Pollution</b>	According to the NEMA (Act No. 107 of 1998), pollution can be defined as, <i>“Any change in the environment caused by (i) substances; (ii) radioactive or other waves; or (iii) noise, odours, dust or heat emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future”.</i>
<b>Potentially hazardous substance</b>	A potentially hazardous substance refers to a substance, which, in the reasonable opinion of the ECO, can have a harmful effect on the environment. Hazardous Chemical Substances are defined in the Regulations for Hazardous Chemical Substances published in terms of the Occupational Health and Safety Act.
<b>Reasonable</b>	Reasonable means reasonable in the opinion of the ECO, after consultation with the ESO - unless the context indicates otherwise.
<b>Rehabilitation</b>	Rehabilitation refers to re-establishing or restoring something to its original state or to a healthy, sustainable capacity or state.

TERMS	DESCRIPTION
<b>Site</b>	A site, in this context, refers to the area in which construction is taking place.
<b>Solid waste</b>	Solid waste refers to all solid waste materials, including construction debris, chemical waste, excess cement/concrete, wrapping materials, timber, tins, cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers).
<b>Species of Conservation Concern (SCC)</b>	Species of Conservation Concern (SCC) refers to species listed in the rare, indeterminate, or monitoring categories of the South African Red Data Books, and/or species listed in globally near-threatened, nationally threatened or nationally near threatened categories (Barnes, 1998).
<b>Threatened species</b>	Threatened species are defined as: a) species listed in the endangered or vulnerable categories in the revised South African Red Data Books or listed in the globally threatened category; b) species of special conservation concern (i.e. taxa described since the relevant South African Red Data Books, or whose conservation status has been highlighted subsequent to 1984); c) species which are included in other international lists; or d) species included in Appendix 1 or 2 of the Convention of International Trade in Endangered Species (CITES).
<b>Topsoil</b>	Topsoil refers to the top 100 mm of soil and may include top material, e.g. vegetation and leaf litter.

**TABLE OF CONTENTS**

**1 INTRODUCTION..... 1**

1.1 Objectives of the EMPr..... 1

1.2 Structure and Function of the EMPr ..... 2

1.3 Legislative Requirements ..... 3

1.4 Environmental Authorisation ..... 4

**2 DETAILS OF THE EAP & Specialist Team ..... 5**

2.1 Expertise of the EAP ..... 5

2.1 Details of the Specialist Team ..... 5

**3 PROPOSED ACTIVITY ..... 7**

3.1 Project Description..... 7

3.2 Project Locality ..... 8

3.3 Construction Site: Hours of Operation..... 8

**4 LAYOUT OF THE EMPr ..... 10**

4.1 Planning and Design Phase..... 10

4.2 Construction Phase ..... 10

4.3 Operational Phase ..... 10

4.4 Decommissioning Phase..... 10

**5 IMPACT MANAGEMENT ACTIONS..... 11**

5.1 General Construction Phase Mitigation and Management Measures..... 11

5.2 General and Specialist EIR Guidelines, Mitigation and Management Measures ..... 20

5.3 Cumulative Impact and Other Infrastructure..... 56

5.4 Site Sensitivity ..... 57

**6 ADMINISTRATION AND REGULATION OF ENVIRONMENTAL OBLIGATIONS ..... 58**

6.1 Management Structure ..... 58

6.2 Roles and Responsibilities ..... 58

6.2.1 *The Applicant (Developer)*..... 58

6.2.2 *The Contractor* ..... 58

6.2.3 *The Resident Engineer*..... 58

6.2.4 *The Environmental Site Officer (ESO)*..... 59

6.2.5 *Environmental Control Officer (ECO)* ..... 59

6.3 Compliance Monitoring and Corrective Action..... 61

6.4 Reporting and Review ..... 61

6.5 Monitoring..... 61

6.6 Emergency Preparedness..... 62

6.7 Environmental Incident Management ..... 62

6.8 Management Review ..... 62

**7 REPORTING..... 63**

7.1 Method Statements ..... 63

7.2 Good Housekeeping ..... 64

7.3 Record Keeping ..... 64

7.4 Document Control..... 64

**8 ENVIRONMENTAL AWARENESS ..... 65**

8.1 Environmental Training ..... 65

8.2 Monitoring of Environmental Training..... 65

**9 ENVIRONMENTAL MONITORING ..... 66**

9.1 General Environmental Monitoring ..... 66

9.2 Avifaunal and Bat Monitoring ..... 66

**10 MANAGEMENT PLANS ..... 67**

10.1 Open Space Management Plan ..... 67

10.2 Watercourse and Wetland Management Plan ..... 67

10.3 Faunal Relocation Plan .....	68
10.4 Botanical Search and Rescue.....	68
10.5 Site Clearing Plan.....	69
10.6 Rehabilitation and Landscape Management Plan.....	69
10.7 Alien Vegetation Management Plan .....	72
10.8 Fire Management Plan .....	75
10.9 Traffic, Transportation and Road Maintenance Management Plan .....	76
10.10 Stormwater Management Plan.....	77
10.11 Erosion Management Plan .....	78
10.12 Waste Management Plan.....	80
10.13 Emergency Response Plan .....	81
<b>11 CLOSURE PLANNING.....</b>	<b>85</b>
11.1 Post-Construction Audit .....	85
11.2 General Review of the EMPr .....	85
<b>12 CONCLUSIONS.....</b>	<b>86</b>
12.1 Impact Management Outcomes .....	86
12.2 Concluding Statements .....	86
<b>13 APPENDIX A.....</b>	<b>87</b>
<b>14 APPENDIX B .....</b>	<b>90</b>
<b>15 APPENDIX C .....</b>	<b>91</b>
<b>16 APPENDIX D.....</b>	<b>93</b>

# 1 INTRODUCTION

Soutrivier North Wind Energy Facility RF (Pty) Ltd, a subsidiary of WKN-Windcurrent SA (Pty) Ltd, (the Applicant) is proposing the construction of a Wind Energy Facility (WEF), near the towns of Victoria West and Loxton in the Pixley Ka Seme District Municipality (Northern Cape Province).

Table 1-1 below lists the proposed properties which will be affected by the proposed infrastructure.

**Table 1-1: 21-Digit Surveyor General (SG) Codes of the affected properties.**

WEF: SOUTRIVIER NORTH		
FARM NAME	21 DIGIT SG NUMBER	PORTION AND FARM NUMBER
Farm 261	C08000000000026100000	Remaining Extent of Farm 261
Slypfontein	C08000000000019900000	Remaining Extent of Farm 199
	C08000000000019900002	Portion 2 of Farm 199
Melton Wold	C08000000000015800003	Portion 3 of Farm 158 (also SR Central)
	C08000000000015800006	Portion 6 of Farm 158 (also SR Central)

## 1.1 OBJECTIVES OF THE EMPR

This Environmental Management Programme report (EMPr) has been compiled to provide mitigation, monitoring and institutional measures to be taken during the various phases of the Soutrivier North Energy Facility, situated within the Northern Cape Province. These measures aim to eliminate, offset and/or reduce adverse environmental and social impacts.

This EMPr informs all relevant parties, in this case, the Project Coordinator, the Contractor, the Environmental Control Officer (ECO) and all other staff employed by Soutrivier North Wind Energy Facility RF (Pty) Ltd at the site, of their duties in the fulfilment of the legal requirements for the construction and operation of the Soutrivier North WEF, with particular reference to the prevention and mitigation of anticipated potential environmental impacts.

All parties should note that obligations imposed by the EMPr are legally binding in terms of the Environmental Authorisation (EA) granted by the relevant environmental permitting authority, the national Department of Forestry, Fisheries and the Environment (DFFE).

The general objectives of the EMPr are to:

- Ensure compliance with the regulatory authority stipulations and guidelines which could be local, provincial, national and/or international;
- Ensure that there is sufficient allocation of resources on the project budget so that the scale of EMPr-related activities is consistent with the significance of project impacts;
- Verify environmental performance through information on impacts as they occur;
- Respond to unforeseen events;
- Provide feedback for continual improvement in environmental performance;
- Identify a range of mitigation measures which could reduce and mitigate the potential impacts to minimal or insignificant levels;
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project;
- Identify measures which could optimize beneficial impacts;
- Create management structures which address the concerns and complaints of I&APs with regards to the development;
- Establish a method of monitoring and auditing environmental management practices during all phases of the activity;



- Ensure that safety recommendations are complied with; and
- Specify time periods within which the measures contemplated in the final EMPr must be implemented, where appropriate.

## 1.2 STRUCTURE AND FUNCTION OF THE EMPR

An EMPr is focused on sound environmental management practices, which will be undertaken to minimise adverse impacts on the environment through the lifetime of a development. In addition, an EMPr identifies measures which should be in place or will be actioned to manage any incidents and emergencies that could occur during the operation of the project.

As such, the EMPr provides specifications which must be adhered to in order to minimise adverse environmental impacts associated with the various phases of the Soutrivier North Wind Energy Facility. The contents of the EMPr are consistent with the requirements as set out in Appendix 4 of the National Environmental Management Act (NEMA, Act No. 107 of 1998 and subsequent 2014 amendments) Environmental Impact Assessment (EIA) Regulations (2014, and subsequent 2017 amendments), as stipulated below.

### REQUIREMENTS OF AN ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT IN TERMS OF GN R. 982 (GN R. 326, 2017) APPENDIX 4

- (1) An EMPr must comply with Section 24(N) of the Act and include -
  - (a) Details of –
    - (i) The EAP who prepared the EMPr; and
    - (ii) The expertise of the EAP to prepare an EMPr, including a curriculum vitae;
  - (b) A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;
  - (c) A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;
  - (d) A description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including –
    - (i) Planning and design;
    - (ii) Pre-construction activities;
    - (iii) Construction activities;
    - (iv) Rehabilitation of the environment after construction and where applicable post closure; and
    - (v) Where relevant, operation activities;
  - (f) A description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable include actions to –
    - (i) Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;
    - (ii) Comply with any prescribed environmental management standards or practices;
    - (iii) Comply with any applicable provisions of the Act regarding closure, where applicable;
    - (iv) Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;
  - (g) The method of monitoring the implementation of the impact management actions contemplated in paragraph (f);
  - (h) The frequency of monitoring the implementation of the impact management actions contemplated in (f);

- (i) An indication of the persons who will be responsible for the implementation of the impact management actions;
  - (j) The time periods within which the impact management actions contemplated in paragraph (f) must be implemented;
  - (k) The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);
  - (l) A program for reporting on compliance, taking into account the requirement as prescribed by the regulations;
  - (m) An environmental awareness plan describing the manner in which –
    - (i) The applicant intends to inform his or her employees of any environmental risk which may result from their work; and
    - (ii) Risks must be dealt with in order to avoid pollution or the degradation of the environment; and
  - (n) Any specific information that may be required by the competent authority.
- (2) Where a government notice *gazetted* by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.

### 1.3 LEGISLATIVE REQUIREMENTS

Construction must be according to the best industry practices, as identified in the project documents. This EMPr, which forms an integral part of the contract documents, informs the Contractor of their duties in the fulfilment of the project objectives, with particular reference to the prevention, mitigation and management of environmental impacts caused by the activities of the various phases associated with the Soutrivier North WEF. The Contractor should note that obligations imposed by the approved EMPr are legally binding in terms of environmental statutory legislation and in terms of the additional conditions to the general conditions of contract which pertain to this project. In the event that any rights and obligations contained in this document contradict those specified in the standard or project specifications, then the latter must prevail.

The Contractor must identify and comply with all South African national and provincial environmental legislation, including associated regulations and all local by-laws relevant to the project. Key legislation currently applicable to the construction and operational phases of the project must be complied with. The list of applicable legislation provided below is intended to serve as a guideline only and is not exhaustive:-

TITLE OF LEGISLATION, POLICY OR GUIDELINE:	DATE:
National Environmental Management Act (NEMA) (Act No. 107 of 1998) and its subsequent amendments	1998 and 2014 amendments
National Environmental Management Act (NEMA) (Act No. 107 of 1998, as amended) Environmental Impact Assessment (EIA) Regulations (2014, as amended)	2014
The Constitution Act (Act No. 108 of 1996)	1996
National Heritage Resources Act (NHRA) (Act No. 25 of 1999)	1999
National Water Act (NWA) (Act No. 36 of 1998, as amended)	1998
National Environmental Management: Waste Act (NEMWA) (Act No. 59 of 2008, as amended)	2008
National Environmental Management: Protected Areas Act (NEMPAA) (Act No. 57 of 2003)	2003
National Environmental Management: Protected Areas Amendment Act (Act No. 31 of 2004)	2004
National Environmental Management: Air Quality Act (NEMAQA) (Act No. 39 of 2004, as amended)	2004
Conservation of Agricultural Resources Act (CARA) (Act No. 43 of 1983)	1983
National Environmental Management: Biodiversity Act (NEMBA) (Act No. 10 of 2004)	2004
National Forest Act (NFA) (Act No. 84 of 1998, as amended)	1998
National Environmental Management: Biodiversity Act, Alien and Invasive Species Regulations (2014)	2014
Occupational Health and Safety Act (OHSA) (Act No. 85 of 1993, as amended)	1993
Hazardous Substances Act (HSA) (Act No. 15 of 1973)	1973
Spatial Planning and Land Use Management Act (SPLUMA) (Act No. 16 of 2013)	2013

TITLE OF LEGISLATION, POLICY OR GUIDELINE:	DATE:
Electricity Regulation Act (Act No. 4 of 2006, as amended)	2006
Aviation Act (Act No. 74 of 1962): 13 <sup>th</sup> Amendment of the Civil Aviation Regulations 1997, dated 2008	1962, 1997 and 2008
Minerals and Petroleum Resources Development Act (MPRDA) (Act No. 28 of 2002, as amended)	2002
Provincial Nature and Environmental Conservation Ordinance (No. 19 of 1974)	1974
Northern Cape Nature Conservation Act (Act No. 9 of 2009)	2009
National Road Traffic Act (NRTA) (Act No. 39 of 1996)	1996
National Veld and Forest Fire Act (Act No. 101 of 1998)	1998
South African Bureau of Standards (SABS)	
National Infrastructure Plan (NIP, 2012)	2012
Local Government: Municipal Systems Act (Act No. 32 of 2000)	2000
Pixley Ka Seme District Municipality (Northern Cape) Development Plans and Frameworks	Most recent
Ubuntu Local Municipality (Northern Cape) Development Plans and Frameworks	

#### 1.4 ENVIRONMENTAL AUTHORISATION

In accordance with the requirements of the NEMA (Act No. 107 of 1998, as amended) EIA Regulations (2014, as amended), the proposed Soutrivier North WEF is subject to a Scoping and EIA Process.

This EMPr interprets the findings of the EIR and prescribes project-specific specifications to be achieved. The EMPr is a progressive working document which should be updated throughout the development phases, as required.

## 2 DETAILS OF THE EAP & SPECIALIST TEAM

### 2.1 EXPERTISE OF THE EAP

**EAP: Dr Alan Carter, Pri.Sci.Nat, Registered EAP**

**NEMA registered Company: Coastal and Environmental Services (Pty) Ltd. t/a CES**

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Dr Alan Carter is an Executive and the East London Branch Manager at CES. He has extensive training and experience in both financial accounting and environmental science disciplines with international accounting firms in South Africa and the USA. He is a member of the American Institute of Certified Public Accountants (licensed in Texas) and holds a PhD in Plant Sciences. He is also a certified ISO14001 EMS auditor with the American National Standards Institute. Alan has been responsible for leading and managing numerous and varied consulting projects over the past 25 years. He is a registered professional with the South African Council for Natural Scientific Professionals (SACNASP) and a registered EAP through the Environmental Assessment Practitioners Association of South Africa (EAPASA).

### 2.1 DETAILS OF THE SPECIALIST TEAM

<b>Environmental Consultants</b>	<b>Alan Carter</b> , Project Leader & The EAP <i>CES</i>
	<b>Caroline Evans</b> , Project Manager & Co-Author <i>CES</i>
	<b>Bruce d’Hotman</b> , Co-Author & GIS Mapping <i>CES</i>
<b>Avifaunal Specialist</b>	<b>Anja Albertyn</b> , Avifaunal Specialist <i>Holland &amp; Associates Environmental Consultants</i>
<b>Bat Specialist</b>	<b>Jonathan Aronson</b> , Bat Specialist <i>Camissa Sustainability Consulting</i>
<b>Ecological Specialist</b>	<b>Jamie Pote</b> , Ecological Specialist <i>Jamie Pote Consulting</i>
<b>Freshwater Specialist</b>	<b>Rabia Mathakutha</b> , Freshwater Specialist <i>FEN Consulting</i>
<b>Heritage Specialist</b>	<b>Nelius Kruger</b> , Archaeological Specialist <i>CES</i>

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**Noise  
Specialist**

**Morné de Jager**, Acoustic Specialist  
*Enviro Acoustic Research, Menco*

---

**Paleontological  
Specialist**

**John Almond**, Paleontological Specialist  
*Natura Viva cc*

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**Riverine Rabbit  
Specialist**

**Christy Bragg**, Zoologist  
*Bohemian Scientist*

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**Socio-Economic  
Specialist**

**Marchelle Terblanche**, Socio-economic Specialist  
*INDEX*

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**Visual  
Specialist**

**Bryony van Niekerk**, Visual Specialist  
*NuLeaf Planning and Environmental*

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### 3 PROPOSED ACTIVITY

#### 3.1 PROJECT DESCRIPTION

The proposed Soutrivier North Wind Energy Facility (WEF) includes the following infrastructure:

- Up to thirty-one (31) wind turbines (maximum nominal power output of up to 270MW) with a rotor diameter of 240m, a hub height of 200m, blade length of up to 120m, and a total tip height of up to 320m;
  - Permanent laydown area of up to 3 000m<sup>2</sup> per turbine.
  - Temporary laydown area of up to 3 000m<sup>2</sup> per turbine.
  - Turbine foundations of up to 900m<sup>2</sup> per turbine.
- IPP Substation (SS) of up to 3ha (inclusive of a 33/132kV SS, offices and parking and a permanent SS laydown area);
- Temporary laydown area, CTMF and CC of up to 10ha;
- BESS of up to 10ha (temporary laydown area, CTMF and CC area will be converted to the BESS facility post-construction phase);
- Medium voltage cabling between turbines and the switching stations, to be laid underground where technically feasible; and
- Internal access roads of up 31km constructed at up to 14m wide (construction phase), rehabilitated to 8m wide (operational phase). Existing roads will be used as far as possible. However, where required, internal access roads will be constructed between the turbines.

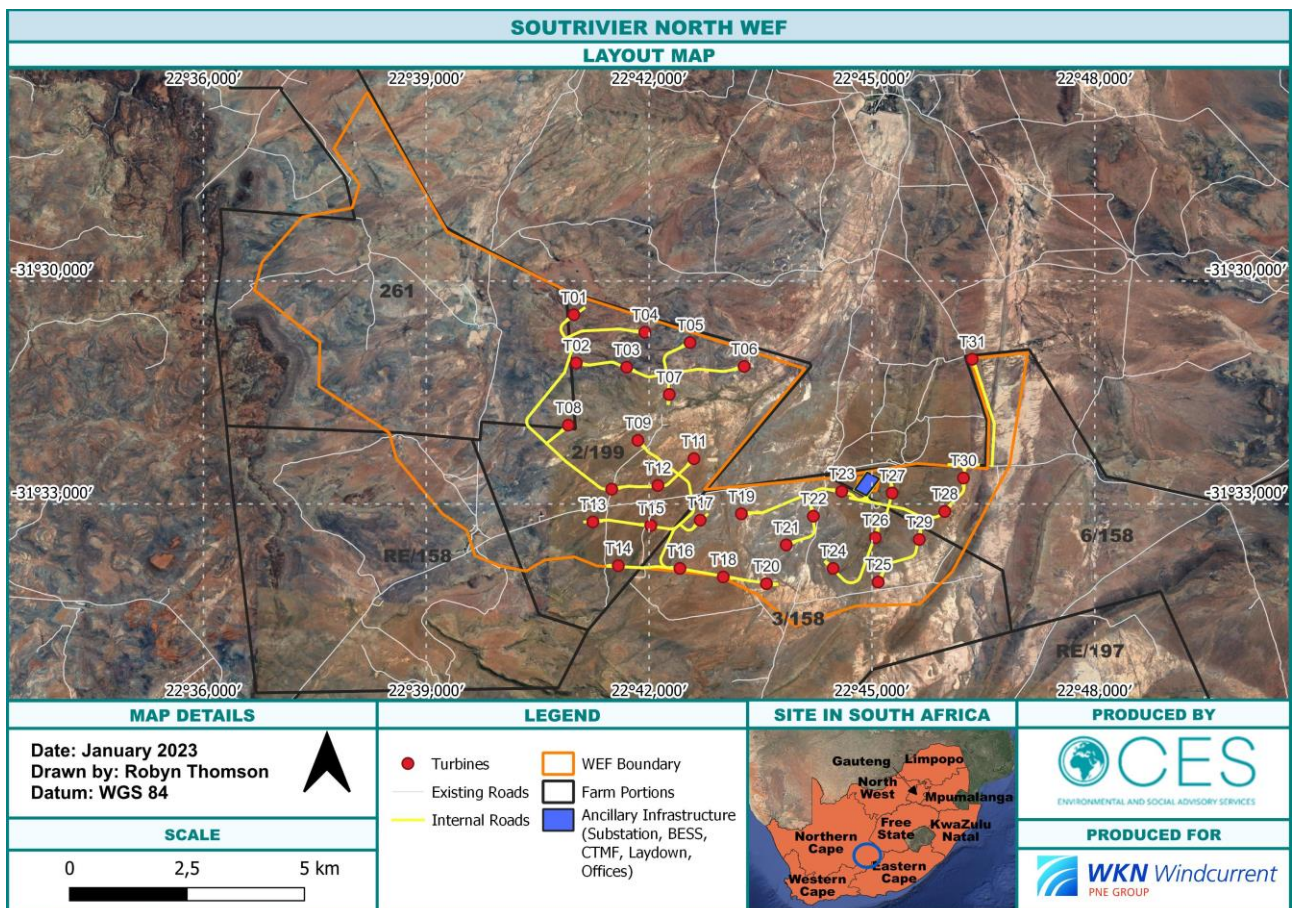


Figure 3-1: Layout Map of the Proposed Soutrivier North Wind Energy Facility Development site.

### 3.2 PROJECT LOCALITY

Soutrivier North WEF will be situated between the towns of Victoria West and Loxton in the Northern Cape Province of South Africa. The proposed Soutrivier North WEF is located on the following farm portions:

- Farm 158 (Melton Wold), Portions 3 and 6;
- Farm 199 (Slypfontein), Remaining Extent (RE) and Portion 2; and
- Farm 261, Remaining Extent (RE).

These properties are situated within the Ubuntu Local Municipality in the Northern Cape Province.

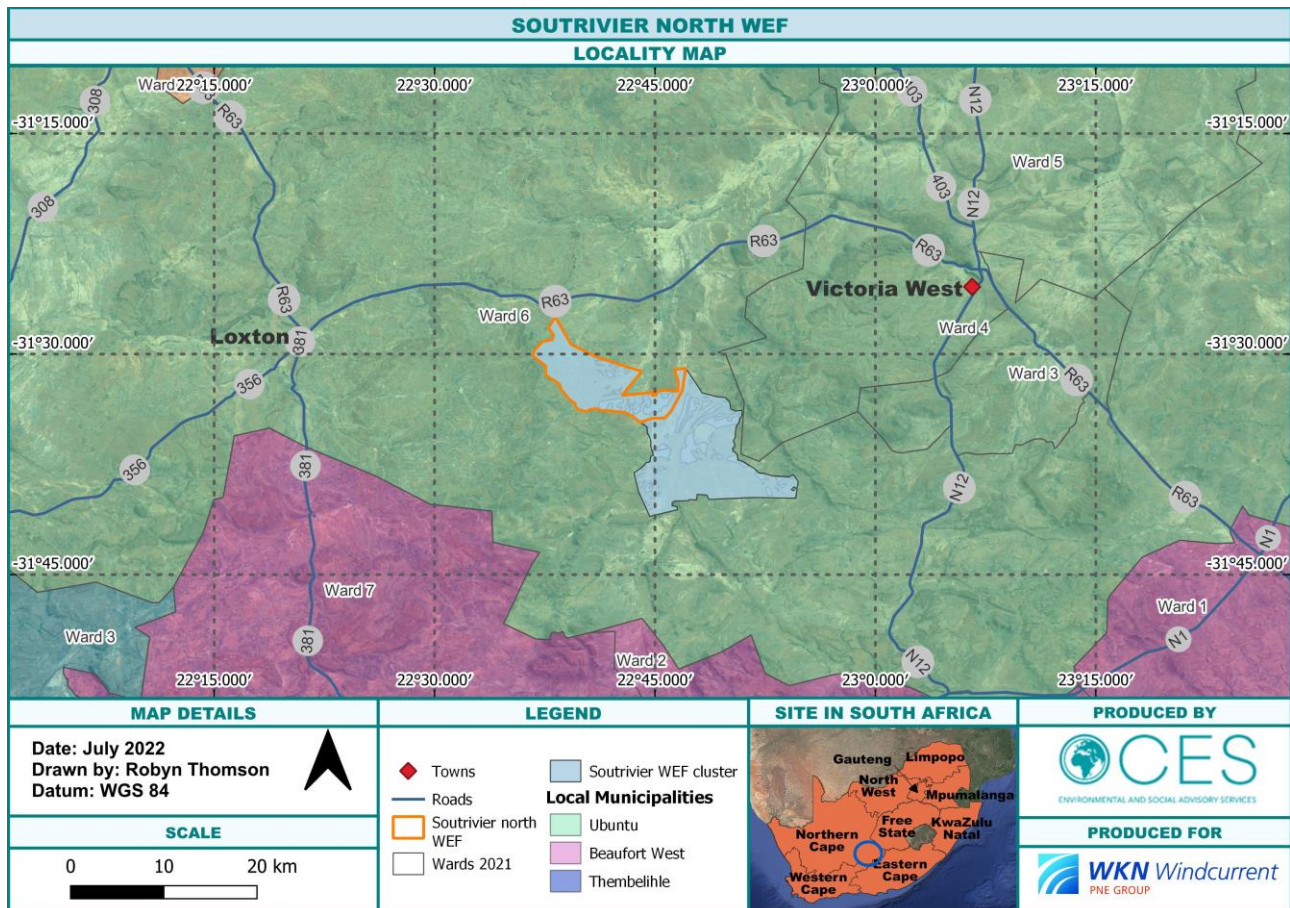


Figure 3-2: Locality Map of the Proposed Soutrivier North WEF.

### 3.3 CONSTRUCTION SITE: HOURS OF OPERATION

Due to the rural nature and on-going agricultural activities within the area, the Ecological Specialist stipulated that no construction activities should occur between dusk and dawn. In certain cases, owing to the nature of the construction activity, it may be necessary to extend the working hours to allow for completion of tasks such as turbine erection or concrete pouring into foundation excavations. Table 3-1 summarises the construction activities anticipated to take place on the site. Those activities underlined in Table 3-1 may take place during working hours AND between dusk and dawn if necessary.

Table 3-1: Summary of construction activities on site. Underlined activities may take place outside of regular working hours (i.e. between dusk and dawn).

PHASE	DURATION	ACTIVITIES	TYPICAL PLANT & MACHINERY
Site Establishment (low impact)	Dependent on the number of	1. Setting out of construction area 2. Site camp establishment <u>o Levelling of camp area</u>	1. LDV (i.e. bakkie) 2. Dump trucks, TLB, roller and possibly a grader or excavator

PHASE	DURATION	ACTIVITIES	TYPICAL PLANT & MACHINERY
	turbines. Generally, 1 – 2 years.	<ul style="list-style-type: none"> <li>o Import and placement of aggregates to form a free draining platform</li> <li>o Delivery of office and welfare containers</li> <li>o Electricity, sanitation, and internet connections</li> </ul> 3. Erection of temporary stock-proof fencing across the site to separate stock from the construction area	3. LDV
Civil and Electrical Works (high impact)		1. Topsoil stripping and bulk earthworks (excavations and backfill) for roads, hardstandings and WTG foundations. <u>2. Concrete works</u> <u>3. Fixing reinforcement</u> 4. Cable ducting, trenching and laying 5. Road and hardstanding construction (placement of aggregate layers) 6. Blasting (if hard rock present) 7. Pylon erection and electrical cable stringing (where there is an overhead power line) <u>8. Above activities but within the substation and relevant to substation construction and including building construction works e.g. bricklaying, roofing, installation and testing of electrical equipment such as transformers and switchgear</u>	1. Dozer, excavator, dump trucks, water trucks, vibratory roller 2. Concrete pump and concrete delivery trucks 3. Flat-bed delivery trucks, telehandler/ excavator 4. Excavator/ TLB 5. As item 1 6. Specialist explosives sub-contractor with appropriate drilling equipment. Excavators and dump trucks. 7. Flat-bed delivery trucks, telehandler/ excavator, LDVs 8. As above
Wind Turbine Erection (possible low impact)		<u>1. Delivery of WTG components</u> <u>2. Assembly/erection of WTG</u> <u>3. Crane and assembling tools shifting</u> <u>4. Crane disassembling, cranes, and site DEMOB</u>	1. Flat-bed or clamp style delivery trucks with components of up to 10m height and 120m length, mobile crane (250 tonne capacity), telehandler 2. Mobile crane, flat bed delivery trucks, telehandler 3. Main crane (750 tonne capacity), mobile crane, telehandler
Wind Turbine Testing and Commissioning (low impact)		1. Internal fit-out of WTG 2. Testing and commissioning	1. LDV, generator on a trailer towed by the LDV. 2. As above.
Overall Wind Farm Testing (low impact)		1. Testing	1. LDV for staff transport

By allowing selected construction activities to continue outside of the stipulated working hours the construction period will be reduced, thus minimising the environmental impacts of the construction period as a whole.

If it becomes necessary for additional activities to take place outside of daylight hours, this must be agreed to in writing by the ECO, and permission from the landowner must be obtained.



## 4 LAYOUT OF THE EMPr

In order to ensure a holistic approach to the management of environmental impacts during the planning and design, construction, operational and decommissioning phases of the proposed Soutrivier North WEF, this EMPr sets out the methods by which proper environmental controls are to be implemented by the Contractor and all other parties involved. These phases of development are discussed in more detail below and has specific issues unique to that phase.

### 4.1 PLANNING AND DESIGN PHASE

The Planning and Design Phase is an integral component of the project life cycle and requires interaction between the design engineers and environmental consultants to ensure that the engineers are aware of the environmental constraints that must be considered and incorporated into the final design of the project.

The format of the Planning and Design Phase section is to ensure that all specifications are included in the design phase. It requires ongoing and in-depth discussions between the final design team and the appointed Environmental Control Officer (ECO). The engineer will have to cost for and be available for, ongoing discussions with the ECO at all stages of final design.

### 4.2 CONSTRUCTION PHASE

The Construction Phase section details the environmental management system/framework within which construction activities will be governed, and it consists of various actions, initiatives, and systems which the Contractor will have to ensure are in place and are undertaken. It consists of both a management system and environmental specifications which contain detailed specifications that will need to be undertaken or adhered to by the Contractor.

The Construction Phase section will need to be developed parallel to the final design stages, and constructive input should be invited from the selected Contractor. Sound environmental management is orientated around a pragmatic, unambiguous but enforceable set of guidelines and specifications, and for this reason it is imperative that the Contractor, while being bound by the EMPr, fully understands it, and has had input into its final development. For this reason, the final construction EMPr will need to be signed off after input from the selected Contractor prior to the initiation of construction activities. It should, however, be noted that the Contractor must tender on the existing document and that in areas of uncertainty, a precautionary approach to the environmental guidelines and specifications must be adopted.

### 4.3 OPERATIONAL PHASE

The Operational Phase section provides specific guidance related to operational activities associated with a particular development. By taking proactive measures during the Construction Phase, potential environmental impacts emanating during the Operational Phase will be minimised. Monitoring of certain issues, such as the success of vegetation re-establishment and erosion control, will be required to continue during operation. The final Operational Phase section should be developed in conjunction with any other relevant stakeholders prior to the adoption thereof.

### 4.4 DECOMMISSIONING PHASE

This section includes principles for the Decommissioning Phase of the Soutrivier North WEF. This section will require revisiting and updates at the time of decommissioning.

## 5 IMPACT MANAGEMENT ACTIONS

### 5.1 GENERAL CONSTRUCTION PHASE MITIGATION AND MANAGEMENT MEASURES

In addition to the mitigation measures and impact management actions which were stipulated in the Soutrivier North WEF EIR, and included in Section 5.2 of this report, the following general Construction Phase mitigation and management measures will apply.

Table 5-1: General Construction Phase Mitigation Measures

GENERAL CONSTRUCTION PHASE		
ACTIVITY	MITIGATION AND MANAGEMENT MEASURES	
1.	<b>SITE DEMARCATION</b>	<p>The location, layout, and method of establishment of the construction camp, including the following, must be clearly indicated, and demarcated prior to the commencement of construction:</p> <ul style="list-style-type: none"> <li>• All Contractors' offices;</li> <li>• Lay down areas;</li> <li>• Vehicle wash areas (if any);</li> <li>• Workshops and drip trays;</li> <li>• Fuel storage areas (including filling and dispensing from storage tanks);</li> <li>• Cement/concrete mixing areas (including the methods employed for the mixing of concrete and particularly the containment of runoff water from such areas and the method of transportation of concrete); and</li> <li>• Other infrastructure required for the running of the project.</li> </ul> <ul style="list-style-type: none"> <li>• The Contractor must erect and maintain permanent and/or temporary fences in the locations directed by the ECO. Such fences should, if so specified, be erected before undertaking designated activities;</li> <li>• All no-go areas in proximity to the construction camp must be clearly demarcated on-site by the ECO or botanical specialist; and</li> <li>• The Contractor must ensure that, insofar as he/she has the authority, no person, machinery, equipment, or materials enter the "no-go" areas at any time.</li> </ul>
2.	<b>SITE ACCESS</b>	<p>Details, including a drawing, showing where and how the access points and routes will be located and managed must be submitted to the ECO. These should be supported by the following management requirements:</p> <ul style="list-style-type: none"> <li>• On the site and within such distance of the site as may be stated, the Contractor should control the movement of all vehicles, including vehicles of suppliers so that they remain on designated routes, are distributed so as not to cause an undue concentration of traffic and that all relevant laws are complied with. In addition, such vehicles should be routed and operated in a manner that minimises the disruption to regular users of the routes;</li> <li>• On gravel or earth roads onsite and within 500 m of the site, the Contractor's vehicles as well as the suppliers' must not exceed a speed of 40 km/h or as directed by the ECO; and</li> <li>• The Contractor must supply the ECO with a Method Statement detailing the location and management of all access points and roads.</li> </ul>
3.	<b>MATERIALS HANDLING, USE AND STORAGE</b>	<ul style="list-style-type: none"> <li>• The Contractor must ensure that any delivery drivers are informed of all procedures and restrictions (including identified "no-go" areas) required to comply with this EMP; and</li> <li>• The Contractor must ensure that these delivery drivers are supervised during offloading, by someone with an adequate understanding of the requirements of the EMP;</li> <li>• Materials must be appropriately secured to ensure safe passage between destinations. Loads including, but not limited to, sand, stone chip, fine vegetation, refuse, paper and cement, should have appropriate cover to prevent them spilling from the vehicle during transit;</li> </ul>

GENERAL CONSTRUCTION PHASE		
ACTIVITY		MITIGATION AND MANAGEMENT MEASURES
		<ul style="list-style-type: none"> <li>The Contractor will be responsible for any clean up resulting from the failure by their employees or suppliers to properly secure transported materials;</li> <li>All manufactured and/or imported material should be stored within the Contractor's camp, and, if required by the EMPr, out of the rain;</li> <li>All laydown areas outside of the construction camp will be subject to the ECO's approval; and</li> <li>Imported gravel, fill, soil, and sand materials should be free of weeds, alien invasive seed matter, plant material, litter and contaminants and must be obtained from sources approved by the ECO.</li> </ul>
4.	STOCKPILING	<ul style="list-style-type: none"> <li>Any stockpiling of gravel, cut, fill or any other material including spoil must only be in areas that have been approved by the ECO within the defined working area;</li> <li>The Contractor should ensure that the material does not blow or wash away. If the stockpiled material is in danger of being washed or blown away, the Contractor should spray it with Dustex or cover it with a suitable material, such as hessian or plastic. Stockpiles of topsoil must not be covered with plastic; and</li> <li>No stockpiling of any material will be allowed within 20 m of any "no-go" areas.</li> </ul>
5.	SOLID WASTE MANAGEMENT	<ul style="list-style-type: none"> <li>Onsite burning, burying, or dumping of any waste materials, litter or refuse must not occur;</li> <li>The Contractor should provide vermin and weatherproof bins with lids of sufficient number and capacity to store the solid waste produced on a daily basis. The lids must be kept firmly on the bins at all times;</li> <li>Bins must not be allowed to become overfull and should be emptied daily;</li> <li>The waste from bins may be temporarily stored onsite in a central waste area that is weatherproof and scavenger proof, and which the ECO has approved;</li> <li>Recyclable waste should be disposed of into separate skips/bins and removed offsite for recycling;</li> <li>All solid waste must be disposed of offsite at an approved registered landfill site. The Contractor must supply the ECO with the appropriate disposal certificates; and</li> <li>The Contractor must submit a solid waste management plan, as part of the Pollution Control Method Statement, to the ECO.</li> </ul>
6.	WATER USE	<ul style="list-style-type: none"> <li>All sources of water for construction purposes must be approved by the ECO in writing before any such sources can be used to obtain water; and</li> <li>All wash water should be recycled for use as wash water again or for dust suppression, where applicable.</li> </ul>
7.	HAZARDOUS SUBSTANCES	<ul style="list-style-type: none"> <li>The transportation and handling of hazardous substances must comply with the provisions of the Hazardous Substances Act (Act No.187 of 1993) and associated regulations as well as SABS 0228 and SABS 0229;</li> <li>The Contractor must also comply with all other applicable regional and local legislation and regulations with regard to the transport, use and disposal of hazardous substances. Hazardous chemical substances (as defined in the Regulations for Hazardous Chemical Substances) used during construction must be stored in secondary containers. The relevant Material Safety Data Sheets (MSDS) must be available onsite;</li> <li>Procedures detailed in the MSDSs must be followed in the event of an emergency situation;</li> <li>The Contractor will be responsible for the training and education of all personnel onsite who will be handling hazardous materials about their proper use, handling and disposal; and</li> <li>If potentially hazardous substances are to be stored or used onsite, the Contractor must submit a Method Statement to the ECO detailing the substances/materials to be</li> </ul>

GENERAL CONSTRUCTION PHASE		
ACTIVITY	MITIGATION AND MANAGEMENT MEASURES	
		used, together with the transport, storage, handling, and disposal procedures for the substances.
8.	<b>CEMENT AND MIXING OF CONCRETE</b>	<ul style="list-style-type: none"> <li>● The proposed location of cement mixing areas (including the location of cement stores and sand and aggregate stockpiles) must be indicated on the site layout plan and approved by the ECO;</li> <li>● All wastewater generated from the operation and cleaning of concrete mixing equipment and other sources of concrete should be passed through a concrete wastewater settlement system;</li> <li>● The Contractor must ensure that minimal water is used for washing of concrete and cement mixing equipment;</li> <li>● Used cement bags must be disposed of in weatherproof bins onsite to prevent the generation of wind-blown cement dust and the bags from blowing away;</li> <li>● The Contractor must ensure that concrete is mixed on mortar boards, all visible remains of concrete are removed and disposed of as waste and that all surplus aggregate is removed; and</li> <li>● As part of the Pollution Control and Concrete Mixing Method Statement, a plan detailing all actions to be taken to comply with the requirements must be submitted by the Contractor to the ECO.</li> </ul>
9.	<b>FUELS AND OIL</b>	<p><u>Fuel Storage</u></p> <ul style="list-style-type: none"> <li>● All construction materials including fuels and oil should be stored in demarcated areas that are contained within berms/bunds. Washing and cleaning of equipment should also be done in berms or bunds, in order to trap any cement and prevent excessive soil erosion;</li> <li>● All necessary approvals with respect to fuel storage and dispensing must be obtained from the appropriate authorities. Symbolic safety signs depicting “No Smoking” and “Danger”, conforming to the requirement of SABS 1186, must be prominently displayed in and around the fuel storage area. There must be adequate fire-fighting equipment at the fuel storage area;</li> <li>● The Contractor must ensure that all liquid fuels and oils are stored in tanks with lids, which are kept firmly shut and under lock and key at all times. The capacity of the tank should be clearly displayed, and the product contained within the tank clearly identified using the emergency information system detailed in SABS 0232 part 1. Fuel storage tanks capacity must not exceed 9 000 litres and must be kept on-site only for as long as fuel is needed for construction activities, on completion of which they must be removed;</li> <li>● Tanks onsite should not be linked or joined via any pipe work but should remain as separate entities. The tanks must be situated on a smooth impermeable base with a bund. The volume inside the bund should be 110% of the total capacity of the largest storage tank. The base may be constructed of concrete, or of plastic sheeting with impermeable joints with a layer of sand over to prevent perishing. The impermeable lining should extend to the crest of the bund. The floor of the bund should be sloped to enable any spilled fuel and/or fuel-contaminated water to be removed. Appropriate material, approved by the ECO that absorbs / breaks-down or encapsulates minor hydrocarbon spillage and which is effective in water should be installed in the sump;</li> <li>● Adequate precautions should be provided to prevent spillage during the filling of any tank and during the dispensing of the contents. The dispensing mechanism for the fuel storage tanks should be stored in a waterproof container when not in use; and</li> <li>● As part of the required site layout for the construction camp, a plan must be submitted to the ECO detailing the design, location and construction of the fuel storage area as well as for the filling and dispensing from storage tanks and for the type of absorbing / breaking-down or encapsulating material to be used.</li> </ul>

GENERAL CONSTRUCTION PHASE		
ACTIVITY	MITIGATION AND MANAGEMENT MEASURES	
	<p><u>Refuelling</u></p> <ul style="list-style-type: none"> <li>• Where reasonably practical, the plant should be refuelled at a designated re-fuelling area/depot or at a workshop as applicable. If this is not reasonably practical, then the surface under the refuelling area must be protected and appropriately bunded against pollution to the reasonable satisfaction of the ECO prior to any refuelling activities;</li> <li>• If fuel is dispensed from 200-litre drums, the proper dispensing equipment must be used, and the drum should not be tipped in order to dispense fuel. The Contractor should ensure that the appropriate fire-fighting equipment is present during refuelling operations;</li> <li>• The Contractor must ensure that there is always a supply of absorbent material readily available to absorb / breakdown or where possible, be designed to encapsulate minor hydrocarbon spillages. The quantities of such materials should be able to handle a minimum of 200 ℓ of hydrocarbon liquid spill. Prior to any refuelling or maintenance activities, the ECO must approve this material;</li> </ul> <p><u>Used oil and hydrocarbon contaminated materials</u></p> <ul style="list-style-type: none"> <li>• Used oil should be stored at a central location onsite prior to removal offsite for disposal at an approved disposal or recycling site; and</li> <li>• Old oil filters and oil, petrol and diesel-soaked material must be treated as hazardous waste. The Contractor should remove all oil, petrol, and diesel-soaked sand immediately and should dispose of it as hazardous waste or treat it onsite with material that breaks down or encapsulates such spillages as approved by the ECO.</li> </ul>	
10.	<p><b>WORKSHOP, EQUIPMENT MAINTENANCE AND STORAGE</b></p>	<ul style="list-style-type: none"> <li>• The Contractor should ensure that in his workshop and other plant maintenance facilities, including those areas where, after obtaining the ECO's approval, the Contractor carries out emergency plant maintenance, there is no contamination of the soil or vegetation. The workshop must have a smooth impermeable (concrete or thick plastic covered with sand) floor;</li> <li>• The floor should be bunded and sloped towards an oil trap or sump to contain any spillages. When servicing equipment, drip trays should be used to collect the waste oil and other lubricants. Drip trays should also be provided in construction areas for stationary plant (such as compressors) and for "parked" plant (such as scrapers, loaders, vehicles);</li> <li>• All vehicles and equipment must be kept in good working order and serviced regularly. Leaking equipment must be repaired immediately or removed from the site;</li> <li>• All vehicle and equipment washing must be undertaken in the workshop or maintenance areas, and these areas must be equipped with a suitable impermeable floor and sump/oil trap. The use of detergents for washing should be restricted to low phosphate and nitrate products and low sudsing-type detergents; and</li> <li>• As part of the site layouts, a plan must be submitted to the ECO detailing the design of the bunding of the workshop and how run-off from the workshop will be managed as well as how drip trays used under plant will be managed.</li> </ul>
11.	<p><b>ABLUTION FACILITIES</b></p>	<ul style="list-style-type: none"> <li>• Washing, whether of a person or of personal effects, and acts of excretion and urination are strictly prohibited other than at the facilities provided. The Contractor must provide the necessary ablution facilities for all their personnel prior to the commencement of work;</li> <li>• Ablution facilities must be supplied by the Contractor for the workers at a ratio of at least 1 toilet per 20 workers in areas approved by the ECO. Toilets should be situated within 200 m of any area where work is taking place in numbers sufficient to meet the ratio depicted above for the workers in the area;</li> <li>• The facilities should be maintained in a hygienic state and serviced regularly. Toilet paper must be provided. Temporary/portable toilets should be secured to the ground</li> </ul>

GENERAL CONSTRUCTION PHASE		
ACTIVITY		MITIGATION AND MANAGEMENT MEASURES
		<p>to prevent them toppling due to wind or any other cause, to the satisfaction of the ECO; and</p> <ul style="list-style-type: none"> <li>Discharge into the environment and burial of waste is strictly prohibited. The Contractor must ensure that no spillage occurs when the toilets are cleaned or emptied and that the contents are removed from the site. Toilets must be emptied before any temporary site closure.</li> </ul>
12.	EATING AREAS	<ul style="list-style-type: none"> <li>The Contractor should designate eating area(s), subject to the approval of the ECO. No cooking is allowed outside of the Contractor’s camp area onsite;</li> <li>At mealtimes, all workers must eat in designated eating areas. These areas should have shade for the workers;</li> <li>Sufficient bins must be present in these areas. All disposable food packaging must be disposed of in the bins after every meal; and</li> <li>The feeding- or leaving of food for animals is strictly prohibited.</li> </ul>
13.	SITE STRUCTURES	<ul style="list-style-type: none"> <li>All site establishment components (as well as equipment) should be positioned to limit visual intrusion on neighbouring areas and the size of the land area disturbed. The type and colour of roofing and cladding materials of the Contractor's temporary structures should be selected to reduce reflection; and</li> <li>The Contractor should supply and maintain adequate and suitable sheds for the storage of materials. Sheds for the storage of materials that may deteriorate or corrode if exposed to the weather should be weatherproof, adequately ventilated and provided with raised floors.</li> </ul>
14.	LIGHTING	<ul style="list-style-type: none"> <li>The Contractor should ensure that any lighting installed on the site for their activities does not cause a reasonably avoidable disturbance to neighbouring residents or the naturally occurring fauna; and</li> <li>The installation of low UV emitting lights, such as most LEDs is recommended, as these cause less disturbance to insects and fauna.</li> </ul>
15.	NOISE	<ul style="list-style-type: none"> <li>The Contractor should take precautions to minimise noise generated on-site (e.g. install and maintain silencers on machinery where necessary);</li> <li>The Contractor must comply with the Noise Induced Hearing Loss Regulations published under the Occupational Health and Safety Act;</li> <li>Appropriate directional and intensity settings are to be maintained on all hooters and sirens;</li> <li><u>When possible and practical</u>, work should be limited to daylight hours – between 06:00 and 18:00 (see Table 3-1). Permission to work outside these times will require approval from the ECO; and</li> <li>No amplified music must be allowed on site. The Contractor must not use sound amplification equipment on-site unless in emergency situations.</li> </ul>
16.	DUST CONTROL	<ul style="list-style-type: none"> <li>The Contractor will be responsible for the continued control of dust arising from their operations. The Contractor must take all reasonable measures to minimize the generation of dust as a result of construction activities to the satisfaction of the ECO. Appropriate dust suppression measures include spraying or dampening with water, using a commercial dust binder (such as Hydropam or Dustex), rotovating straw bales, planting of open cleared space and the scheduling of dust-generating activities. If the conditions are such that the Contractor cannot satisfactorily dampen the dust, then the ECO may halt operations until such time as the conditions are more suitable for lower dust-generating construction activities;</li> <li>Areas that are to have the topsoil stripped for construction purposes must be limited and only stripped when work is about to take place;</li> <li>Other activities and situations that may result in a dust nuisance include site clearance and other earth moving operations, open cleared space, stockpiles of topsoil or sand and activities associated with concrete mixing; and</li> </ul>

GENERAL CONSTRUCTION PHASE		
ACTIVITY	MITIGATION AND MANAGEMENT MEASURES	
		<ul style="list-style-type: none"> <li>The appropriate health and safety equipment (e.g. dust masks) should be worn by workers during the phases of dust-producing construction activity.</li> </ul>
17.	<b>ENVIRONMENTAL AWARENESS TRAINING</b>	<ul style="list-style-type: none"> <li>Environmental awareness training courses should be run for all personnel onsite (See Annexure A for a proposed Basic Environmental Education Course). Two courses should be run, one for the Contractor's and Subcontractor's management and one for all site staff and labourers. Courses should be run in the morning during normal working hours at a suitable venue provided by the Contractor. All attendees should remain for the duration of the course and sign an attendance register on completion, that clearly indicates participant's names, a copy of which must be handed to the ECO;</li> <li>The size of each session should be limited to thirty (30) people. The Contractor should allow for sufficient sessions to train all personnel. Subsequent sessions should be run for any new personnel coming onto site. A Method Statement with respect to the organisation of these courses should be submitted; and</li> <li>Notwithstanding the specific provisions of this clause, it is incumbent upon the Contractor to convey the sentiments of the EMP to all personnel and Subcontractors involved with the Works.</li> </ul>
18.	<b>FIRE CONTROL</b>	<ul style="list-style-type: none"> <li>The Contractor must take all the necessary precautions to ensure that fires are not started as a result of site activities;</li> <li>No open fires must be permitted on the site;</li> <li>Smoking must not be permitted in areas where there is a fire hazard. Such areas include the workshop and fuel storage areas and any areas where the vegetation or other material is such as to support the rapid spreading of an initial flame;</li> <li>The Contractor should appoint a Fire Officer who will be responsible for ensuring immediate and appropriate actions in the event of a fire and will ensure that employees are aware of the procedures to be followed. The Contractor must forward the name of the Fire Officer to the ECO for approval within 7 days of being on-site;</li> <li>The Contractor must ensure that there is basic firefighting equipment available onsite at all times. This should include at least rubber beaters when working in urban open spaces and natural areas, and at least one fire extinguisher of the appropriate type when welding or other "hot" activities are undertaken; and</li> <li>The Contractor will be liable for any expenses incurred by any organisations called to assist with fighting fires that were started as a result of their activities or personnel, and for any cost relating to the rehabilitation of burnt areas, or consequential damages.</li> </ul>
19.	<b>EMERGENCY PROCEDURES</b>	<ul style="list-style-type: none"> <li>Emergency procedures, including the names and contact details of responsible personnel and emergency services must be made available to all staff and should be clearly displayed at relevant locations at the site. The Contractor should advise the ECO of any emergencies onsite, together with a record of action taken, within 24 hours of the emergency occurring; and</li> <li>The Contractor must submit a Method Statement covering the procedures for the following emergencies:               <p><u>Fire</u></p> <ul style="list-style-type: none"> <li>The Contractor should advise the relevant authority of a fire as soon as one starts and must not wait until it is out of control; and</li> <li>The Contractor must ensure that all employees are aware of the procedures to be followed in the event of a fire.</li> </ul> <p><u>Accidental leaks and spillages</u></p> <ul style="list-style-type: none"> <li>The Contractor must ensure that all employees are aware of the procedures to be followed for dealing with spills and leaks, which must include notifying the ECO and the relevant authorities. The Contractor must ensure that all the necessary materials</li> </ul> </li> </ul>

GENERAL CONSTRUCTION PHASE		
ACTIVITY		MITIGATION AND MANAGEMENT MEASURES
		<p>and equipment for dealing with spills and leaks are available onsite at all times. Treatment and remediation of the spill areas must be undertaken to the reasonable satisfaction of the ECO;</p> <ul style="list-style-type: none"> <li>• In the event of a hydrocarbon spill, the source of the spillage must be isolated, and the spillage contained. The area should be cordoned off and secured. The Contractor should ensure that there is always a supply of absorbent material readily available to absorb / breakdown or where possible, be designed to encapsulate minor hydrocarbon spillages. The quantities of such materials should be able to handle a minimum of 200 ℓ of hydrocarbon liquid spill; and</li> <li>• Any spills must be cleared, and the contaminated soil or sludge disposed of in an appropriate manner, approved by the ECO, or at a licensed hazardous waste disposal site.</li> </ul>
20.	PROTECTION OF NATURAL FEATURES	<ul style="list-style-type: none"> <li>• The Contractor must not deface, paint, damage or mark any natural features (e.g. rock formations or trees) situated in or around the site for survey or other purposes unless agreed upon beforehand with the ECO. Any features affected by the Contractor in contravention of this clause must be restored/rehabilitated to the satisfaction of the ECO; and</li> <li>• The Contractor and onsite staff must not at any stage enter dense, intact vegetation without written approval from the ECO.</li> </ul>
21.	PROTECTION OF FAUNA AND FLORA	<ul style="list-style-type: none"> <li>• A Botanist has identified the need for plant search and rescue (done as part of the pre-submission process) to identify Species of Conservation Concern (SCC) to be relocated;</li> <li>• Protected plant species must be removed from the designated construction footprint and relocated to adjacent areas of similar habitat that should not be affected by construction activities. The plants should be used in landscaping once construction is complete (if applicable);</li> <li>• Except to the extent necessary for the carrying out of the works, flora should not be removed, damaged or disturbed;</li> <li>• The removal and stockpiling of topsoil must also be carried out in accordance with this EMPr;</li> <li>• Trapping, poisoning and/or shooting of animals is strictly forbidden. No domestic pets or livestock are permitted onsite;</li> <li>• The use of chemicals of all forms should be carefully controlled and monitored to avoid contamination of surrounding areas; and</li> <li>• Construction phases should allow for education of staff as to the significance of species of conservation concern.</li> </ul>
22.	PROTECTION OF HERITAGE FEATURES	<ul style="list-style-type: none"> <li>• Construction managers and/or foremen must be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites;</li> <li>• If concentrations of palaeontological and/or archaeological heritage material and human remains are uncovered during construction, all work must cease immediately and be reported to the South African Heritage Resources Agency (SAHRA) (021 642 4502) so that systematic and professional investigation/ excavation can be undertaken; and</li> <li>• Any person who causes intentional damage to archaeological or historical sites and/or artefacts could be penalised or legally prosecuted in terms of the National Heritage Resources Act (Act No. 25 of 1999).</li> </ul>
23.	VEGETATION CLEARANCE	<ul style="list-style-type: none"> <li>• Vegetation clearing and trampling must be avoided in areas demarcated as “no-go” areas (if any);</li> <li>• Temporary infrastructure such as the site camp, lay down areas and storage areas must not be placed in any other area than the area approved by the ECO;</li> <li>• The Contractor must work according to a plan, which demarcates areas to be cleared. The plan should be part of the Project Layout Plan developed in the Site Design Phase;</li> </ul>



GENERAL CONSTRUCTION PHASE		
ACTIVITY	MITIGATION AND MANAGEMENT MEASURES	
		<ul style="list-style-type: none"> <li>The minimum amount of vegetation clearance must take place; and</li> <li>Collection of, or wilful damage to, any plants outside of the areas demarcated for clearing is not allowed.</li> </ul>
24.	TOPSOIL	<ul style="list-style-type: none"> <li>Topsoil should only be stripped from the areas as indicated below:               <ul style="list-style-type: none"> <li>Any area which is to be used for temporary storage of materials;</li> <li>Areas which could be polluted by any aspect of the construction activity; and</li> <li>Areas designated for the dumping of soil.</li> </ul> </li> <li>Stripping of topsoil should be undertaken in such a manner as to minimise erosion by wind or runoff;</li> <li>Outside of the development footprint, topsoil will be stripped to a depth not exceeding 150 mm from the original ground level;</li> <li>Areas from which the topsoil is to be removed must be cleared of any foreign material which could form part of the topsoil during removal including bricks, rubble, any waste material, litter, excess vegetation and any other material which could reduce the quality of the topsoil;</li> <li>The Contractor must ensure that subsoil and topsoil are not mixed during stripping, excavation, reinstatement and rehabilitation. If mixed with clay sub-soil, the usefulness of the topsoil for rehabilitation of the site will be lost;</li> <li>Soils should be exposed for the minimum time possible once cleared;</li> <li>Topsoil should be temporarily stockpiled, separately from (clay) subsoil and rocky materials;</li> <li>Topsoil should only be stockpiled in areas designated by the ECO;</li> <li>Stockpiles will either be vegetated with indigenous grasses or covered by a suitable fabric to prevent erosion and invasion of weeds; and</li> <li>Stockpiled topsoil must not be compacted.</li> </ul>
25.	STORMWATER MANAGEMENT	<ul style="list-style-type: none"> <li>Stormwater should be managed using suitable structures such as swales, gabions and rock rip-wrap so that any run-off from the development site is attenuated prior to discharge. Silt and sedimentation should be kept to a minimum, through the use of the above-mentioned structures by also ensuring that all structures don't create any form of erosion; and</li> <li>Natural run-off must be diverted to stormwater drains where these are available.</li> </ul>
26.	EROSION AND SEDIMENTATION CONTROL	<ul style="list-style-type: none"> <li>The Contractor must take all reasonable measures to limit erosion and sedimentation due to construction activities and must comply with such detailed measures as required by this EMP; and</li> <li>Revegetate areas that have been disturbed as soon as possible;</li> <li>Where erosion and/or sedimentation occur, whether on or off the site, despite the Contractor complying with the aforementioned, rectification should be carried out in accordance with details specified by the ECO. Where erosion and/or sedimentation occur due to the fault of the Contractor, rectification must be carried out to the reasonable requirements of the ECO and at the expense of the Contractor; and</li> <li>Actions must also be taken in the event of heavy rains and potential flooding, whereby diversion barriers must not cause excessive erosion.</li> </ul>
27.	AESTHETICS	<ul style="list-style-type: none"> <li>The Contractor must take reasonable measures to ensure that construction activities do not have an unreasonable impact on the aesthetics of the area.</li> </ul>
28.	COMMUNITY RELATIONS	<ul style="list-style-type: none"> <li>The Contractor must keep a "Complaints Register" onsite. The Register should contain all contact details of the person who made the complaint, and information regarding the complaint itself as well as the date and time that the complaint was resolved;</li> <li>The ESO will be responsible for responding to queries and/or complaints and may request assistance from the Contractor's Management Staff;</li> <li>The Complaints Register must be audited by the ECO; and</li> </ul>

GENERAL CONSTRUCTION PHASE	
ACTIVITY	MITIGATION AND MANAGEMENT MEASURES
29.	<p style="text-align: center;"><b>TEMPORARY SITE CLOSURE</b></p> <ul style="list-style-type: none"> <li>● Construction materials and other purchases relating to the project should be done, where possible, within the nearby community and at local shops.</li> <li>● If the Site is closed for a period exceeding 5 days, the Contractor’s Safety, Health and Environment (SHE) Officer in consultation with the ECO should carry out the following checklist procedure and ensure that the following conditions pertain and report on compliance with this clause:</li> </ul> <p><u>Fuels / flammables / hazardous materials stores</u></p> <ul style="list-style-type: none"> <li>● Fuel stores are as low in volume as practicable;</li> <li>● There are no leaks;</li> <li>● The outlet is secure and locked;</li> <li>● The bund is empty;</li> <li>● Fire extinguishers are serviced and accessible;</li> <li>● The area is secure from accidental damage through vehicle collision and the like;</li> <li>● Emergency and contact numbers are available and displayed; and</li> <li>● There is adequate ventilation in enclosed spaces.</li> </ul> <p><u>Safety</u></p> <ul style="list-style-type: none"> <li>● Check that site safety checks have been carried out in accordance with the Occupational Health and Safety Act (No. 85 of 1993) prior to site closure;</li> <li>● An inspection schedule and log for use by security or contracts staff is developed;</li> <li>● All trenches and manholes are secured;</li> <li>● Applicable notice boards are in place and secured;</li> <li>● Emergency and Management contact details are prominently displayed;</li> <li>● Security personnel have been briefed and have the facilities to contact or be contacted by relevant management and emergency personnel;</li> <li>● Night hazards such as reflectors, lighting, traffic signage etc. have been checked;</li> <li>● Fire hazards identified and the local authority notified of any potential threats, e.g. large brush stockpiles, fuels etc.;</li> <li>● Pipe stockpiles are wedged / secured;</li> <li>● Scaffolds are secure; and</li> <li>● Structures vulnerable to high winds are secure.</li> </ul> <p><u>Erosion</u></p> <ul style="list-style-type: none"> <li>● Wind and dust mitigation measures such as straw, brush packs, irrigation etc. are in place;</li> <li>● Excavated and filled slopes and stockpiles are at a stable angle;</li> <li>● Re-vegetated areas have a watering schedule and the supply to such areas is secured; and</li> <li>● There are sufficient detention ponds or channels in place.</li> </ul> <p><u>Water contamination and pollution</u></p> <ul style="list-style-type: none"> <li>● Hazardous fuel stores are secure;</li> <li>● Cement and materials stores are secure;</li> <li>● Toilets are empty and secured;</li> <li>● Refuse bins are empty and secured;</li> <li>● Bunding is clean and treated with appropriate material that will absorb / breakdown and where possible be designed to encapsulate minor hydrocarbon spillage; and</li> <li>● Drip trays are empty and secure.</li> </ul>

**5.2 GENERAL AND SPECIALIST EIR GUIDELINES, MITIGATION AND MANAGEMENT MEASURES**

The EAP and specialists have recommended the following additional mitigation and management measures which must be implemented during the relevant phases of development of the Soutrivier North WEF.

Comprehensive ECO audits should be undertaken during the development of the Soutrivier North WEF to verify compliance with the mitigation and management measures which are stipulated in the sections below. If compliance with any of these mitigation or management measures cannot be met, it will be the responsibility of the appointed Contractor to provide reasons/motivations for the non-compliance(s).

**Table 5-2: Planning and Design Phase Mitigation Measures and Management Actions, General**

ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES
<b>PLANNING AND DESIGN PHASE – GENERAL EIR</b>		
1.	<b>TRAFFIC &amp; TRANSPORT</b>	<ul style="list-style-type: none"> <li>Project planning must include a transport management plan that will be implemented, especially during the construction phase of the development.</li> <li>The necessary road traffic permits must be obtained for transporting parts, containers, materials, and construction equipment to the site.</li> <li>Careful planning of the routes taken by heavy and extra-large vehicles must highlight areas of road that may need to be upgraded in order to accommodate these vehicles. Once identified these areas must be upgraded if necessary.</li> </ul>
2.	<b>STORAGE OF HAZARDOUS SUBSTANCES</b>	<ul style="list-style-type: none"> <li>All hazardous substances such as paints, diesel and cement must be stored in a bunded area with an impermeable surface beneath them.</li> <li>Cement mixing must ideally be done at a single location which should be suitably located. However, it might be required that grouting mix is prepared at each of the WTG locations for the jointing of concrete towers.</li> </ul>
3.	<b>ENVIRONMENTAL LEGISLATION AND POLICY</b>	<ul style="list-style-type: none"> <li>Ensure that all relevant legislation and policy is consulted and further ensure that the project is compliant with such legislation and policy. In addition, planning for the construction and operation of the proposed energy facility should consider available best practice guidelines. These should include (but are not restricted to):               <ul style="list-style-type: none"> <li>Local and District Spatial Development Frameworks</li> <li>Local Municipal bylaws</li> </ul> </li> </ul>
4.	<b>STORMWATER MANAGEMENT PLAN AND EROSION</b>	<ul style="list-style-type: none"> <li>Structures must be located at least 32 m away from identified drainage lines.</li> <li>Water Use Licences will be required, where relevant, prior to construction</li> <li>A Storm Water Management Plan must be designed and implemented to ensure maximum water seepage at the source of water flow.</li> <li>The plan must include management mitigation measures for water pollution, wastewater management and the management of surface erosion e.g. by considering the applicability of contouring, etc.</li> </ul>
5.	<b>WASTE MANAGEMENT PLAN</b>	<ul style="list-style-type: none"> <li>A waste management plan must be developed and implemented for handling on-site waste.</li> <li>An appropriate area where waste can be stored before disposal must be designated.</li> </ul>
6.	<b>ELECTROMAGNETIC INTERFERENCE</b>	<ul style="list-style-type: none"> <li>Accurate siting of wind turbines must take place in the planning and design phase to reduce these effects.</li> <li>If complaints are received from surrounding landowners regarding this issue, the developer must investigate and mitigate these issues to the best of their abilities.</li> </ul>
7.	<b>SHADOW FLICKER</b>	<ul style="list-style-type: none"> <li>The layout of wind turbines must be designed in order to minimize the effects of shadow flicker on surrounding landowners.</li> <li>Recommendations made by the visual impact assessor with regard to the identification of landowners who may be within range of the shadow flicker caused by the turbines, must be implemented.</li> <li>If surrounding landowners complain of shadow flicker-related issues, these must be investigated and mitigated to the best of the developers’ ability.</li> </ul>

**Table 5-3: Construction Phase Mitigation Measures and Management Actions, General**

ACTIVITY	MITIGATION AND/OR MANAGEMENT MEASURES
<b>CONSTRUCTION PHASE – GENERAL EIR</b>	
1.	<p style="text-align: center;"><b>SITE ESTABLISHMENT</b></p> <ul style="list-style-type: none"> <li>● The Contractor shall establish construction camps, offices, workshops and any other infrastructure as per the agreed site layout plan in a manner that does not adversely affect the environment.</li> <li>● The Contractor shall submit a method statement for site clearance for approval by the Proponent in consultation with the ECO. Site establishment shall take place in an orderly manner and all required amenities shall be installed at camp sites before the main workforce move onto site.</li> <li>● The Construction camp shall have the necessary ablution facilities with chemical toilets at commencement of construction activities to the satisfaction of the Project Coordinator. The Contractor shall inform all site staff to make use of supplied ablution facilities and under no circumstances shall indiscriminate sanitary activities be allowed other than in supplied facilities.</li> <li>● Safe drinking water for human consumption shall be available at the site offices and at other convenient locations on site. All water used on site must be taken from a legal source and comply with the recognised standards for potable and other uses.</li> <li>● The Contractor shall provide adequate facilities for his staff so that they are not encouraged to supplement their comforts on site by accessing what can be taken from the natural surroundings.</li> <li>● The Contractor shall ensure that energy sources are available at all times for construction and supervision personnel for heating and cooking purposes.</li> <li>● The Contractor shall supply waste collection bins where such is not available, and all solid waste collected shall be disposed of at a municipal registered landfill. These bins must be equipped with animal-proof lids to ensure the contents are not accessible to wild or domestic animals.</li> <li>● A certificate of disposal shall be obtained by the Contractor and kept on file.</li> <li>● Where a registered waste site is not available close to the construction site, the Contractor shall provide a method statement (i.e. how and where he intends to dispose of the waste) with regard to waste management. The disposal of waste shall be in accordance with all relevant legislation.</li> <li>● Under no circumstances may solid waste be burnt on site.</li> <li>● ESO to assist in siting of structures and supervise any bush clearing for the construction camp. This must be submitted to the ECO for approval. Construction camp should be fenced to avoid sprawl.</li> <li>● If there is a concrete batching site, it should be fenced. Shade cloth should be attached to the fence to stop sand blowing around.</li> </ul>
2.	<p style="text-align: center;"><b>SITE CLEARING</b></p> <ul style="list-style-type: none"> <li>● Site clearing must take place in phased manner, as and when required. The area to be cleared must be clearly demarcated and this footprint strictly maintained.</li> <li>● Vegetation clearing must be restricted to the identified sites for the construction camp, cement mixing areas, ancillary infrastructure lay down areas, underground power cable route, control cabin and other activities on-site that have been identified as necessary for development of the project.</li> <li>● Where feasible, spoil must be used for rehabilitation on-site. Where this is not possible spoil that is removed from the site must be removed to an approved spoil site or municipal licensed landfill site.</li> <li>● Silt fences and erosion control measures must be implemented in areas where these risks are more prevalent. These include steep areas.</li> <li>● Topsoil must be neatly stockpiled adjacent to the excavations ready for backfill when required.</li> <li>● The Contractor shall ensure that all work is undertaken in a manner that minimises the impact on vegetation outside the immediate area of the Works. No tree or shrub outside the area of the Works shall be felled, topped, cut, or pruned until it has been</li> </ul>

ACTIVITY	MITIGATION AND/OR MANAGEMENT MEASURES
<b>CONSTRUCTION PHASE – GENERAL EIR</b>	
	<p>clearly marked for this purpose by the Contractor. The method of marking should be included in a Method Statement for the ECO’s approval, and no tree outside the area of the works shall be burned for any purpose.</p>
3.	<p><b>SOIL IMPACTS</b></p> <p><u>Topsoil</u></p> <ul style="list-style-type: none"> <li>• The full depth of topsoil should be stripped from areas affected by construction and related activities prior to the commencement of major earthworks. This should include the building footprints, working areas and storage areas. Topsoil must be reused where possible to rehabilitate disturbed areas.</li> <li>• The upper 30 cm of topsoil must be stripped and stockpiled as topsoil. It should be retained for re-spreading over disturbed surfaces during rehabilitation.</li> <li>• Care must be taken not to mix topsoil and subsoil during stripping.</li> <li>• Polluted topsoil must be disposed of at a licensed landfill site. Waste manifests must be kept as proof that this has been disposed of legally.</li> <li>• Topsoil stockpiles are to be handled only twice – once during clearing and stockpiling, and once during rehabilitation/backfilling.</li> </ul> <p><u>Soil Stripping</u></p> <ul style="list-style-type: none"> <li>• No soil stripping must take place on areas within the site that the Contractor does not require for construction works, or on areas of retained vegetation.</li> <li>• Subsoil and topsoil should, in all construction and lay down areas, be stockpiled separately to be returned for backfilling in the correct soil horizon order.</li> <li>• Construction vehicles must only be allowed to utilise existing tracks or pre-planned access routes.</li> </ul> <p><u>Stockpiles</u></p> <ul style="list-style-type: none"> <li>• Stockpiles should not be situated such that they obstruct natural water pathways and drainage channels.</li> <li>• Stockpiles should not exceed 1.5 m in height, with the exception of the WTG foundation excavation stockpile height that shall be limited to the height of the excavation.</li> <li>• If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by vegetation or cloth.</li> <li>• Stockpiles may further be protected by the construction of berms or low brick walls around their bases.</li> <li>• Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding.</li> </ul> <p><u>Fuel storage</u></p> <ul style="list-style-type: none"> <li>• Topsoil and subsoil to be protected from contamination.</li> <li>• Fuel and material storage must be away from stockpiles.</li> <li>• Cement, concrete and chemicals must be mixed on an impermeable surface and provisions should be made to contain spillages or overflows into the soil.</li> <li>• Any storage tanks containing hazardous materials must be placed in bunded containment areas with sealed surfaces. The bund walls must be high enough to contain 110% of the total volume of the stored hazardous material.</li> <li>• Contaminated soil must be contained and disposed of off-site at an approved landfill site. Waste manifests must be kept as proof that this has been disposed of legally.</li> </ul> <p><u>Concrete mixing</u></p> <ul style="list-style-type: none"> <li>• No vehicles transporting concrete to the site may be washed on site. If this cannot be avoided, the Contractor must provide a disposal site for the washing and the cleaning of the trucks and should maintain this site and ensure that no residual concrete is spread out around the project site.</li> <li>• If a batching plant is necessary, run-off should be managed effectively to avoid contamination of other areas of the site. Untreated run-off from the batch plant</li> </ul>

ACTIVITY	MITIGATION AND/OR MANAGEMENT MEASURES
<b>CONSTRUCTION PHASE – GENERAL EIR</b>	
	<p>must not be allowed to get into the storm water system or any rivers, streams, wetlands or existing erosion channels / dongas.</p> <ul style="list-style-type: none"> <li>● If it is impractical to dispose of water at a WWTW then a Method Statement should be compiled to make provision for a system that will not allow wastewater to contaminate the surrounding area (e.g. settling ponds).</li> <li>● Drip trays should be used when off-loading concrete trucks to collect any concrete that spills.</li> </ul> <p><u>Earthworks</u></p> <ul style="list-style-type: none"> <li>● Soils compacted during construction should be deeply ripped to loosen compacted layers and re-graded to even running levels. Topsoil should be spread over landscaped areas.</li> </ul>
4.	<p><b>EROSION</b></p> <ul style="list-style-type: none"> <li>● Wind screening and stormwater control should be undertaken to prevent soil loss from the site.</li> <li>● All erosion control mechanisms need to be regularly maintained.</li> <li>● Retain vegetation where possible to avoid soil erosion</li> <li>● Vegetation clearance should be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time.</li> <li>● Re-vegetation of disturbed surfaces should occur immediately after the construction activities are completed.</li> <li>● No impediment to the natural water flow other than approved erosion control works is permitted.</li> </ul>
5.	<p><b>AIR QUALITY</b></p> <p><u>Dust control</u></p> <ul style="list-style-type: none"> <li>● Damping down of un-surfaced and un-vegetated areas during dusty periods is required. Potable water must not be used for this and only water abstracted from sources approved by DWS in agreement with the landowners is permitted.</li> <li>● Retention of vegetation where possible will reduce dust travel.</li> <li>● Excavations and other clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighbouring areas.</li> <li>● The Contractor shall be responsible for dust control on site to ensure no nuisance is caused to the Landowner or neighbouring Communities.</li> <li>● A notice at the junction of the N10 and the access road must be installed with a phone number that public can use to lodge complaints about dust.</li> <li>● A speed limit of 40km/h must not be exceeded on dirt roads.</li> <li>● Any complaints or claims emanating from the lack of dust control shall be attended to immediately by the Contractor.</li> </ul> <p><u>Emissions control</u></p> <ul style="list-style-type: none"> <li>● Regular servicing of vehicles in order to limit gaseous emissions (to be done off-site).</li> <li>● Regular servicing of on-site toilets to avoid potential odours.</li> <li>● Allocated cooking areas must be provided.</li> </ul> <p><u>Fire prevention</u></p> <ul style="list-style-type: none"> <li>● All cooking shall be done in demarcated areas that are safe in terms of runaway or uncontrolled fires. It is recommended that a formal “braai area” is constructed at the site office for cooking.</li> <li>● The Contractor shall have operational firefighting equipment available on site at all times. The level of firefighting equipment must be assessed and evaluated through a typical risk assessment process. It may be necessary to increase the level of protection, especially during the winter months.</li> </ul>
6.	<p><b>WATER QUALITY</b></p> <p><u>Sanitation</u></p> <ul style="list-style-type: none"> <li>● Adequate sanitary and ablutions facilities must be provided for construction workers. Such an agreement must be conducted between the relevant municipality</li> </ul>

ACTIVITY	MITIGATION AND/OR MANAGEMENT MEASURES
<b>CONSTRUCTION PHASE – GENERAL EIR</b>	
	<p>and the developer. In the case of Soutrivier North the local municipality has agreed to meet with the developer to discuss roles and responsibilities based on proximity to the WEF.</p> <ul style="list-style-type: none"> <li>The facilities must be regularly serviced to reduce the risk of surface or groundwater pollution.</li> </ul> <p><u>Hazardous materials</u></p> <ul style="list-style-type: none"> <li>Use and /or storage of materials, fuels and chemicals which could potentially leak into the ground must be controlled in a manner that prevents such occurrences.</li> <li>All storage tanks containing hazardous materials must be placed in bunded containment areas with sealed surfaces.</li> <li>The bund wall must be high enough to contain 110% of the total volume of the stored hazardous material with an additional allocation for potential high runoff stormwater events.</li> <li>Any hazardous substances must be stored at least 100m from any of the water bodies on site.</li> <li>Contaminated wastewater (such as concrete wastewater) must be managed by the Contractor to ensure existing water resources on the site are not contaminated. All wastewater from general activities in the camp shall be collected and removed from the site for appropriate disposal at a licensed commercial facility.</li> <li>Waste manifests must be kept as proof of legal disposal at a hazardous landfill site</li> </ul> <p><u>Water resources</u></p> <ul style="list-style-type: none"> <li>Site staff shall not be permitted to use any other open water body or natural water source adjacent to or within the designated site for the purposes of bathing, washing of clothing or for any construction related activities.</li> <li>Municipal water (or another source approved by the ECO or secured through a WUL) should be used for all activities such as washing of equipment or disposal of any type of waste, dust suppression, concrete mixing, compacting, etc.</li> <li>Compaction of backfilled material must attain low soil permeability.</li> <li>Site design and operation must be such that surface/storm water is diverted away from excavation trenches.</li> <li>Backfilling of trenches must be done in such a way that water ponding and erosion of the backfilled trench are avoided.</li> </ul> <p><u>Stormwater</u></p> <ul style="list-style-type: none"> <li>The site must be managed in a manner that prevents pollution of drains, downstream watercourses or groundwater, due to suspended solids, silt or chemical pollutants.</li> <li>Temporary cut-off drains and berms may be required to capture stormwater and promote infiltration.</li> <li>Hazardous substances must be stored at least 100 m away from any water bodies on-site to avoid pollution.</li> </ul>
7.	<p><b>NOISE</b></p> <ul style="list-style-type: none"> <li>Construction site yards, workshops, and other noisy fixed facilities should be located well away from noise sensitive areas. Once the proposed final layouts are made available by the contractor(s), the sites must be evaluated in detail and specific mitigation measures designed into the system.</li> <li>Noise levels must be kept within acceptable limits. All noise and sounds generated must adhere to SABS 0103 specifications for maximum allowable noise levels for residential areas. No pure tone sirens or hooters may be utilised except where required in terms of SABS standards or in emergencies.</li> </ul>
8.	<p><b>BIODIVERSITY</b></p> <ul style="list-style-type: none"> <li>Any animals rescued or recovered will be relocated in suitable habitat away from any infrastructure. An expert who holds a Competency Certificate to handle Dangerous and Venomous Reptiles should be contracted to remove any snakes.</li> </ul>

ACTIVITY	MITIGATION AND/OR MANAGEMENT MEASURES
<b>CONSTRUCTION PHASE – GENERAL EIR</b>	
	<ul style="list-style-type: none"> <li>• Cleared vegetation can be used to form wood piles, and logs and stumps can be placed in rehabilitated areas. Dead or decaying wood piles should be created as these also provide valuable refuge, especially due to the clearance of vegetation cover.</li> <li>• Logs and stumps also provide important habitats for several reptile species as well as smaller mammals, amphibians, arachnids, and scorpions. With time they will eventually be reduced to valuable compost. Dead trees and stumps are also used for nesting purposes by barbets, hoopoes and owls, as well as perching or hunting platforms for birds like kingfishers.</li> <li>• Any lizards, gecko’s, monitors, or snakes encountered should be allowed to escape to suitable habitat away from the disturbance. No reptile should be intentionally killed, caught, or collected during any phase of the project. The local department of environmental affairs (Northern Cape) are mandated to investigate the management of the site as per each provinces’ mandated legislation.</li> <li>• General avoidance of snakes is the best policy if encountered. Snakes should not be intentionally harmed or killed and allowed free movement away from the area.</li> <li>• Appropriate footwear should be worn in the field.</li> <li>• When possible, construction work should be restricted to one area at a time. This will give smaller birds, mammals, reptiles, and amphibians an opportunity to move into undisturbed areas close to their natural habitat. The Contractor must ensure that no faunal species are trapped, hunted, or killed during the construction phase.</li> <li>• No further vegetation clearance to that which is essential for establishing project infrastructure is permitted, except for the removal of alien invasive species. All remaining indigenous vegetation must be conserved wherever possible.</li> <li>• No roads shall be cut through river- and stream banks (riparian vegetation) as this may lead to erosion. If this is essential then a method statement is required, and the ECO must approve the method statement.</li> <li>• There must be no unnecessary disturbance of natural vegetation. Where unavoidable, such disturbed areas must be rehabilitated.</li> <li>• Implement a worker environmental education program and implement best management practices.</li> </ul>
9.	<p><b>WASTE MANAGEMENT</b></p> <p><u>Construction rubble</u></p> <ul style="list-style-type: none"> <li>• Construction rubble shall be disposed of in pre-agreed, demarcated spoil dumps that have been approved by the relevant Municipality. Waste manifests must be kept as proof that this has been disposed of legally.</li> </ul> <p><u>Litter management</u></p> <ul style="list-style-type: none"> <li>• Sufficient waste bins (with animal proof lids) must be provided at the construction site for different types of waste disposal and for recycling purposes.</li> <li>• Refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction site.</li> <li>• A housekeeping team should be appointed to regularly maintain the litter and rubble situation on the construction site.</li> <li>• Littering by the employees of the Contractor shall not be allowed under any circumstances. The ECO shall monitor the neatness of the work sites as well as the Contractor campsite.</li> <li>• Sanitary bins must be provided for women.</li> <li>• All waste must be removed from the site and transported to a landfill site as approved by the relevant Municipality.</li> </ul> <p><u>Hazardous waste</u></p> <ul style="list-style-type: none"> <li>• All hazardous waste materials must be carefully stored as advised by the ECO, and then disposed of off-site at a licensed landfill site.</li> <li>• Contaminants to be stored safely to avoid spillage</li> </ul>



ACTIVITY	MITIGATION AND/OR MANAGEMENT MEASURES
<b>CONSTRUCTION PHASE – GENERAL EIR</b>	
	<ul style="list-style-type: none"> <li>● Machinery must be properly maintained to keep oil leaks in check.</li> </ul> <p><u>Sanitation</u></p> <ul style="list-style-type: none"> <li>● The Contractor shall install mobile chemical toilets on the site.</li> <li>● Staff shall be sensitised to the fact that they should use these facilities at all times.</li> <li>● No indiscriminate sanitary activities on-site shall be allowed.</li> <li>● Ablution facilities shall be within 100m from workplaces but not closer than 100m from any natural water bodies or boreholes. There should be enough toilets available to accommodate the workforce. Male and females must be accommodated separately where possible. Alternatively, ablution facilities may be located in a place approved by the ECO.</li> <li>● Toilets must be serviced regularly, and the ESO should inspect toilets regularly.</li> <li>● Potable water must be provided for all construction staff.</li> </ul> <p><u>Remedial actions</u></p> <ul style="list-style-type: none"> <li>● Depending on the nature and extent of the spill, contaminated soil must be either excavated or treated on-site.</li> <li>● The ECO must approve the precise method of treatment of polluted soil.</li> <li>● This could involve the application of soil absorbent materials or oil-digestive powders to the contaminated soil.</li> <li>● If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent materials.</li> <li>● Contaminated remediation materials must be carefully removed from the area of the spill so as to prevent further release of petrochemicals to the environment and stored in adequate containers until appropriate disposal.</li> <li>● Spill kits must be provided at strategic points within the construction site.</li> </ul>
10.	<p><b>HEALTH AND SAFETY</b></p> <p><u>Worker safety</u></p> <ul style="list-style-type: none"> <li>● Safety measures, work procedures and first aid must be implemented on-site.</li> <li>● A health and safety plan in terms of the Occupational Health and Safety Act (Act No. 85 of 1993) must be drawn up to ensure worker safety.</li> <li>● Contractors must ensure that all equipment is maintained in a safe operating condition.</li> <li>● A record of health and safety incidents must be kept on-site.</li> <li>● Any health and safety incidents must be reported to the Project Coordinator immediately.</li> <li>● First aid facilities must be available on site at all times.</li> <li>● Workers have the right to refuse work in unsafe conditions.</li> <li>● Material stockpiles or stacks must be stable and well secured to avoid collapse and possible injury to site workers.</li> </ul> <p><u>Worker facilities</u></p> <ul style="list-style-type: none"> <li>● Eating areas should be regularly serviced and cleaned to ensure the highest possible standards of hygiene and cleanliness</li> </ul> <p><u>Protective gear</u></p> <ul style="list-style-type: none"> <li>● Personal Protective Equipment (PPE) must be made available to all construction staff and the wearing and use of PPE must be compulsory. Hard hats and safety shoes must be worn at all times and other PPE worn where necessary i.e. dust masks, earplugs, hard hats, safety boots and overalls etc.</li> <li>● No person is to enter the site without the necessary PPE.</li> <li>● The construction camp must remain fenced for the entire construction period.</li> </ul>

ACTIVITY	MITIGATION AND/OR MANAGEMENT MEASURES
<b>CONSTRUCTION PHASE – GENERAL EIR</b>	
	<ul style="list-style-type: none"> <li>● Potentially hazardous areas such as trenches are to be demarcated and clearly marked with orange snow netting. In addition, the ESO must check the trenches before work commences to ensure that no animal species have fallen in.</li> <li>● Adequate warning signs of hazardous working areas must be erected in suitable locations.</li> <li>● Uncovered manholes and excavations must be clearly demarcated</li> <li>● Emergency numbers for local police, fire department, Eskom and the Municipality must be placed in a prominent area.</li> <li>● Firefighting equipment must be placed in prominent positions across the site where it is easily accessible. This includes fire extinguishers, a fire blanket as well as a water tank.</li> <li>● A speed limit of 40km/h must be adhered to by all vehicles and machinery.</li> </ul> <p><u>Hazardous Material Storage</u></p> <ul style="list-style-type: none"> <li>● Staff that will be handling hazardous materials must be trained to do so.</li> <li>● Any hazardous materials (apart from fuel) must be stored within a lockable store with a sealed floor.</li> <li>● All storage tanks containing hazardous materials must be placed in bunded containment areas with sealed surfaces. The bund walls must be high enough to contain 110% of the total volume of the stored hazardous material.</li> <li>● The provisions of the Hazardous Chemical Substances Regulations promulgated in terms of the Occupational Health and Safety Act 85 of 1993 and the SABS Code of Practise must be adhered to. This applies to solvents and other chemicals possibly used in the construction time.</li> </ul> <p><u>Procedure in the event of a petrochemical spill</u></p> <ul style="list-style-type: none"> <li>● The individual responsible for, or who discovers, the petrochemical spill must report the incident to the Project Coordinator, ECO and/or Contractor as soon as reasonably possible.</li> <li>● The problem must be assessed, and the necessary actions required will be undertaken.</li> <li>● The immediate response must be to contain the spill.</li> </ul> <p><u>Fire management</u></p> <ul style="list-style-type: none"> <li>● Firefighting equipment should be present on-site at all times as per Occupational Health and Safety Act.</li> <li>● All construction staff must be trained in fire hazard control and firefighting techniques.</li> <li>● All flammable substances must be stored in dry areas which do not pose an ignition risk to the said substances.</li> <li>● No open fires will be allowed on site unless in a demarcated area identified by the ECO (e.g. a “braai” area). This area must be equipped with fire extinguishers.</li> <li>● Smoking may only be conducted in demarcated areas as agreed upon by the ECO and Contractor.</li> </ul>
11.	<p style="text-align: center;"><b>SECURITY</b></p> <ul style="list-style-type: none"> <li>● Unsocial activities such as consumption or illegal selling of alcohol, drug utilisation or selling on-site are prohibited.</li> <li>● Any persons found to be engaged in such activities shall have disciplinary and / or criminal action taken against them.</li> <li>● No person shall enter the site unless authorised to do so by the Contractor, Project Coordinator or ECO. All visitors must report to the site office on arrival, undergo induction training, sign an indemnity form and be in possession of the correct PPE clothing to wear while on site.</li> </ul>

ACTIVITY	MITIGATION AND/OR MANAGEMENT MEASURES	
<b>CONSTRUCTION PHASE – GENERAL EIR</b>		
		<ul style="list-style-type: none"> <li>• If any fencing interferes with the construction process, such fencing shall be deviated until construction is completed. The deviation of fences shall be negotiated and agreed with the landowner in writing by the Developer, in consultation with the ECO.</li> <li>• Trespassing on private / commercial properties adjoining the site is forbidden.</li> <li>• The site must be secured in order to reduce the opportunity for criminal activity in the locality of the construction site.</li> </ul>
12.	<b>SOCIAL ENVIRONMENT</b>	<ul style="list-style-type: none"> <li>• All contact with affected parties shall be courteous at all times. The rights of the affected parties shall be respected at all times.</li> <li>• A complaints register should be kept on site. Details of complaints should be incorporated into the audits as part of the monitoring process. This register is to be tabled during monthly site meetings.</li> <li>• No interruptions other than those negotiated shall be allowed to any essential services.</li> <li>• Damage to infrastructure shall not be tolerated and any damage shall be rectified immediately by the Contractor. A record of all damage and remedial actions shall be kept on site.</li> <li>• Road rehabilitation should take place during and once construction is completed.</li> <li>• Construction traffic should only make use of approved routes.</li> <li>• Where possible unskilled job opportunities should be afforded to local community members.</li> <li>• Equal opportunities for employment should be created to ensure that the local female population also have access to these opportunities. Females should be encouraged to apply for positions.</li> <li>• Payment should comply with applicable Labour Law legislation in terms of minimum wages.</li> <li>• Local companies should be given the opportunity to tender for the provision of locally sourced materials, labour, plant, transport, etc.</li> </ul>
13.	<b>CULTURAL AND HERITAGE ARTEFACTS</b>	<ul style="list-style-type: none"> <li>• Local museums as well as the South African Heritage Resource Agency (SAHRA) should be informed if any artefacts are uncovered in the affected area and mitigation measures recommended by SAHRA should be followed.</li> <li>• The Contractor must ensure that his workforce is aware of the necessity of reporting any possible historical or archaeological finds to the ECO so that appropriate action can be taken.</li> <li>• Any discovered artefacts shall not be removed under any circumstances. Any destruction of a site can only be allowed once a permit is obtained and the site has been mapped and noted.</li> <li>• Permits shall be obtained from SAHRA, where relevant.</li> </ul>
14.	<b>CONSTRUCTION SITE DECOMMISSIONING</b>	<p><u>Removal of equipment</u></p> <ul style="list-style-type: none"> <li>• All structures comprising the construction camp are to be removed from site.</li> <li>• The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc, and these shall be cleaned up and contaminants disposed of appropriately.</li> <li>• All hardened surfaces within the construction camp area should be ripped, all imported materials removed, and the area shall be top soiled and rehabilitated using the guidelines as set out in the section on Flora and Fauna that forms part of this document.</li> </ul> <p><u>Temporary services</u></p> <ul style="list-style-type: none"> <li>• The Contractor must arrange the cancellation of all temporary services.</li> <li>• Temporary roads must be closed and access across these blocked.</li> <li>• All areas where temporary services were installed are to be rehabilitated to the satisfaction of the ECO.</li> </ul>

ACTIVITY	MITIGATION AND/OR MANAGEMENT MEASURES
<b>CONSTRUCTION PHASE – GENERAL EIR</b>	
	<p><u>Associated infrastructure</u></p> <ul style="list-style-type: none"> <li>● Surfaces are to be checked for waste products from activities such as concrete batching and cleared in a manner approved by the ECO.</li> <li>● All surfaces hardened due to construction activities are to be ripped and imported material thereon removed.</li> <li>● All rubble is to be removed from the site to an approved disposal site as approved by the ECO. Burying of rubble on-site is prohibited. Waste manifests must be kept as proof that this has been disposed of legally.</li> <li>● The site is to be cleared of all litter. Waste manifests must be kept as proof that this has been disposed of legally.</li> <li>● The Contractor is to check that all watercourses are free from building rubble, spoil materials and waste materials.</li> <li>● Fences, barriers and demarcations associated with the construction phase are to be removed from the site.</li> <li>● All residual stockpiles must be removed or spread on site as directed by the ECO.</li> <li>● All unused building materials must be removed from the site.</li> <li>● The Contractor must repair any damage that the construction works has caused to neighbouring properties, specifically, but not limited to, damage caused by poor storm water management.</li> </ul> <p><u>Rehabilitation</u></p> <ul style="list-style-type: none"> <li>● Disturbed areas of natural vegetation as well as cut and fills must be rehabilitated immediately after the installation of the new towers to prevent further soil erosion.</li> <li>● Re-seeding shall be done on disturbed areas as directed by the ECO. Only seeds of indigenous plants must be used.</li> <li>● Recommended rehabilitation is in the form of active and ongoing re-vegetation of affected areas, including areas where surface disturbances resulted from construction, as well as areas that were used for alternative or other functions, such as storage areas, parking bays, etc.;</li> <li>● Once construction activities at a tower site has been completed, rehabilitation must commence;</li> <li>● Existing access roads should be left ‘as is’ for future use during maintenance operations;</li> <li>● In accordance with the Conservation of Agricultural Resources Act, No. 43 of 1983, slopes in excess of 2% must be contoured and slopes in excess of 12% must be terraced.</li> <li>● Other methods of rehabilitation may also be used at the discretion of the ECO, e.g. stone pitching, logging, etc. Contour banks shall be spaced according to the slope on tower sites. The type of soil shall also be taken into consideration.</li> <li>● Final inspection in order to ensure adherence to EMPr guidelines, completion of localised/ remaining areas of impact, monitoring of rehabilitation success, etc.</li> </ul>

Table 5-4: Construction Phase Mitigation Measures and Management Actions, Specialists

ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES	
<b>CONSTRUCTION PHASE – SPECIALISTS</b>			
1.	AQUATIC	<p><b>VEHICULAR MOVEMENT (TRANSPORTATION OF CONSTRUCTION MATERIALS)</b></p> <p><b>AND</b></p> <p><b>REMOVAL OF VEGETATION AND ASSOCIATED DISTURBANCES TO SOIL</b></p>	<ul style="list-style-type: none"> <li>All development footprint areas vegetation clearance to be limited to what is essential;</li> <li>All vegetation removed as part of the site clearing activities must be transported from the construction site (may not be stockpiled) and disposed of at a registered waste disposal facility;</li> <li>During construction of the surface infrastructure within the 100 m GN509 Zone of Regulation (e.g., access roads), regular spraying of non-potable water or the use of chemical dust suppressants, that are approved for use near freshwater ecosystems must be implemented to reduce dust and to ensure no smothering of vegetation within the freshwater features occurs from excessive dust settling. It is recommended that the freshwater ecologist provide a statement on the suitability of the use of the proposed dust suppressant;</li> <li>No construction vehicles, nor construction personnel or vehicles may traverse through freshwater features outside the construction footprint considered as no-go areas (except on approved road crossings);</li> <li>As far as possible, existing roads must be utilised to gain access to sites;</li> <li>Contractor laydown areas, and material storage facilities to remain outside of the freshwater features and their associated 100 m NEMA / GN509 ZoR of the freshwater features;</li> <li>All vehicle re-fuelling is to take place in specifically designated re-fuelling areas that must be located outside of the 100 m NEMA / GN509 ZoR; and</li> <li>No vegetation may be removed from the 100 m ZoR surrounding the freshwater features where no infrastructure is planned.</li> </ul>
		<p><b>REMOVAL OF VEGETATION AND TOPSOIL AND ASSOCIATED STOCKPILING;</b></p> <p><b>GROUND-BREAKING AND EARTHWORKS RELATING TO FOUNDATIONS AND TRENCHES; MIXING AND CASTING OF CONCRETE FOR CONSTRUCTION PURPOSES;</b></p> <p><b>BACKFILLING OF EXCAVATED AND DISTURBED AREAS;</b></p> <p><b>AND</b></p> <p><b>MISCELLANEOUS ACTIVITIES BY CONSTRUCTION PERSONNEL</b></p>	<ul style="list-style-type: none"> <li>Contractor laydown areas, and material storage facilities to remain outside of the freshwater features and their associated 100 m NEMA / GN509 ZoR of the freshwater features;</li> <li>Ground-breaking activities outside the delineated extent of a freshwater feature:               <ul style="list-style-type: none"> <li>During excavation activities, the topsoil and vegetation must be stockpiled separately from other material outside the delineated extent of the freshwater features;</li> <li>Excavated materials must not be contaminated, and it must be ensured that the minimum surface area is taken up by any stockpiled materials. The mixture of the lower and upper layers of the excavated soil must be kept to a minimum, so as for later use as backfill material after construction has commenced;</li> <li>All exposed soils must be protected from wind using tarpaulins for the duration of the construction phase to prevent potential erosion and sedimentation of the freshwater features;</li> <li>Suitable drainage must be insured along the turbine foundations, in order to ensure that</li> </ul> </li> </ul>

ACTIVITY	MITIGATION AND/OR MANAGEMENT MEASURES
<b>CONSTRUCTION PHASE – SPECIALISTS</b>	
	<p>water does not pond or drain in a concentrated manner into the nearby freshwater features. This must be considered as part of the stormwater management plan and be overseen by the Environmental Control Officer (ECO);</p> <ul style="list-style-type: none"> <li>○ Ensure no concentrated runoff from the surface infrastructure construction areas is to enter the freshwater features by installing silt traps or placing haybales down gradient of the construction footprint (until suitable basal vegetation cover has been restored); and</li> <li>○ Alien vegetation management plan to be compiled during the planning phase and implemented concurrently with the commencement of construction.</li> </ul> <ul style="list-style-type: none"> <li>● The following measures must be adhered to with regards to concrete mixing on site:           <ul style="list-style-type: none"> <li>○ Ensure proper handling and disposal of concrete and cement-related mortars to minimise or eliminate discharges into the freshwater features;</li> <li>○ Fresh concrete and cement mortar must not be mixed near the freshwater features. Mixing of cement may be done within the construction camp, however, may not be mixed on bare soil, and must be within a lined, bound or bunded portable mixer. Consideration must be taken to use ready mix concrete;</li> <li>○ No mixed concrete shall be deposited directly onto the ground within the freshwater features (outside of the designated area) or associated riparian habitat. A batter board or other suitable platform/mixing tray is to be provided onto which any mixed concrete can be deposited whilst it awaits placing;</li> <li>○ A washout area must be designated outside of the freshwater features, and wash water must be treated on-site or discharged to a suitable sanitation system;</li> <li>○ Cement bags must be disposed of in the demarcated hazardous waste receptacles and the used bags must be disposed of through the hazardous substance waste stream and</li> <li>○ Spilled or excess concrete must be disposed of at a suitable landfill site. Chain of custody documentation must be provided.</li> </ul> </li> <li>● The following measures must be adhered with regards to backfilling of excavated areas:           <ul style="list-style-type: none"> <li>○ Stockpiled material must be used as backfill material;</li> <li>○ All excavated areas must be backfilled to the natural ground level with excavated material; and</li> <li>○ Soil must be suitably compacted, and all construction material must be removed from</li> </ul> </li> </ul>

ACTIVITY	MITIGATION AND/OR MANAGEMENT MEASURES
<b>CONSTRUCTION PHASE – SPECIALISTS</b>	
	<p>the site upon the completion of construction or used in the rehabilitation process.</p> <ul style="list-style-type: none"> <li>● Rehabilitation of the construction footprint areas:               <ul style="list-style-type: none"> <li>○ All footprint areas which have been compacted must be ripped and revegetated with indigenous vegetation as soon as the construction activities have been completed; and</li> </ul> </li> <li>● The operational area must regularly be inspected for alien and invasive vegetation species which might have established due to the construction activity related disturbances.</li> </ul>
<p><b>CREATION OF NEW ROAD CROSSINGS WITHIN THE SOUT RIVER AND THE LOWER FOOTHILL TRIBUTARIES ASSOCIATED WITH THE KLEIN BRAK AND SOUT RIVER SYSTEMS</b></p> <p><b>AND</b></p> <p><b>CREATION OF NEW ROAD CROSSINGS WITHIN THE MOUNTAIN STREAM DRAINAGE LINES (NO RIPARIAN VEGETATION) AND UPPER FOOTHILL TRIBUTARIES (NO RIPARIAN VEGETATION) ASSOCIATED WITH THE KLEIN BRAK AND SOUT RIVER SYSTEMS</b></p>	<ul style="list-style-type: none"> <li>● All construction works to be undertaken during the dry periods when there is no flow within the freshwater features.</li> <li>● Existing crossings through freshwater features should be prioritised for upgrading rather than development of new crossings, where possible;</li> <li>● The throughflow structures must be designed to ensure that the structures are geotechnically sound and that they are hydraulically stable, even if a 1:100 year flood event was to occur. The designs must include culverts installed intermittently to ensure a free draining landscape. A suitably qualified hydrologist be consulted to provide guidance on the relevant sizes and width requirements to ensure that hydraulic functioning of the system is maintained;</li> <li>● The crossings must be designed such that should they be overtopped, they remain stable and do not lead to excessive downstream erosion and incision. It must be ensured that the final design accounts for appropriate wetting frequencies and patterns are maintained in the pre-development condition (with input from the freshwater ecologist, where necessary);</li> <li>● The reaches of the freshwater features where no activities are planned to occur must be considered no-go areas and should be marked at a maximum distance of 5 m upstream and downstream of the proposed road upgrade crossing. This 5 m construction Right of Way would allow for construction personal, vehicles (if applicable) to enter the freshwater feature crossing where the road is proposed to be constructed;</li> <li>● The clearing of vegetation within the footprint area must be kept to a minimum to avoid unnecessary disturbance within the active channel;</li> <li>● The removed vegetation must be stockpiled outside of the delineated boundary of a freshwater feature. The footprint areas of these stockpiles must be kept to a minimum, and may not exceed a height of 2 m. Should the vegetation not be suitable for reinstatement after the construction phase or be alien/invasive vegetation species, all material must be disposed of at a registered garden refuse site and may not be burned or mulched on site;</li> </ul>

ACTIVITY	MITIGATION AND/OR MANAGEMENT MEASURES
<b>CONSTRUCTION PHASE – SPECIALISTS</b>	
	<p><i><b>SITE PREPARATION PRIOR TO CONSTRUCTION ACTIVITIES; REMOVAL OF VEGETATION AND ASSOCIATED DISTURBANCES TO SOIL; DISTURBANCES TO SOIL OF THE FRESHWATER FEATURES; MOVEMENT OF CONSTRUCTION MACHINERY/ VEHICLES WITHIN THE FRESHWATER FEATURES; AND POSSIBLE SPILLS / LEAKS FROM CONSTRUCTION VEHICLES.</b></i></p> <ul style="list-style-type: none"> <li>● The construction footprint must be limited to a construction Right of Way that comprises a 5 m construction buffer (upstream and downstream of the freshwater ecosystem crossing) only.</li> <li>● Upgrading of the informal roads must take cognisance of the delineated extent of the freshwater feature traversed by the existing informal access road and that located within close proximity to the road. Should the road be increased in width, the road must be expanded on the side opposite of a freshwater feature, to ensure that the remaining natural buffer between the access road and the freshwater feature remains intact;</li> <li>● Material to be used (gravel – if applicable) as part of the upgrading of the existing roads must be stockpiled outside the delineated extent of the freshwater features (preferably at least 32 m from the freshwater feature) to prevent sedimentation thereof and to avoid any other vegetation being impacted by the construction activities. These stockpiles may not exceed a height of 2 m and must be protected from wind using tarpaulins;</li> <li>● The disturbed area surrounding the road must be revegetated with suitable indigenous vegetation to prevent the establishment of alien vegetation species and to prevent erosion from occurring;</li> <li>● An alien vegetation management plan as compiled by the terrestrial/botanical ecologist is highly recommended and supported by the freshwater specialist and must be implemented concurrently with the commencement of construction; and</li> <li>● All existing alien and invasive vegetation must be removed. All material must be disposed of at a registered garden refuse site and may not be burned or mulched on site.</li> <li>● The following measures must be adhered to with regards to excavation and soil compaction activities within the freshwater ecosystems (including that associated with the installation of underground cabling):             <ul style="list-style-type: none"> <li>○ During the excavation activities, any soil/sediment or silt removed from the freshwater feature may be temporarily stockpiled in the road reserve but outside the delineated extent of the freshwater feature. These stockpiles may not exceed 2 m in height, and their footprint must be kept to a minimum. Stockpiling of removed materials may only be temporary (may only be stockpiled during the period of construction at a particular site) and must be disposed of at a registered waste disposal facility;</li> <li>○ During trenching activities, seepage water may be present within the trench. Therefore, any seepage must not be discharged straight into the river channel but through a silt trapping area first before entering the downstream reach;</li> </ul> </li> </ul>



ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES	
<b>CONSTRUCTION PHASE – SPECIALISTS</b>			
			<ul style="list-style-type: none"> <li>○ Excavated materials must not be contaminated, and it must be ensured that the minimum surface area is taken up. Mixture of the lower and upper layers of the excavated soil must be kept to a minimum, for later usage as backfill material or as part of rehabilitation activities;</li> <li>○ For trenching of the cables, the topsoil must be stored separately and may not be contaminated. Furthermore, the soil layers must be placed in the same order and the topsoil returned last;</li> <li>○ Care must be taken to ensure that no scouring or erosion occurs as a result of the proposed culvert crossing. Installation of riprap or gabion mattresses and/or concrete aprons associated with any culverts;</li> <li>○ All construction material (with specific mention of prefabricated culvert structures) must be stockpiled in the laydown area and must only be imported to the construction site when required;</li> <li>○ Machinery/vehicles used to install culvert structures must be parked on the existing road surface and may not enter the freshwater features; and</li> <li>○ Reno-mattresses or riprap must be installed at the outlet side of the culvert/bridge structures to ensure energy dissipation and prevent concentrated runoff into the downstream freshwater feature. The reno mattress/riprap must be installed flush with the culvert outlet.</li> </ul>
3.	AVIFAUNA	<i>DISPLACEMENT THROUGH DISTURBANCE</i>	<ul style="list-style-type: none"> <li>● If pre-construction monitoring discovers any breeding target species, the specialist will develop case specific recommendations for management of the situation.</li> <li>● No infrastructure should be built in areas which have been identified as MEDIUM sensitivity by the Avifaunal Specialist.</li> </ul>
		<i>DISPLACEMENT THROUGH HABITAT LOSS</i>	<ul style="list-style-type: none"> <li>● Ensure retention of as much of the indigenous vegetation as possible, minimise the footprint of all associated infrastructure, including buildings, electrical infrastructure and the width and length of roads, and rehabilitate as many disturbed areas as possible following construction.</li> <li>● Protection of active any active nesting and breeding sites pre-construction as per specialist case specific recommendations for management.</li> </ul>
		<i>MORTALITY FROM COLLISIONS WITH TURBINES</i>	<ul style="list-style-type: none"> <li>● Pre-construction monitoring in line with Best Practice Guidelines.</li> <li>● The sensitivity map in of Avifaunal Report must be adhered to.</li> <li>● Habitat management measures such as removing artificial rock piles, minimising perching and nesting opportunities within the facility, blade painting and implementing post-construction monitoring are recommended.</li> </ul>

ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES	
<b>CONSTRUCTION PHASE – SPECIALISTS</b>			
		<p><b>MORTALITY FROM COLLISIONS WITH POWERLINES</b></p> <p><b>AND</b></p> <p><b>MORTALITY FROM ELECTROCUTIONS ON ELECTRICAL INFRASTRUCTURE</b></p>	<ul style="list-style-type: none"> <li>All powerlines linking the turbines and linking turbine strings to the on-site substation should be placed underground. Where this is not possible this should be discussed with the specialist and a compromise reached that provides acceptable protection for birds.</li> </ul>
		<b>CUMULATIVE IMPACTS</b>	<ul style="list-style-type: none"> <li>Ensure the correct implementation of authorised Environmental Management Programmes through compliance audits.</li> </ul>
4.	<b>BAT</b>	<b>MODIFICATION OF BAT HABITAT</b>	<ul style="list-style-type: none"> <li>Avoid:               <ul style="list-style-type: none"> <li>Limit potential for bats to roost in project infrastructure (e.g., buildings, turbines, road culverts) by ensuring they are properly sealed such that bats cannot gain access.</li> <li>No construction activities at night. No placement of infrastructure (except roads) in no-go areas.</li> </ul> </li> <li>Minimise:               <ul style="list-style-type: none"> <li>Minimise clearing of vegetation, minimise disturbance and destruction of farm buildings on site, minimise removal of trees, minimise disturbance and destruction of rocky outcrops, and where this is required, these features should be examined for roosting bats. This study assumes that all buildings and rocky outcrops are potentially roosts and must be buffered since numerous species use these features for roosting.</li> <li>Apply good construction abatement control practices to reduce emissions and pollutants (e.g., noise, erosion, waste) created during construction.</li> </ul> </li> <li>Restore:               <ul style="list-style-type: none"> <li>Rehabilitate all areas disturbed during construction (including aquatic habitat).</li> </ul> </li> </ul>
5.	<b>HERITAGE</b>	<b>DESTRUCTION OF HERITAGE ARTIFACTS</b>	<ul style="list-style-type: none"> <li>Stone Ageremains occur abundantly in the project landscape where locally available raw material for the manufacture of stone tools is available in the geological setting. Most of the artefacts are probably Middle Stone Age (MSA) lithics such as blades, scrapers, chunks and cores produced on quartzite. Single possible Later Stone Age (LSA) microlithic tools were noted. Stone artefact scatters are usually located in areas with fluvial gravels along drainage lines, pans and within decomposing calcretes, rocky outcrops or ridges. Despite the high number of observations of artefacts, these resources are common and representative of similar scatters across widespread areas of the Karoo. The widespread but ephemeral scatters are often of low heritage value due to temporally mixed contexts and the frequent absence of faunal, organic and other cultural remains which is scattered over thousands of square kilometres of the Karoo. The Stone Age localities are not conservation-worthy and even though the resources may be destroyed during construction, the impact is inconsequential.</li> </ul>

ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES	
<b>CONSTRUCTION PHASE – SPECIALISTS</b>			
			<ul style="list-style-type: none"> <li>• A small rock shelter containing cultural remnants and a stone packed corbel building is situated along a low ridge west of turbine position T22 (TBN24). The site contains remnants of consecutive occupation events and it has potential to yield valuable archaeological information on the local settlement of LSA groups through the Historical Period and it has been assigned a medium archaeological significance. It is recommended that a 100m no-go development buffer be demarcated with a fence or construction barricade during the Preconstruction Phase. Continuous site monitoring should be done in order to detect potential impact on the site at the earliest opportunity. Should impact on the site prove inevitable, a Phase 2 Assessment inclusive of site documentation, possible sampling and analysis must be conducted during the Preconstruction Phase. The necessary destruction permits from the relevant Heritage Resources Authorities should be obtained prior to site impact and destruction.</li> <li>• A rusted metal arrow head or spear head was located on the surface along a drainage line west of turbine location T09 (SRN19). The arrow head might have been part the hunting equipment of Herder groups traversing in the landscape. No other material culture, archaeological remains or deposits were noted in association with the artefact and it is probably an isolated find out of context. It has been assigned a low archaeological significance.</li> <li>• Information on the layout of civil services such as access roads were made available to specialists at an advanced stage of this assessment and not all of these proposed access road alignments could be included in site investigations. It is recommended that a suitably qualified archaeologist be appointed during the Construction Phase to monitor vegetation clearing and excavation activities for the possible occurrence of archaeological material remains and features in these areas.</li> <li>• Considering the localised nature of heritage remains, the general monitoring of the development progress by an ECO or by the heritage specialist is recommended for all stages of the project. Should any subsurface palaeontological, archaeological or historical material, or burials be exposed during construction activities, all activities should be suspended and the archaeological specialist should be notified immediately.</li> </ul>
6.	<b>NOISE</b>	<b>CONSTRUCTION NOISE: DAYTIME</b>	<ul style="list-style-type: none"> <li>• The significance of the noise impact is low for daytime construction activities and no additional mitigation is required or recommended. General measures are recommended to ensure that annoyance with the project is minimised. It is therefore recommended that the applicant plan process access roads to pass further than 60m from residential dwellings of the identified NSR.</li> </ul>

ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES	
<b>CONSTRUCTION PHASE – SPECIALISTS</b>			
		<b>CONSTRUCTION NOISE: NIGHTTIME</b>	<ul style="list-style-type: none"> <li>The significance of the noise impact is low and additional mitigation is not required, yet some general management measures are included to ensure that the potential annoyance that may be created due to night-time construction noises are minimized. Potential mitigation measures would include:               <ul style="list-style-type: none"> <li>Minimizing night-time activities when working within 2,000m from any NSR. Work should only take place at one WTG location to minimize potential night-time cumulative noises (when working at night within 2,000m from NSR);</li> <li>The applicant must notify the NSR when night-time activities will be taking place within 1,000m from the NSR; and</li> <li>The applicant must plan the completion of noisiest activities (such a pile driving, rock breaking and excavation) during the daytime period (even though it is expected that it is highly unlikely that this may take place at night).</li> </ul> </li> </ul>
7.	PALAEONTOLOGICAL	<b>LOSS/DAMAGE OF FOSSILS</b>	<ul style="list-style-type: none"> <li>Pre-construction walk-down of authorized project footprint by specialist palaeontologist in the Pre-Construction Phase</li> <li>Ongoing monitoring for fossil remains of all substantial bedrock excavations and surface clearance activities by ECO during Construction Phase, with safeguarding and reporting of new palaeontological finds (notably fossil vertebrate bones &amp; teeth) to SAHRA for possible specialist mitigation (See appended Chance Fossil Finds Protocol).</li> </ul>
8.	RIVERINE RABBIT	<b>LOSS OF HABITAT</b>	<ul style="list-style-type: none"> <li>Turbines and pylons should be located outside of the buffers around riverine habitat</li> <li>An ECO must be employed to demarcate areas for use during construction, and to ensure that the construction activities remain within the designated area and that no unauthorised activities occur outside of the construction footprint</li> <li>Avoid road development traversing riparian areas, where possible</li> </ul>
		<b>DISTURBANCE FROM CONSTRUCTION NOISE</b>	<ul style="list-style-type: none"> <li>An ECO must be employed to demarcate areas for use during construction, and to ensure that the construction activities remain within the designated area and that no unauthorised activities occur outside of the construction footprint</li> <li>Traffic and loud machinery should be prohibited during the early hours of the morning (04:00 – 09:00) and early evening (18:00 – 22:00)</li> <li>Any trenches built must have slopes that allow any dispersing rabbits that fall in to escape and must be backfilled.</li> </ul>
		<b>MORTALITY (BUSHMEAT ROADKILL) OR</b>	<ul style="list-style-type: none"> <li>Prohibit all employees from hunting</li> <li>Prohibit open fires</li> <li>Prohibit any domestic carnivores (e.g. dogs) from entering the site with employees</li> <li>An ECO must be employed to demarcate areas for use during construction, and to ensure that the construction activities remain within the designated area and that no unauthorised activities occur outside of the construction footprint</li> <li>Avoid road development traversing riparian areas, where possible</li> </ul>

ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES	
<b>CONSTRUCTION PHASE – SPECIALISTS</b>			
			<ul style="list-style-type: none"> <li>Speed restrictions for all project vehicles (40km/h is recommended) should be in place to reduce road kills of rabbits killed on the project roads. Traffic should be reduced during the early hours of the morning (04:00 – 09:00) and early evening (18:00 – 22:00)</li> <li>Any contractor employed for development work must ensure that no rabbit or hare species are disturbed, trapped, hunted or killed by them and their team during the construction phase. Conservation-orientated clauses should be built into contracts for construction personnel, complete with penalty clauses for non-compliance</li> </ul>
9.	SOCIAL	<i>TEMPORARY EMPLOYMENT</i>	<ul style="list-style-type: none"> <li>Maximise local employment and local content (the Project’s direct sending area) through the Preferential Procurement Plan and Contractor Services Management Plan (CSMP) for all contractors that are used.</li> <li>Involve the Ubuntu LM and PKSDM from the early processes (from financial close already if possible). Determine their existing processes with regards to a labour desk and streamline employment processes between the various stakeholders.</li> <li>Appoint a Community Employer Relations Officer / CLO. Communicate with communities through this one channel to ensure transparency, limit unrealistic expectations and to avoid conflict.</li> </ul>
		<i>LOCAL PROCUREMENT</i>	<ul style="list-style-type: none"> <li>Maximise local content of procurement by procuring from the local and regional study areas as far as possible.</li> <li>Do a value-chain analysis of services required (directly and indirectly related to construction such as transport, laundry, catering, etc.). Communicate this to the PKSDM and Ubuntu LED Units at least 4 months prior to the tender process commencing in order for SMME’s to prepare.</li> <li>Include minimum thresholds in the CSMP for local employment, BBEEE procurement, SMME targets, local services providers, etc.</li> </ul>
		<i>INDUCED LOCAL ECONOMIC IMPACTS</i>	<ul style="list-style-type: none"> <li>Maximise the Project’s local content as far as possible.</li> </ul>
		<i>TRAINING / SKILLS DEVELOPMENT</i>	<ul style="list-style-type: none"> <li>Where feasible, the Developer should:</li> <li>Make the skill requirements clear to the municipality in advance and do a skills analysis of the available labour force.</li> <li>Implement a SMME skills development programme and do certification (training on how to tender, understanding contracts, basic business skills, etc.) at least 4 months prior inviting SMMEs to tender and involve the relevant LED Units in the programmes.</li> <li>Do a Value-chain analysis of services required (directly and indirectly related to construction) and communicate this to local and district municipalities in advance so that they are prepared and equipped to take part in the tender process.</li> <li>Require larger contractors to work with small SMMEs to train and transfer skills and include this in their respective CSMP’s.</li> <li>Implement on-the-job training for unskilled workers.</li> </ul>

ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES	
<b>CONSTRUCTION PHASE – SPECIALISTS</b>			
			<ul style="list-style-type: none"> <li>Capacitate the local government structures by involving them as early as possible in the Project; remain transparent throughout the processes.</li> <li>Negotiate a MoU with the municipality so that each role-player is clearly aware of its roles, responsibilities and timelines in the Project processes.</li> <li>Establish an EMC or similar Forum for the duration of construction to aid communication and transparency. Members of the EMC / Forum to meet on a quarterly basis to discuss issues that may arise during the course of the construction period (if feasible).</li> </ul>
		<b>EMPLOYMENT EQUITY</b>	<ul style="list-style-type: none"> <li>Obtain inputs from the local and district municipality on the contents of the Procurement strategy and Employment Equity Plan to be implemented.</li> <li>Set targets for the employment of Youth, women and the disabled in the respective CSMPs.</li> </ul>
		<b>IMPACTS ASSOCIATED WITH AN INFLUX OF JOBSEEKERS / TEMPORARY CONSTRUCTION WORKERS</b>	<ul style="list-style-type: none"> <li>Employment / Temporary construction workers:</li> <li>Clearly identify the beneficiary communities / labour sending area and compile the employment strategy in collaboration with the affected municipalities’ LED Units.</li> <li>Contractually oblige contractors and sub-contractors to only source labour through the labour desk / job registration database and make this known to the target communities.</li> <li>Work through limited communication channels (e.g. Ward Councillors and the Employer Relations Officer / CLO).</li> <li>Be vigilant not to raise unrealistic expectations amongst the local communities and workers with regards to employment, skills requirements, local procurement and so forth. Ensure transparency through the Ward Councillors, CLO and the EMC / Forum.</li> <li>No recruitment of temporary workers at the access to the construction site.</li> <li>As part of their Social Management Plan’s (SMP’s), contractors to provide a transport and housing plan: (i) no workers are allowed to be housed on site or in informal housing / settlements; (ii) allow workers that do not live nearby time to return to their families at regular intervals or over weekends.</li> <li>No workers to remain on site after shifts.</li> <li>It is also recommended that the Developer embarks on a Social Awareness Campaign for the workforce that focuses on sexual health, unwanted pregnancies and related social issues.</li> <li>Security, safety and environmental health:</li> <li>24-hour security, demarcate and fence the construction site (if possible), material stores to be secured, access control and no trespassing of workers outside designated construction areas.</li> <li>Join the local community policing forum or similar initiative for the duration of construction.</li> <li>Keep the local SAPS, other emergency services, Ward Councillors, landowners and other relevant stakeholders informed about the construction progress and time-lines.</li> <li>Develop a Fire / Emergency Management Plan in conjunction with affected and neighbouring landowners.</li> </ul>

ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES	
<b>CONSTRUCTION PHASE – SPECIALISTS</b>			
			<ul style="list-style-type: none"> <li>• Dispose of the various types of waste generated in the appropriate manner at licensed waste landfill sites at regular intervals. Comply with the waste management plan compiled for the construction phase.</li> <li>• Display “danger” warning signs and “no public access” signs at all potential accesses, paths and along the periphery of the construction areas in English and the local languages.</li> <li>• If water for construction is obtained from a natural water resource, comply with the Water Use Licence conditions for the duration of the construction period.</li> <li>• Ensure implementation of the provisions of the Occupational Health and Safety Act No. 85 of 1993 and adhere to the Emergency and Safety plan procedures for the duration of the construction phase.</li> <li>• Awareness / community engagement:</li> <li>• Keep open communication channels with the landowners and address any potential issues as a matter of priority.</li> <li>• Make contact details of the main contractor and procedures to lodge complaints available to landowners and the local communities through the Ward Councillors and EMC / Forum.</li> <li>• Make a complaints register / log book available at the entrance to the construction site and act immediately should issues arise.</li> <li>• Consult with surrounding landowners whose livestock, private residences and other infrastructure could be affected by dust, noise and other impacts that result from traffic movement and general construction activities.</li> <li>• Where required, draw up a land use management plan with individual landowners to protect livestock and farmland, which addresses restricted access areas, procedures when farm gates are opened and closed and so forth.</li> <li>• Rehabilitate the veld to its original state post construction.</li> </ul>
		<b>LAND USE IMPACTS</b>	<ul style="list-style-type: none"> <li>• Rehabilitate the veld to its original state post construction.</li> </ul>
		<b>INTRUSION IMPACTS</b>	<ul style="list-style-type: none"> <li>• Comply with the EMPr requirements to address any potential noise and dust impacts.</li> <li>• Proper planning, management and rehabilitation of all construction sites to forego the visual impacts of the construction activities, as proposed in the VIA (Nuleaf Planning &amp; Environmental, October 2022).</li> <li>• Implement all mitigation measures as proposed</li> <li>• Discuss construction timelines with landowners so that grazing of livestock can take place away from construction areas.</li> <li>• Collaborate with the necessary road management agencies when road closures are required and advertise alternative routes in advance.</li> <li>• Impose penalties for reckless drivers as a way to enforce compliance to traffic rules.</li> </ul>

ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES	
<b>CONSTRUCTION PHASE – SPECIALISTS</b>			
		<b>HEALTH AND SAFETY RISKS FOR WORKERS</b>	<ul style="list-style-type: none"> <li>• Ensure implementation of the provisions of the Occupational Health and Safety Act (Act No. 85 of 1993) and adhere to the Emergency and Safety plan procedures for the duration of the construction phase.</li> <li>• Promote good conduct of employees through awareness campaigns. It is also recommended that the Developer embarks on a Social Awareness Campaign for the workforce that focuses on sexual health, unwanted pregnancies and related social issues.</li> <li>• Contractors to provide a housing plan that makes provision for workers that do not live nearby to return to their families at regular intervals or over weekends.</li> <li>• Provide safe and clean drinking water and instil regular water breaks to keep workers hydrated.</li> <li>• Provide sufficient ablution facilities (chemical/portable toilets, etc.) at strategic locations that are cleaned regularly.</li> <li>• Keep the local police, emergency and ambulance services informed of construction times and progress.</li> </ul>
10.	TERRESTRIAL BIODIVERSITY	<b>POTENTIAL TERRESTRIAL BIODIVERSITY IMPACTS</b>  <b>VEGETATION</b>	<ul style="list-style-type: none"> <li>• Blanket clearing of vegetation must be limited to the site. No clearing outside of required footprint required for construction to take place.</li> <li>• Topsoil must be striped and stockpiled separately during site preparation and replaced on completion where revegetation will take place.</li> <li>• Any site camps and laydown areas requiring clearing must be located within already disturbed areas as far as possible, or away from watercourses, alluvial areas and other sensitive features (rocky outcrops).</li> </ul>
		<b>POTENTIAL TERRESTRIAL BIODIVERSITY IMPACTS</b>  <b>FLORA SPECIES</b>	<ul style="list-style-type: none"> <li>• A flora search and rescue is recommended before commencement.</li> <li>• Respective permits to be obtained beforehand.</li> </ul>
		<b>POTENTIAL TERRESTRIAL BIODIVERSITY IMPACTS</b>  <b>ALIEN INVASIVE SPECIES</b>	<ul style="list-style-type: none"> <li>• Alien trees and weeds must be removed from the site as per CARA/ NEMBA requirements.</li> <li>• A suitable weed and alien invasive plant management plan to be implemented in construction and operation phases.</li> <li>• After clearing and construction is completed, an appropriate cover crop may be required, should natural re-establishment of grasses not take place in a timely manner, such as along road verges. This will also minimise dust.</li> </ul>
		<b>POTENTIAL TERRESTRIAL BIODIVERSITY IMPACTS</b>  <b>EROSION</b>	<ul style="list-style-type: none"> <li>• Suitable measures must be implemented in areas that are susceptible to erosion. Areas must be rehabilitated, and a suitable cover crop planted once construction is completed.</li> <li>• Topsoil must be stripped and stockpiled separately and replaced on completion.</li> <li>• If natural vegetation re-establishment does not occur, a suitable grass must be applied.</li> </ul>
		<b>POTENTIAL TERRESTRIAL BIODIVERSITY IMPACTS</b>  <b>ECOLOGICAL PROCESSES</b>	<ul style="list-style-type: none"> <li>• Blanket clearing of vegetation must be limited to the development footprint, and the area to be cleared must be demarcated before any clearing commences.</li> </ul>
		<b>POTENTIAL TERRESTRIAL BIODIVERSITY IMPACTS</b>	<ul style="list-style-type: none"> <li>• Suitable structures to be constructed at watercourse crossings that do not alter flows.</li> </ul>



ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES	
<b>CONSTRUCTION PHASE – SPECIALISTS</b>			
		<p><b>AQUATIC AND RIPARIAN PROCESSES</b></p>	<ul style="list-style-type: none"> <li>Stormwater discharge into watercourses to be protected against erosion.</li> </ul>
		<p><b>POTENTIAL TERRESTRIAL BIODIVERSITY IMPACTS</b></p> <p><b>FAUNAL HABITAT</b></p>	<ul style="list-style-type: none"> <li>Blanket clearing of vegetation must be limited to the construction footprint required.</li> <li>Rocky outcrop areas and Riverine Rabbit Habitat to be avoided as far as possible.</li> <li>It is important that clearing activities are kept to the minimum and take place in a phased manner, where applicable. This allows any smaller animal species to move into safe areas and prevents wind and water erosion of the cleared areas.</li> </ul>
		<p><b>POTENTIAL TERRESTRIAL BIODIVERSITY IMPACTS</b></p> <p><b>FAUNAL PROCESSES</b></p>	<ul style="list-style-type: none"> <li>The habitats and microhabitats present on the project site are not unique and are widespread in the general area, hence the local impact associated with the footprint would be of low significance if mitigation measures are adhered to.</li> <li>Small mammals within the habitat on and around the affected area are generally mobile and likely to be transient to the area. They will most likely vacate the area once construction commences. As with all construction sites there is a latent risk that there will be some accidental mortalities. Specific measures are made to reduce this risk. The risk of species of special concern is low, and it is unlikely that there will be any impact to populations of such species because of the activity.</li> <li>Reptiles such as lizards are less mobile compared to mammals, and some mortalities could arise. It is recommended that a faunal search and rescue be conducted before construction commences, although experience has shown that there could still be some mortalities as these species are mobile and may thus move onto site once construction is underway. A reptile handler should be on call for such circumstances.</li> <li>Should any amphibian migrations occur between wetland areas during construction, appropriate measures (including temporarily suspending works in the affected area) should be implemented.</li> </ul>
		<p><b>POTENTIAL TERRESTRIAL BIODIVERSITY IMPACTS</b></p> <p><b>FAUNAL SPECIES</b></p>	<ul style="list-style-type: none"> <li>A pre-commencement faunal search and rescue is recommended.</li> <li>Respective permits to be obtained beforehand.</li> <li>No animals are to be harmed or killed during the course of operations.</li> <li>Workers are NOT allowed to snare any faunal species.</li> </ul>
		<p><b>POTENTIAL RISKS TO FAUNA SPECIES OF CONSERVATION CONCERN:</b></p> <p><b>HABITAT LOSS, DEGRADATION AND FRAGMENTATION</b></p>	<ul style="list-style-type: none"> <li>Minimising the project footprint by utilising existing roads and disturbed areas as much as technically possible.</li> <li>Locate developments away from identified sensitive habitats, this includes no go zones and buffer zones for turbine pads, electrical substations and housing facilities as well as construction laydown areas.</li> <li>Implementing adequate dust control and erosion control.</li> <li>Careful planning of road layout to minimise the length of roads traversing through riverine habitats and rocky ridges that have been identified as Very high or high sensitivity which may create barriers and fragment habitats.</li> </ul>

ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES	
<b>CONSTRUCTION PHASE – SPECIALISTS</b>			
			<ul style="list-style-type: none"> <li>Establish wildlife passes, where artificial barriers are found; this particularly refers to physical barriers such as roads and fences.</li> <li>Develop and implement a site-specific spill management plan.</li> </ul>
		<p><b>POTENTIAL RISKS TO FAUNA SPECIES OF CONSERVATION CONCERN:</b></p> <p><b>DISTURBANCE</b></p>	<ul style="list-style-type: none"> <li>Implementing adequate noise reduction measures, including the use of insulation to reduce noise output from turbine hubs.</li> <li>Temporal (curtailment) restrictions. Temporal restriction strategies can focus on altering turbine operation during times or weather conditions when wildlife is most active or where a negative impact has been found during the monitoring program.</li> <li>Targeted operational timing by working with wind facility managers to target specific turbines under certain weather conditions where a negative impact has been identified. This may require changing the minimum windspeed at which turbines begin to turn and generate energy (cut-in speed) so that they idle during gentle wind and in so doing reduce noise during periods of low ambient noise.</li> <li>Minimise development lighting in order to minimise light pollution, disturbance to animals at night;</li> <li>Minimize noise disturbance during constructions where construction takes place within 1000 m of Very high and high sensitivity habitats. Restricting noise to daytime (9 am – 4 pm) periods when most fauna are less active</li> </ul>
		<p><b>POTENTIAL RISKS TO FAUNA SPECIES OF CONSERVATION CONCERN:</b></p> <p><b>MORTALITY FROM ROAD COLLISION</b></p>	<ul style="list-style-type: none"> <li>Careful planning of roads to minimise the length that traverses through riverine and rocky habitats that have been identified as Very high or high sensitivity.</li> <li>Use existing roads as much as possible.</li> <li>Roadkill monitoring program on both internal and external public roads targeting sensitive habitats and wildlife corridors. Roadkill Monitoring programs must be initiated at pre-construction phase and continued during construction and post-construction as well as conducted over different seasons.</li> <li>Pre-construction road planning to identify target sites for wildlife crossing structures which should be considered during the EIA process and with pre-construction roadkill monitoring findings. Wildlife crossing structures must be made in consultation with road planner, construction manager and wildlife biologist. This is generally more cost effective than retro fixing existing roads.</li> <li>Assess efficiency of roadkill mitigation approaches via a post-implementation roadkill monitoring program.</li> <li>Implementation of speed limits on both internal access WEF roads (40km/h) as well as external public roads (60km/h).</li> <li>Reduced speed limits of 30km/h where roads (both internal and external) cross High and Very high sensitivity areas identified; including riverine habitat, koppies and ecotones which may harbour sensitive species and generally have higher species diversity and abundance</li> <li>Wildlife warning signage and speed reduction measures where roads cross High and Very high sensitivity areas.</li> <li>Education and awareness campaigns on SCC and their habitat must form part of staff induction procedures to help increase</li> </ul>

ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES	
<b>CONSTRUCTION PHASE – SPECIALISTS</b>			
			<p>awareness, respect and responsibility towards the environment for all staff and contractors.</p> <ul style="list-style-type: none"> <li>• Inductions on safe wildlife passing and driving to reduce possible injury and roadkill alongside roads.</li> <li>• There is higher risk of collision when animals are more active which is typically from late afternoon to early morning. During these times a low speed limit (30km/h) needs to be implemented. Night-time driving should be avoided as much as possible but if necessary, speed needs to be reduced significantly to avoid collisions. Lagomorph species (hares and rabbits) often freeze in headlights and require headlights to be momentarily turned off to allow the animal to move off the road.</li> <li>• Reduced speeds also need to be implemented during reduced visibility such as misty conditions that have been observed on the site.</li> <li>• Induction must include reporting of any vehicle/wildlife collision or found roadkill to the appointed Roadkill monitoring personnel.</li> <li>• Search and rescue of slow-moving species, specifically Karoo Dwarf Tortoises, during the construction phase. IUCN guidelines for translocation of sensitive species should be consulted. Tortoises will need to be carefully relocated and provided shelter and water-rich food as well as monitoring of threatened species to ensure of their survival. Should a subpopulation be found further consultations with a herpetologist will be required for appropriated mitigation.</li> </ul>
		<p><b>POTENTIAL RISKS TO FAUNA SPECIES OF CONSERVATION CONCERN:</b></p> <p><b>CUMULATIVE IMPACT</b></p>	<ul style="list-style-type: none"> <li>• It is important to evaluate the consequences of each development before the next is begun.</li> <li>• Use a precautionary approach and aim to minimise negative effects even when the effects are not fully known.</li> <li>• Ensure the construction phase is done in as short a period as possible and avoid breeding season, typically in the spring after good rains.</li> <li>• Construction needs to be done during daytime, avoiding noise and disturbance when faunal communities are most likely active, particularly where the construction is in proximity to their habitat. Sensitive habitats near construction will need to be clearly marked.</li> <li>• Relating construction phase of the development with neighbouring developments and farming activity to ensure construction does not begin immediately after the completion of another or simultaneously.</li> <li>• The developer instigates a proactive mitigation measure by initiating a multi-stakeholder dialogue at a workshop to clarify these concerns and how they might be taken forward and co-funded. The aim of this mitigation is to reduce current impacts that threaten the survival of SCC populations. We recommend a biodiversity wildlife corridor approach whereby protecting sensitive habitats is made a priority. This may include species refuge areas where no form of indiscriminate wildlife killing/snaring is allowed, no or highly reduced livestock grazing, and no pest control including locust spraying is carried out.</li> </ul>

ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES	
<b>CONSTRUCTION PHASE – SPECIALISTS</b>			
		<p><b>POTENTIAL RISKS TO FAUNA SPECIES OF CONSERVATION CONCERN:</b></p> <p><b>CASCADING IMPACT ACROSS TROPHIC LEVELS</b></p>	<ul style="list-style-type: none"> <li>Poaching and the use of hunting dogs at site is prohibited.</li> <li>Initiate a general Fauna Biodiversity Monitoring program</li> <li>A Fauna Biodiversity program must be initiated pre-construction to have baseline population status and monitoring must be ongoing post-construction to identify any changes in occupancy in certain species' population which may in turn indirectly impact other fauna populations.</li> <li>We recommend the use of multiple monitoring methods including and not limited to; camera trapping in diverse habitats, targeted camera trapping for SCC; small mammal monitoring with the use of Sherman traps; the use of Conservation Scent Detection Dog teams to assist in detecting SCC.</li> </ul>
11.	VISUAL		<ul style="list-style-type: none"> <li>Ensure that vegetation is not unnecessarily removed during the construction period.</li> <li>Reduce the construction period through careful logistical planning and productive implementation of resources.</li> <li>Plan the placement of lay-down areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e., in already disturbed areas) wherever possible.</li> <li>Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.</li> <li>Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.</li> <li>Reduce and control construction dust using approved dust suppression techniques as and when required (i.e., whenever dust becomes apparent).</li> <li>Restrict construction activities to daylight hours whenever possible in order to reduce lighting impacts.</li> <li>Rehabilitate all disturbed areas immediately after the completion of construction works.</li> </ul>

Table 5-5: Operational Phase Mitigation Measures and Management Actions, General

ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES	
<b>OPERATIONAL PHASE – GENERAL EIR</b>			
1.	ECOLOGY	<ul style="list-style-type: none"> <li>Ensure that maintenance staff and vehicles remain on designated roads and paths within the site.</li> <li>Avoid unnecessary disturbance of existing bush patches.</li> </ul>	
2.	SOCIO-ECONOMIC	<ul style="list-style-type: none"> <li>Ensure that if the community trust business model is implemented, the board of trustees is representative of the surrounding communities, and that proper oversight procedures are established prior to operation of the WEF.</li> </ul>	
3.	LIGHTING	<ul style="list-style-type: none"> <li>Reduce night lighting impacts by using shaded lighting, LED lighting and using lights at low levels.</li> </ul>	
4.	ARCHITECTURE OF ANCILLARY INFRASTRUCTURE	<ul style="list-style-type: none"> <li>Ensure that the surfaces of all project structures and buildings visible to the public are maintained such that:               <ul style="list-style-type: none"> <li>their colours minimize visual intrusion and contrast by blending with the existing colours of the surrounding landscape,</li> <li>their colours and finishes do not create excessive glare, and</li> <li>their colours and finishes are consistent with local policies and ordinances.</li> </ul> </li> </ul>	

ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES
5.	STORAGE OF HAZARDOUS SUBSTANCES	<ul style="list-style-type: none"> <li>Ensure that all hazardous substances are stored in appropriately banded locations.</li> </ul>
6.	OPERATING EQUIPMENT	<ul style="list-style-type: none"> <li>Lower noise emission levels from inverters and transformers can be achieved by housing them in enclosed structures.</li> </ul>
7.	STORMWATER MANAGEMENT	<ul style="list-style-type: none"> <li>Maintain recommendations of the Storm Water Management Plan.</li> </ul>
8.	WASTE MANAGEMENT	<ul style="list-style-type: none"> <li>Develop and implement a waste management plan incorporating recycling and waste minimization and legal aspects into the plan.</li> <li>Develop and implement a worker education plan for waste management in the work environment.</li> </ul>

Table 5-6: Operational Phase Mitigation Measures and Management Actions, Specialist

ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES
<b>OPERATIONAL PHASE – SPECIALISTS</b>		
1.	AQUATIC	<p><b>PROACTIVE MONITORING TO ENSURE STRUCTURAL INTEGRITY IS MAINTAINED AND TO IDENTIFY EARLY SIGNS OF FAILURE / EROSION.</b></p> <p><b>CONCENTRATED RUNOFF ENTERING THE FRESHWATER FEATURES</b></p> <p><b>AND</b></p> <p><b>DISTURBANCE TO THE VEGETATION WITHIN AND SURROUNDING THE FRESHWATER FEATURES.</b></p> <ul style="list-style-type: none"> <li>No indiscriminate movement of construction equipment through the freshwater features may be permitted during standard operational activities or maintenance activities. Use must be made of the existing freshwater ecosystem crossings only;</li> <li>Vehicles used in the development site must be regularly washed (on a non-permeable surface or off-site) to avoid the dispersal of seeds on any alien or invasive species into the freshwater features;</li> <li>Hot spots for the build-up of debris and excess sediment must be identified and when necessary, debris/excess sediment must be removed by hand to prevent future flooding and potential damage to infrastructure;</li> <li>Routine maintenance of the roads must be undertaken to ensure that no concentration of flow and subsequent erosion occurs due to the road crossings/instream infrastructure. Such maintenance activities must specifically be undertaken after high rainfall events;</li> <li>Stormwater runoff from the road crossings must be monitored (by the O&amp;M Manager, to ensure it does not result in erosion of the freshwater features. Stormwater must be allowed to diffusely spread across the landscape, by ensuring adequate surface roughness in the freshwater feature (through vegetation and rocky areas);</li> <li>Maintenance vehicles must make use of dedicated access roads and no indiscriminate movement in the freshwater features may be permitted;</li> <li>During periodic maintenance activities of the roads, monitoring for erosion must be undertaken; and</li> <li>Should erosion be observed, caused by the road crossings/instream infrastructure, the area must be rehabilitated by infilling the erosion gully and revegetation thereof with suitable indigenous vegetation. Use can also be made of rocks collected from the surrounding area to infill any area prone to erosion (however, these must be sustainably sourced not taken from the surrounding freshwater features including rivers in the local area).</li> </ul>
2.	AVIFAUNA	<p><b>DISPLACEMENT THROUGH DISTURBANCE</b></p> <ul style="list-style-type: none"> <li>Disturbance can be managed and mitigated most effectively at the design stage by avoiding important nesting, roosting and foraging areas of sensitive species during site selection and</li> </ul>

ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES	
			<p>layout design, which has been achieved for the proposed development (embedded mitigation).</p> <ul style="list-style-type: none"> <li>In order to ensure no SCCs are breeding within the proposed disturbance footprint prior to the commencement of construction or decommissioning activities, a walkthrough of the site conducted within the month prior to commencement of construction can identify areas that require additional mitigation during construction and limit negative impacts on sensitive species.</li> </ul>
	<b>DISPLACEMENT THROUGH HABITAT LOSS</b>		<ul style="list-style-type: none"> <li>Reversibility is considered to be possible with rehabilitation to some degree for the construction phase.</li> <li>Following site selection mitigation is only marginally possible by retaining as much of the indigenous vegetation as possible, minimising the footprint of all associated infrastructure, including buildings, electrical infrastructure and the width and length of roads, and rehabilitating as many disturbed areas as possible following construction.</li> <li>Before construction and decommissioning an avifaunal walkthrough can identify any active nesting and breeding sites, which must be protected until the breeding has concluded.</li> </ul>
	<b>MORTALITY FROM COLLISIONS WITH TURBINES</b>		<ul style="list-style-type: none"> <li>Pre-construction monitoring in line with Best Practice Guidelines.</li> <li>A specialist raptor nest survey and collision risk modelling were completed prior to the selection of the facility site and the selection of the turbine layout, as has been done for this project.</li> <li>The proposed turbine layout avoids all areas of high and medium collision risk for Verreaux’s Eagle identified by the VERA model, in addition to avoiding high flight activity buffers of priority species, nest buffers that were identified for Martial Eagle, Secretarybird, Jackal Buzzard and Pale Chanting Goshawk, as well as applied buffers of ridgelines, wetlands and rivers.</li> <li>Proactive minimizing mitigation measures that are recommended include habitat management measures, such as removing artificial rock piles used by eagle prey, minimising perching and nesting opportunities within the facility, blade painting and implementing post-construction monitoring.</li> <li>The painting of one turbine blade in a different colour has shown to lower collisions by raptors successfully (May et al 2020), and this is currently being implemented retrospectively (in-situ) at one WEF in South Africa. As this mitigation is potentially highly effective, proactively painting the blades of as many turbines as legally possible prior to construction, at a fraction of the cost of a reactive approach is highly recommended.</li> </ul>
	<b>MORTALITY FROM COLLISIONS WITH POWERLINES</b>		<ul style="list-style-type: none"> <li>The impact can be completely avoided by burying all internal overhead powerlines along the internal road network. Where this is technically not possible, in order to minimise collisions, line markers such as bird flappers and static bird flight diverters are being widely used with some success.</li> <li>Where this is not possible, every meter of overhead power line potentially significantly increases the probability of collisions resulting in a high negative, and unacceptable impact significance rating.</li> </ul>
	<b>MORTALITY FROM ELECTROCUTIONS ON ELECTRICAL INFRASTRUCTURE</b>		<ul style="list-style-type: none"> <li>Bird electrocutions can be easily avoided by burying overhead powerlines, and by creating separation between conductors of differing electrical potential at substations and electrical</li> </ul>

ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES	
			<p>infrastructure, and by placing insulation over conductors, or by redirecting birds to perch or nest away from conductors (APLIC 2006, Dwyer et al. 2017).</p> <ul style="list-style-type: none"> <li>• If all overhead powerlines are buried any exposed electrical infrastructure within the substation is of a bird-friendly insulated design, the impact can be completely removed.</li> </ul>
		<b>CUMULATIVE IMPACTS</b>	<ul style="list-style-type: none"> <li>• The only real mitigation possible in order to minimise cumulative impacts, beyond minimising impacts for each project separately during the EIA process, is for the Competent Authority to ensure only projects are authorised that are practically mitigatable to an acceptable level, and that do not lead to unacceptable negative impacts, including cumulative impacts, and to ensure the correct implementation of authorised Environmental Management Programmes through compliance audits and enforcement.</li> </ul>
3.	BAT	<b>BAT FATALITIES</b>	<ul style="list-style-type: none"> <li>• Avoid: <ul style="list-style-type: none"> <li>○ No placement of turbines within no-go areas.</li> </ul> </li> <li>• Minimise: <ul style="list-style-type: none"> <li>○ Maintain a minimum blade sweep of 30 m to avoid impacts to lower flying bats such as clutter-edge species (e.g., Cape serotine, Natal long-fingered bat)</li> <li>○ Minimise the rotor diameter</li> <li>○ Turbine blades must be feathered, or a similar technique should be used, to prevent free-wheeling below the turbine cut-in speed.</li> <li>○ Implement post-construction fatality monitoring and apply additional curtailment or deterrents if fatality thresholds are exceeded.</li> </ul> </li> </ul>
		<b>LIGHT POLLUTION</b>	<ul style="list-style-type: none"> <li>• Avoid: <ul style="list-style-type: none"> <li>○ No placement of substations and operational and maintenance buildings within no-go areas.</li> </ul> </li> <li>• Minimise: <ul style="list-style-type: none"> <li>○ Use as little lighting as possible, maximise use of motion-sensor lighting, avoid sky-glow by using hoods, increase spacing between lighting units, and using low intensity lighting (Rydell 1992, Stone 2012).</li> </ul> </li> </ul>
4.	NOISE	<b>DAYTIME OPERATION OF WTG CONSIDERING THE WORST-CASE SPL</b>	<ul style="list-style-type: none"> <li>• <i>The significance of the noise impact is low and no additional mitigation is recommended, though future noise-monitoring is recommended.</i></li> </ul>
		<b>NIGHT-TIME OPERATION OF WTG CONSIDERING THE WORST-CASE SPL</b>	
5.	RIVERINE RABBIT	<b>DISTURBANCE FROM TURBINE NOISE</b>	<ul style="list-style-type: none"> <li>• <i>Turbines and pylons should be located outside of the buffers around riverine habitat</i></li> <li>• <i>Given the lack of knowledge on adequate buffer sizes to effectively mitigate noise impacts on the species, if a population is found on the site in the future, a research project should be instigated and funded to monitor the effect of the turbines on the species</i></li> </ul>
		<b>DEGRADATION OF HABITAT</b>	<ul style="list-style-type: none"> <li>• <i>Implement a Site Erosion Management and Control Plan to prevent erosion from high-lying areas impacting downstream ecosystems</i></li> </ul>
6.	SOCIAL	<b>NEW EMPLOYMENT AND ECONOMIC IMPACTS</b>	<ul style="list-style-type: none"> <li>• Maximise local employment and procurement (from the local and district municipalities) wherever possible.</li> </ul>

ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES
		<ul style="list-style-type: none"> <li>Coordinate the effort to obtain temporary employment, service providers, SMME's etc. required for maintenance work, with the municipal LED Units.</li> </ul>
	<b>INCREASE IN LIVELIHOODS FOR DIRECTLY BENEFITTING LANDOWNERS</b>	<ul style="list-style-type: none"> <li>Consider the potential increase in rates and taxes when lease agreements are negotiated with landowners.</li> </ul>
	<b>SOCIO-ECONOMIC CONTRIBUTION / COMMUNITY DEVELOPMENT</b>	<ul style="list-style-type: none"> <li>Involve the local and district municipalities' LED Units in all processes when SED and ED projects and suitable candidates for projects and/or training programmes are identified.</li> <li>Make gender and Youth issues a specific outcome of the needs analysis to ensure that these groups are targeted.</li> <li>In conjunction with other IPP's in the region or in the RE corridor / RE Zone set up and establish a Forum (or similar structure) to coordinate community development initiatives. Meet on a quarterly basis to provide feedback and ensure transparency.</li> <li>Ensure further transparency and effective information sharing through industry associated websites, emailed newsletters, municipal noticeboards, information events and meetings and existing community channels used by the various wards.</li> <li>Become involved in local initiatives that address existing backlogs, such as the establishment and training of an Emergency Unit / Response Team for fire prevention and emergencies (e.g. with volunteers such as farmers), hospital support (e.g. equipment, training of staff where there are staff shortages, etc.) and so forth to ensure that real community based needs are met.</li> <li>Link with existing NGO's and pre-established projects but make it a requirement (and set targets) for the establishment of new community-driven development processes and for NGO's to assist in skills transfer to these new groups and processes.</li> </ul>
	<b>TRAINING / SKILLS DEVELOPMENT / CAPACITY BUILDING</b>	<ul style="list-style-type: none"> <li>Identify existing NGO's to assist in training and skills transfer to communities and Officials.</li> <li>Link with existing training workshops and programmes for SMME development that are done by municipal LED Units.</li> <li>In collaboration with other IPPs operational in the region, establish a SMME "Village" and training centre to coordinate training efforts of SMMEs and individuals. Link with bigger institutions such as Universities and Further Education and Training (FET) institutes to increase the impact of training and skills development in the region.</li> </ul>
	<b>IMPACTS ON TOURISM</b>	<ul style="list-style-type: none"> <li>Should the affected tourism establishment raise complaints and/or concerns, consult with them and consider to remove the turbine/s that they perceive could be problematic.</li> </ul>
	<b>IMPACTS ON SENSE OF PLACE</b>	<ul style="list-style-type: none"> <li>Implement an effective Land Use Management programme in collaboration with the landowners.</li> <li>Implement all mitigation and management measures as proposed</li> <li>Rehabilitate the veld to its original state post the operational phase.</li> </ul>
	<b>INTRUSION IMPACTS</b>	<ul style="list-style-type: none"> <li>Implement an effective Land Use Management programme (procedures when gates are opened and closed, road maintenance, methods to address potential veld fires, no-go areas, etc.) in collaboration with the landowners.</li> <li>Implement all mitigation and management measures as</li> </ul>



ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES	
			proposed in the VIA and NIA Specialist reports.
7.	TERRESTRIAL BIODIVERSITY	<p>POTENTIAL TERRESTRIAL BIODIVERSITY IMPACTS:</p> <p>ALIEN INVASIVE SPECIES</p>	<ul style="list-style-type: none"> <li>• Alien trees and weeds must be removed from the site as per CARA/ NEMBA requirements.</li> <li>• A suitable weed and alien invasive plant management plan to be implemented in construction and operation phases.</li> <li>• After clearing and construction is completed, an appropriate cover crop may be required, should natural re-establishment of grasses not take place in a timely manner, such as along road verges. This will also minimise dust.</li> </ul>
		<p>POTENTIAL TERRESTRIAL BIODIVERSITY IMPACTS</p> <p>EROSION</p>	<ul style="list-style-type: none"> <li>• Suitable measures must be implemented in areas that are susceptible to erosion. Areas must be rehabilitated, and a suitable cover crop planted once construction is completed.</li> <li>• Topsoil must be stripped and stockpiled separately and replaced on completion.</li> <li>• If natural vegetation re-establishment does not occur, a suitable grass must be applied.</li> </ul>
		<p>POTENTIAL TERRESTRIAL BIODIVERSITY IMPACTS</p> <p>ECOLOGICAL PROCESSES</p>	<ul style="list-style-type: none"> <li>• Blanket clearing of vegetation must be limited to the development footprint, and the area to be cleared must be demarcated before any clearing commences.</li> </ul>
		<p>POTENTIAL TERRESTRIAL BIODIVERSITY IMPACTS</p> <p>AQUATIC AND RIPARIAN PROCESSES</p>	<ul style="list-style-type: none"> <li>• Suitable structures to be constructed at watercourse crossings that do not alter flows.</li> <li>• Stormwater discharge into watercourses to be protected against erosion.</li> </ul>
		<p>POTENTIAL TERRESTRIAL BIODIVERSITY IMPACTS</p> <p>FAUNAL PROCESSES</p>	<ul style="list-style-type: none"> <li>• The habitats and microhabitats present on the project site are not unique and are widespread in the general area, hence the local impact associated with the footprint would be of low significance if mitigation measures are adhered to.</li> <li>• Small mammals within the habitat on and around the affected area are generally mobile and likely to be transient to the area. They will most likely vacate the area once construction commences. As with all construction sites there is a latent risk that there will be some accidental mortalities. Specific measures are made to reduce this risk. The risk of species of special concern is low, and it is unlikely that there will be any impact to populations of such species because of the activity.</li> <li>• Reptiles such as lizards are less mobile compared to mammals, and some mortalities could arise. It is recommended that a faunal search and rescue be conducted before construction commences, although experience has shown that there could still be some mortalities as these species are mobile and may thus move onto site once construction is underway. A reptile handler should be on call for such circumstances.</li> </ul>

ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES
		<ul style="list-style-type: none"> <li>Should any amphibian migrations occur between wetland areas during construction, appropriate measures (including temporarily suspending works in the affected area) should be implemented</li> </ul>
	<p><b>POTENTIAL TERRESTRIAL BIODIVERSITY IMPACTS</b></p> <p><b>FAUNAL SPECIES</b></p>	<ul style="list-style-type: none"> <li>The habitats and microhabitats present on the project site are not unique and are widespread in the general area, hence the local impact associated with the footprint would be of low significance if mitigation measures are adhered to.</li> <li>Small mammals within the habitat on and around the affected area are generally mobile and likely to be transient to the area. They will most likely vacate the area once construction commences. As with all construction sites there is a latent risk that there will be some accidental mortalities. Specific measures are made to reduce this risk. The risk of species of special concern is low, and it is unlikely that there will be any impact to populations of such species because of the activity.</li> <li>Reptiles such as lizards are less mobile compared to mammals, and some mortalities could arise. It is recommended that a faunal search and rescue be conducted before construction commences, although experience has shown that there could still be some mortalities as these species are mobile and may thus move onto site once construction is underway. A reptile handler should be on call for such circumstances.</li> <li>Should any amphibian migrations occur between wetland areas during construction, appropriate measures (including temporarily suspending works in the affected area) should be implemented.</li> </ul>
	<p><b>POTENTIAL RISKS TO FAUNA SPECIES OF CONSERVATION CONCERN:</b></p> <p><b>MORTALITY FROM ROAD COLLISION</b></p>	<ul style="list-style-type: none"> <li>Careful planning of roads to minimise the length that traverses through riverine and rocky habitats that have been identified as Very high or high sensitivity.</li> <li>Use existing roads as much as possible.</li> <li>Roadkill monitoring program on both internal and external public roads targeting sensitive habitats and wildlife corridors. Roadkill Monitoring programs must be initiated at pre-construction phase and continued during construction and post-construction as well as conducted over different seasons.</li> <li>Pre-construction road planning to identify target sites for wildlife crossing structures which should be considered during the EIA process and with pre-construction roadkill monitoring findings. Wildlife crossing structures must be made in consultation with road planner, construction manager and wildlife biologist. This is generally more cost effective than retro fixing existing roads.</li> <li>Assess efficiency of roadkill mitigation approaches via a post-implementation roadkill monitoring program.</li> <li>Implementation of speed limits on both internal access WEF roads (40km/h) as well as external public roads (60km/h).</li> <li>Reduced speed limits of 30km/h where roads (both internal and external) cross High and Very high sensitivity areas identified; including riverine habitat, koppies and ecotones which may harbour sensitive species and generally have higher species diversity and abundance</li> <li>Wildlife warning signage and speed reduction measures where roads cross High and Very high sensitivity areas.</li> </ul>

ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES
		<ul style="list-style-type: none"> <li>• Education and awareness campaigns on SCC and their habitat must form part of staff induction procedures to help increase awareness, respect and responsibility towards the environment for all staff and contractors.</li> <li>• Inductions on safe wildlife passing and driving to reduce possible injury and roadkill alongside roads.</li> <li>• There is higher risk of collision when animals are more active which is typically from late afternoon to early morning. During these times a low speed limit (30km/h) needs to be implemented. Night-time driving should be avoided as much as possible but if necessary, speed needs to be reduced significantly to avoid collisions. Lagomorph species (hares and rabbits) often freeze in headlights and require headlights to be momentarily turned off to allow the animal to move off the road.</li> <li>• Reduced speeds also need to be implemented during reduced visibility such as misty conditions that have been observed on the site.</li> <li>• Induction must include reporting of any vehicle/wildlife collision or found roadkill to the appointed Roadkill monitoring personnel.</li> <li>• Search and rescue of slow-moving species, specifically Karoo Dwarf Tortoises, during the construction phase. IUCN guidelines for translocation of sensitive species should be consulted. Tortoises will need to be carefully relocated and provided shelter and water-rich food as well as monitoring of threatened species to ensure of their survival. Should a subpopulation be found further consultations with a herpetologist will be required for appropriated mitigation.</li> </ul>
	<p><b>PREDATION FROM POSSIBLE INFLUX OF PIED CROW AND OTHER BIRD OF PREY THAT USE POWERLINE PYLONS FOR NEST SITES</b></p>	<ul style="list-style-type: none"> <li>• The use of pylon designs that are less favourable for nesting sites.</li> <li>• The monitoring of powerlines by avifaunal specialists or bird monitors. Nests found on the powerline should be identified to species level. An adaptive management approach can then be implemented, where identified problematic nests can be removed by maintenance personnel and nest deterrents fitted where needed.</li> <li>• The fitting of nest deterrents/discouragers on horizontal and cross beam sections where self-supporting pylons are used.</li> <li>• The design of the anti-climb fence must not offer any suitable sites for nests. This can be done by modifying structures so that they are angled downwards to avoid having horizontal platforms. Anti-climb fences must also be set as low as possible on the towers to discourage nesting by Pied Crows.</li> <li>• Record prey species below Corvid nests (not limited to powerlines) and use findings to implement culling if required. Targeting culling at individuals that prey on tortoises.</li> <li>• Remove available food and water that have been artificially created</li> <li>• No open dumpsite and carcass pits – All waste, organic and inorganic, including oil spills, and any existing agricultural biproduct needs to be environmentally safely disposed of and covered.</li> <li>• Avoid using livestock feeding sites to attract corvids and locate away from sensitive habitats.</li> </ul>

ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES	
			<ul style="list-style-type: none"> <li>Remove existing artificial nest sites including old broken windmills and telephone/electric poles. This should be done with the advice from an avifaunal specialist.</li> </ul>
		<p><b>POTENTIAL RISKS TO FAUNA SPECIES OF CONSERVATION CONCERN:</b></p> <p><b>CUMULATIVE IMPACT</b></p>	<ul style="list-style-type: none"> <li>It is important to evaluate the consequences of each development before the next is begun.</li> <li>Use a precautionary approach and aim to minimise negative effects even when the effects are not fully known.</li> <li>Ensure the construction phase is done in as short a period as possible and avoid breeding season, typically in the spring after good rains.</li> <li>Construction needs to be done during daytime, avoiding noise and disturbance when faunal communities are most likely active, particularly where the construction is in proximity to their habitat. Sensitive habitats near construction will need to be clearly marked.</li> <li>Relating construction phase of the development with neighbouring developments and farming activity to ensure construction does not begin immediately after the completion of another or simultaneously.</li> <li>The developer instigates a proactive mitigation measure by initiating a multi-stakeholder dialogue at a workshop to clarify these concerns and how they might be taken forward and co-funded. The aim of this mitigation is to reduce current impacts that threaten the survival of SCC populations. We recommend a biodiversity wildlife corridor approach whereby protecting sensitive habitats is made a priority. This may include species refuge areas where no form of indiscriminate wildlife killing/snaring is allowed, no or highly reduced livestock grazing, and no pest control including locust spraying is carried out.</li> <li>Poaching and the use of hunting dogs at site is prohibited.</li> </ul>
7.	VISUAL	<p><b>POTENTIAL VISUAL IMPACT OF FACILITY OPERATIONS ON SENSITIVE VISUAL RECEPTORS IN CLOSE PROXIMITY (&lt; 5KM) TO THE PROPOSED DEVELOPMENT</b></p>	<ul style="list-style-type: none"> <li>Retain / re-establish and maintain natural vegetation in all areas outside of the development footprint.</li> <li>Maintain the general appearance of the facility as a whole.</li> <li>Monitor rehabilitated areas, and implement remedial action as and when required.</li> </ul>
		<p><b>POTENTIAL VISUAL IMPACT OF FACILITY OPERATIONS ON SENSITIVE VISUAL RECEPTORS WITHIN THE LOCAL AREA (BETWEEN 5 - 10KM) SURROUNDING THE PROPOSED DEVELOPMENT</b></p>	<ul style="list-style-type: none"> <li>Retain / re-establish and maintain large trees, natural features and noteworthy natural vegetation in all areas outside of the activity footprint.</li> <li>Retain natural pockets (wetland, river and other sensitive vegetation zones) as buffers within the property and along the perimeter.</li> <li>Dust suppression techniques should be in place at all times during the site development and operational phases.</li> <li>Access roads will require an effective dust suppression management programme, such as regular wetting and/or the use of non-polluting chemicals that will retain moisture in the road surface.</li> <li>Downscaling of operations.</li> <li>Keeping infrastructure at minimum heights.</li> <li>Introducing landscaping measures such as vegetating berms.</li> <li>Avoid the use of highly reflective material.</li> </ul>

ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES
		<ul style="list-style-type: none"> <li>• Metal surfaces, where they occur, should be painted in natural soft colours that would blend in with the environment.</li> <li>• Maintain the general appearance of the site as a whole.</li> <li>• Lighting should be kept to a minimum wherever possible.</li> <li>• Install light fixtures that provide precisely directed illumination to reduce light “spillage” beyond the immediate surrounds of the activity – this is especially relevant where the edge of the activity is exposed to residential properties.</li> <li>• Wherever possible, lights should be directed downwards to avoid illuminating the sky.</li> <li>• Avoid high pole top security lighting along the periphery of the site and use only lights that are activated on movement.</li> </ul>
	<p><b>POTENTIAL VISUAL IMPACT OF FACILITY OPERATIONS ON SENSITIVE VISUAL RECEPTORS WITHIN THE DISTRICT (BETWEEN 10 - 20KM) SURROUNDING THE PROPOSED DEVELOPMENT</b></p>	<ul style="list-style-type: none"> <li>• Retain / re-establish and maintain large trees, natural features and noteworthy natural vegetation in all areas outside of the activity footprint.</li> <li>• Retain natural pockets (wetland, river and other sensitive vegetation zones) as buffers within the property and along the perimeter.</li> <li>• Dust suppression techniques should be in place at all times during the site development and operational phases.</li> <li>• Access roads will require an effective dust suppression management programme, such as regular wetting and/or the use of non-polluting chemicals that will retain moisture in the road surface.</li> <li>• Downscaling of operations.</li> <li>• Keeping infrastructure at minimum heights.</li> <li>• Introducing landscaping measures such as vegetating berms.</li> <li>• Avoid the use of highly reflective material.</li> <li>• Metal surfaces, where they occur, should be painted in natural soft colours that would blend in with the environment.</li> <li>• Maintain the general appearance of the site as a whole.</li> <li>• Lighting should be kept to a minimum wherever possible.</li> <li>• Install light fixtures that provide precisely directed illumination to reduce light “spillage” beyond the immediate surrounds of the activity – this is especially relevant where the edge of the activity is exposed to residential properties.</li> <li>• Wherever possible, lights should be directed downwards to avoid illuminating the sky.</li> <li>• Avoid high pole top security lighting along the periphery of the site and use only lights that are activated on movement.</li> </ul>
	<p><b>POTENTIAL VISUAL IMPACT OF FACILITY OPERATIONS ON SENSITIVE VISUAL RECEPTORS WITHIN THE REGION (&gt; 20KM)</b></p>	<ul style="list-style-type: none"> <li>• Retain / re-establish and maintain large trees, natural features and noteworthy natural vegetation in all areas outside of the activity footprint.</li> <li>• Retain natural pockets (wetland, river and other sensitive vegetation zones) as buffers within the property and along the perimeter.</li> <li>• Access roads will require an effective dust suppression management programme, such as regular wetting and/or the use of non-polluting chemicals that will retain moisture in the road surface.</li> <li>• Downscaling of operations.</li> <li>• Keeping infrastructure at minimum heights.</li> <li>• Introducing landscaping measures such as vegetating berms.</li> </ul>

ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES
		<ul style="list-style-type: none"> <li>• Avoid the use of highly reflective material.</li> <li>• Metal surfaces, where they occur, should be painted in natural soft colours that would blend in with the environment.</li> <li>• Maintain the general appearance of the site as a whole.</li> <li>• Lighting should be kept to a minimum wherever possible.</li> <li>• Install light fixtures that provide precisely directed illumination to reduce light “spillage” beyond the immediate surrounds of the activity – this is especially relevant where the edge of the activity is exposed to residential properties.</li> <li>• Wherever possible, lights should be directed downwards to avoid illuminating the sky.</li> <li>• Avoid high pole top security lighting along the periphery of the site and use only lights that are activated on movement.</li> </ul>
	<b>POTENTIAL VISUAL IMPACT OF OPERATIONAL LIGHTING AT NIGHT ON SENSITIVE VISUAL RECEPTORS IN THE REGION</b>	<ul style="list-style-type: none"> <li>• Aviation standards and CAA Regulations for turbine lighting must be followed.</li> <li>• The possibility of limiting aircraft warning lights to the turbines on the perimeter according to CAA requirements, thereby reducing the overall impact, must be investigated.</li> <li>• Install aircraft warning lights that only activate when the presence of an aircraft is detected, if permitted by CAA.</li> <li>• Shield the sources of light by physical barriers (walls, vegetation, or the structure itself).</li> <li>• Limit mounting heights of lighting fixtures, or alternatively use foot-lights or bollard level lights.</li> <li>• Make use of minimum lumen or wattage in fixtures.</li> <li>• Make use of down-lighters, or shielded fixtures.</li> <li>• Make use of Low-Pressure Sodium lighting or other types of low impact lighting.</li> <li>• Make use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.</li> </ul>

**Table 5-7: Decommissioning Phase Mitigation Measures and Management Actions, General**

ACTIVITY		MITIGATION AND/OR MANAGEMENT MEASURES
<b>DECOMMISSIONING PHASE – GENERAL EIR</b>		
1.	<b>ECOLOGY</b>	<ul style="list-style-type: none"> <li>• Construction vehicles and machinery should make use of existing infrastructure such as roads as far as possible to minimise disturbance on the receiving environment.</li> <li>• Ensure that all bare land is rehabilitated after decommissioning.</li> </ul>
2.	<b>NOISE SENSITIVE RECEPTORS</b>	<ul style="list-style-type: none"> <li>• Machinery that causes noise must only be operated at appropriate times (during the day and at normal working hours). See Table 3-1 for exceptions.</li> </ul>
3.	<b>POLLUTION</b>	<ul style="list-style-type: none"> <li>• Littering must be avoided, and litter bins should be made available at various strategic points on site. Refuse from the construction site should be collected on a regular basis and deposited at an appropriate landfill.</li> <li>• No storage of fuels and hazardous materials should be permitted near sensitive water resources. All hazardous substances (e.g. diesel, oil drums, etc.) to be stored in a bunded area.</li> <li>• Ensure adequate storm water management by implementing recommendations of the Storm Water Management Plan during decommissioning.</li> </ul>
4.	<b>DUST</b>	<ul style="list-style-type: none"> <li>• Reduce fugitive/nuisance dust by implementing the following: <ul style="list-style-type: none"> <li>○ Damping down of un-surfaced and un-vegetated areas;</li> <li>○ Retention of vegetation where possible;</li> </ul> </li> </ul>

		<ul style="list-style-type: none"> <li>Demolitions and other clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighbouring areas; and</li> <li>A speed limit of 40km/h must not be exceeded on dirt roads.</li> <li>Any complaints or claims emanating from the lack of dust control should be attended to immediately by the Contractor.</li> </ul>
5.	<b>TRAFFIC &amp; TRANSPORT</b>	<ul style="list-style-type: none"> <li>Deconstruction vehicles and machinery should make use of existing infrastructure such as roads as far as possible to minimise disturbance on the receiving environment.</li> <li>There must be no unnecessary disturbance of existing vegetation.</li> </ul>
6.	<b>SOIL EROSION</b>	<ul style="list-style-type: none"> <li>After the removal of all wind turbine-related structures, the disturbed soils should be re-vegetated to avoid unnecessary soil erosion.</li> </ul>
7.	<b>LAND USE</b>	<ul style="list-style-type: none"> <li>Ensure that an appropriate land use is adopted.</li> </ul>

5.3 CUMULATIVE IMPACT AND OTHER INFRASTRUCTURE

Cumulative impacts are defined as those “that result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned or reasonably defined developments at the time the risks and impact identification process is conducted.” To assess the cumulative impacts that the proposed Soutrivier North WEF will have on the terrestrial ecology of the site, it is necessary to assess this at a broader level by looking at other developments in the area. The cumulative impacts associated with the project will include the loss of vegetation communities at a regional scale which will be exacerbated, the spread of invasive alien plant species which could be exacerbated, and habitat fragmentation and disruption of ecosystem function and process could be exacerbated. The cumulative impact associated with the construction and operation of the proposed Soutrivier North WEF, is likely to be of moderate significance due to the relatively large development footprint. However, to limit the impact, it is important that the recommended management plans (Chapter 10) are implemented, and that vegetation clearance is strictly limited to the development footprint of the Soutrivier North WEF. Rehabilitation, to restore ecological function, is also a key element of mitigating cumulative impacts, and it is therefore important to implement and monitor rehabilitation.

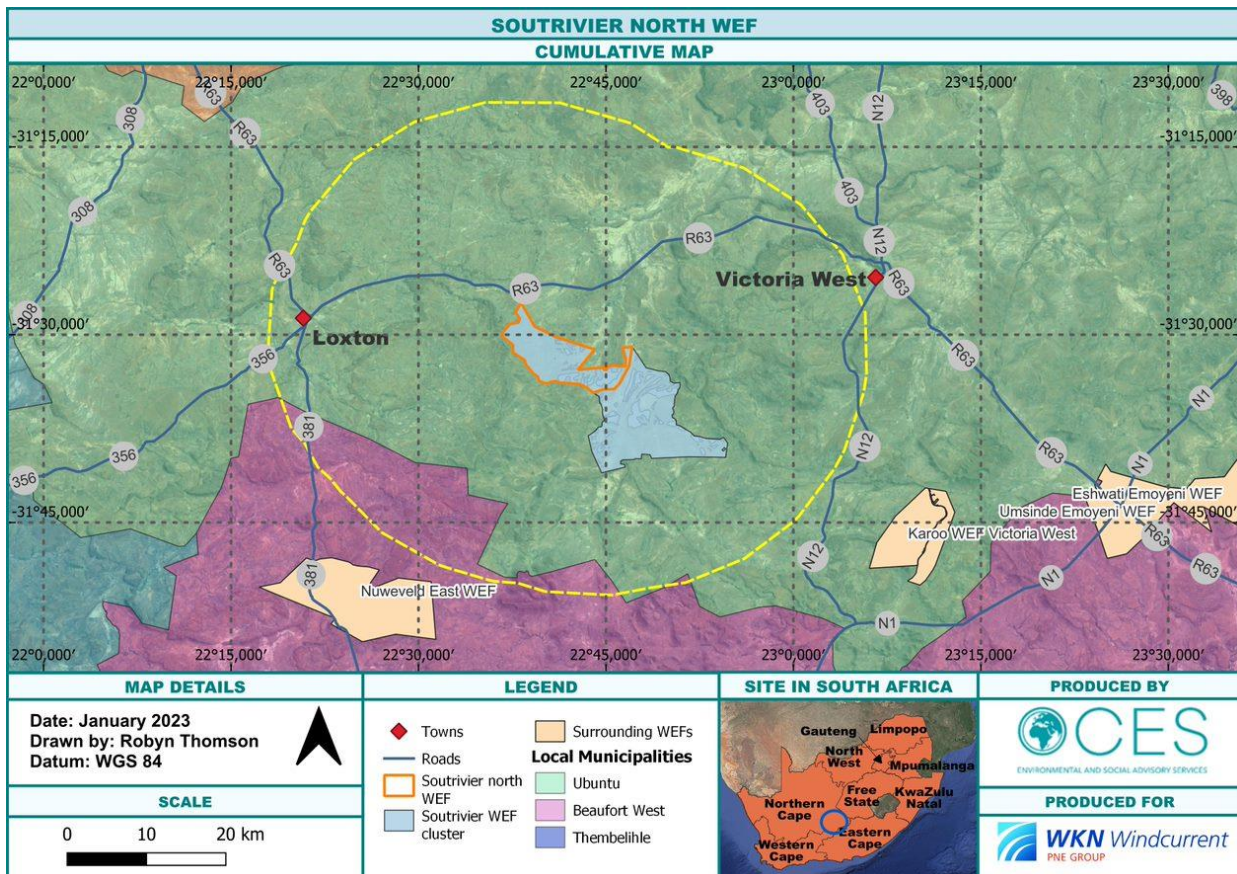


Figure 5.1: Cumulative Renewable Energy Development Map.

### 5.4 SITE SENSITIVITY

The following figure (Figure 5-1) illustrates the site sensitivity of the proposed Soutrivier North WEF site (updated January 2023).

The site sensitivity data represented on this map includes data from all specialists from the Scoping and EIA Process (2022/2023).

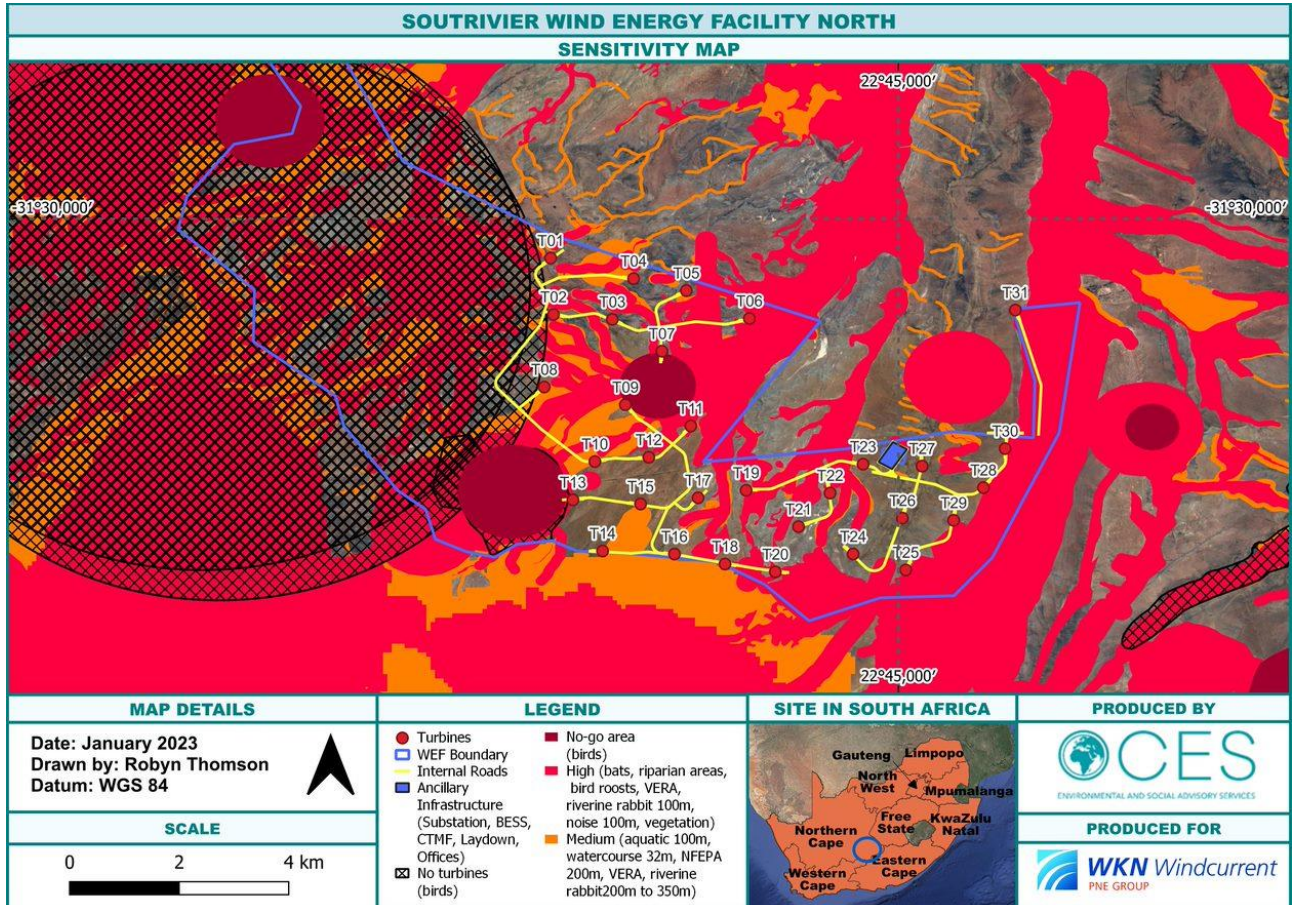


Figure 5-1: Site Sensitivity Map of the Proposed Soutrivier North WEF.



## 6 ADMINISTRATION AND REGULATION OF ENVIRONMENTAL OBLIGATIONS

### 6.1 MANAGEMENT STRUCTURE

In line with this EMPr, the Contractor must prepare a document clearly outlining and demonstrating the environmental responsibilities, accountability, and liability of the Contractor’s employees. The Contractor must assign responsibilities for the following:

- Reporting structures;
- Actions to be taken to ensure compliance;
- Overall design, development, and implementation of the EMPr;
- Documenting the environmental policy and strategy;
- Implementing the EMPr in all stages/phases of the project; and
- All the aspects which require action under the other core elements and sub-elements of the EMPr.

All official communication and reporting lines, including instructions, directives, and information, need to be channelled according to the organisation structure.

### 6.2 ROLES AND RESPONSIBILITIES

#### 6.2.1 *The Applicant (Developer)*

Soutrivier North Wind Power RF (Pty) Ltd (hereafter referred to as the “Applicant” or “Developer”) is a Special Purpose Vehicle (SPV) established by WKN-Windcurrent SA (Pty) Ltd for the sole purpose of developing, owning, and operating the proposed Soutrivier North WEF. The Applicant is the responsible entity for monitoring the implementation of the EMPr and compliance with the EA. However, if the company appoints a Contractor to implement the project, and hence implement the proposed mitigation measures documented in this EMPr on their behalf, then the successful contractor’s responsibilities are outlined as per the section that follows. The Applicant will also be responsible for stipulating and enforcing fines and penalties to the Contractor for contravention of any non-compliances against the EMPr, the EA and other approved plans.

#### 6.2.2 *The Contractor*

The successful Contractor will:

- Be responsible for the finalisation of the EMPr in terms of methodologies which are required to be implemented to achieve the environmental specifications contained herein and the relevant requirements contained in the EA;
- Be responsible for the overall implementation of the EMPr in accordance with the requirements of the developer and the EA;
- Ensure that all third parties, who carry out all or part of the Contractor’s obligations under the contract, comply with the requirements of this EMPr; and
- Be responsible for obtaining any outstanding permits and licenses which are required for the construction of the Soutrivier North WEF.

#### 6.2.3 *The Resident Engineer*

The Resident Engineer (RE) should be appointed by the Applicant and will be required to oversee the construction programme and construction activities performed by the Contractor. The RE is expected to liaise with the Contractor and ECO on environmental matters, as well as any pertinent engineering matters where these may have environmental consequences. The RE will oversee the general compliance of the Contractor with the EMPr and other pertinent site specifications. The RE should also be familiar with the EMPr specifications and further monitor the Contractor’s compliance with the environmental specifications on a

daily basis, through a Site Diary, and enforce compliance.

#### **6.2.4 The Environmental Site Officer (ESO)**

The Contractor should appoint a nominated representative of the Contractor as the ESO for the contract. The ESO must be site-based and should be the responsible person for implementing the environmental provisions of the construction contract. The approved ESO must be onsite at all times.

The ESO's duties will include, *inter alia*, the following:

- Ensuring that all the environmental authorisations and permits, required in terms of the applicable legislation, have been obtained prior to construction commencing;
- Reviewing construction Method Statements (MS) with input from the ECO and RE, where necessary, in order to ensure that the environmental specifications contained within the construction contract are adhered to;
- Assisting the Contractor in finding environmentally responsible solutions to problems;
- Keeping accurate and detailed records of all activities on-site;
- Keeping a register of complaints onsite and recording community comments and issues, and the actions taken in response to these complaints;
- Ensuring that the required actions are undertaken to mitigate the impacts resulting from non-compliance;
- Reporting all incidences of non-compliance to the ECO and Contractor; and
- The ESO must submit regular written reports to the ECO, not less frequently than once a month, during the construction phase of the Soutrivier North WEF.

The ESO must have:

- The ability to manage public communication and complaints;
- The ability to think holistically about the structure, functioning and performance of environmental systems;
- The ESO must be fully conversant with the EIR, EMPr, relevant environmental legislation and any other relevant documents relating to the Soutrivier North WEF; and
- The ESO must have received professional training, including training in the skills necessary to be able to amicably and diplomatically deal with the public as outlined in the first bullet point above.

The ECO should be in the position to determine whether or not the ESO has adequately demonstrated their capabilities to carry out the tasks at hand and in a professional manner. The ECO will therefore have the authority to instruct the Contractor to replace the ESO if, in the ECO's opinion, the appointed officer is not fulfilling their duties in terms of the requirements of the construction contract. Such instruction must be in writing and must clearly set out the reasons why a replacement is required and within what timeframe. The ECO must visit the development site and, in addition to the responsibilities listed in section 6.2.5 below, review the performance of the ESO and submit performance reviews to Soutrivier North Wind Power RF (Pty) Ltd.

#### **6.2.5 Environmental Control Officer (ECO)**

For the purpose of implementing the conditions contained herein, Soutrivier North Wind Power RF (Pty) Ltd must appoint an ECO for the contract. The ECO must be the responsible person for ensuring that the provisions of the EMPr, as well as the EA, are complied with during the construction phase. The ECO will be responsible for issuing instructions to the Contractor, where environmental considerations call for action to be taken. The ECO must submit regular written reports, at least once a month, to the Applicant and, when required and/or requested, to the competent authority (DFFE). The ECO will be responsible for the

monitoring, reviewing, and verifying of compliance with the EMPr and conditions of the EA by the Contractor.

The ECO's duties in this regard will include, *inter alia*, the following:

- Confirming that all the permits and EA(s) required in terms of the applicable legislation have been obtained prior to construction commencing;
- Monitoring and verifying that the EMPr, the EA and the Contract are adhered to at all times and acting if specifications are not followed;
- Monitoring and verifying that environmental impacts are kept to a minimum;
- Reviewing and approving construction Method Statements with input from the ESO and RE, where necessary, in order to ensure that the environmental specifications contained within this EMPr and the EA are adhered to;
- Inspecting the site and surrounding areas on a regular basis to monitor compliance with the EMPr, EA and Contract;
- Monitoring the undertaking by the Contractor of environmental awareness training for all new personnel on-site;
- Ensuring that activities onsite comply with all relevant environmental legislation;
- Undertaking a continual internal review of the EMPr and submitting any changes to the Applicant and authority for review and approval, as applicable;
- Checking the register of complaints kept on-site and maintained by the ESO and ensuring that the correct actions are/were taken in response to these complaints;
- Checking that the required actions are/were undertaken to mitigate the impacts resulting from non-compliance;
- Reporting all incidences of non-compliance to Soutrivier North Wind Power RF (Pty) Ltd;
- The ECO must also submit compliance audit reports to DFFE, in accordance with the requirements of the EA. Such reports must be reviewed by Soutrivier North Wind Power RF (Pty) Ltd prior to submission;
- Keeping a photographic record of progress on-site from an environmental perspective. This can be conducted in conjunction with the ESO, because the ESO will be the person that will be onsite at all times and can therefore take photographic records weekly. The ECO should ensure that the ESO understands the task at hand;
- Recommending additional environmental protection measures, where necessary; and
- Providing feedback on any environmental issues during the site meetings.

The ECO must have:

- A good working knowledge of all relevant environmental policies, legislation, guidelines, and standards;
- The ability to conduct inspections and audits and to produce thorough, readable, and informative reports;
- The ability to manage public communication and complaints;
- The ability to think holistically about the structure, functioning and performance of environmental systems; and
- Proven competence in the application of the following integrated environmental management tools:
  - Environmental Impact Assessment;
  - Environmental Management Plans/Programmes;
  - Environmental auditing;
  - Mitigation and optimisation of impacts;
  - Monitoring and evaluation of impacts; and
  - Environmental management systems.

The ECO must be fully conversant with the EIA Process, the Soutrivier North WEF Development EIR and associated reports, the EA, this EMPr, and other relevant ancillary BAR, EMPs and EAs. The Applicant will have the authority to replace the ECO if, in their opinion, the appointed officer is not fulfilling their duties in terms of the requirements of the EMPr or this specification. Such instruction will be in writing and must be

clearly set out with reasons why a replacement is required and within what timeframe.

### 6.3 COMPLIANCE MONITORING AND CORRECTIVE ACTION

Non-compliance with the conditions of the EMPr must be viewed as a breach of appointment Contract for which the construction contractors will be held liable. The latter is deemed NOT to have complied with the EMPr if:

- There is evidence of contravention of the EMPr, its environmental specifications or the Method Statements developed by the Contractor within the boundaries of the construction site or areas of contractor responsibility;
- Construction-related activities take place outside the defined boundaries of the site;
- Environmental damage ensues due to negligence;
- The Contractor fails to comply with corrective or other instructions issued by the ECO within a specific time; or
- The Contractor fails to respond adequately to complaints from the public or authorities.

The Applicant and the construction contractors are liable for any construction rehabilitation costs associated with their non-compliance with this EMPr. This rehabilitation will be undertaken to the satisfaction of the ECO. The construction contractors will have the right to appeal any punitive action undertaken by the ECO or the Applicant.

### 6.4 REPORTING AND REVIEW

The EMPr reporting and documentation requirements must be based on best practice principles, e.g. ISO 14001, which must take the following requirements into account:

- Documents associated with the EMPr must be reviewed regularly and updated by all environmental management parties;
- Audits of the environmental performance of the construction phase of the project will be undertaken on a monthly basis by accredited auditors in fulfilment of likely conditions of EA in this regard;
- The findings of external, internal, and informal environmental reviews will be recorded and items requiring action will be identified from the recommendations made; and
- The construction contractors will be contractually obliged to fulfil any reasonable recommendations, and implementation of these actions will be assessed in the above audit.

Meetings, where required, should take place onsite. Internal auditing and reporting should be subject to external review by the ECO during the monthly compliance audits.

### 6.5 MONITORING

Construction activities have the potential to impact on a range of biophysical habitats as well as neighbouring communities. The monitoring programme which requires development by the Applicant, ECO and Contractor should, *inter alia*, allow for analysis of:

1. Air emissions (such as dust);
2. Hydrocarbon pollution;
3. Success of local labour employment;
4. Success of local procurement policies;
5. Ambient and workplace noise;
6. Health and safety incidents;
7. Success of traffic management measures; and

8. Contamination and soil erosion.

## 6.6 EMERGENCY PREPAREDNESS

The Contractor must develop environmental emergency response procedures to ensure that there are appropriate responses to unexpected or accidental actions or incidents that will cause environmental impacts during the construction phase. Such activities include, *inter alia*:

- Accidental discharges to water and land;
- Accidental exposure of employees to hazardous substances;
- Accidental fires;
- Accidental spillage of hazardous substances; and/or
- Specific environmental and ecosystem effects from accidental releases or incidents.

The Contractor and Subcontractors must comply with the emergency preparedness incident reporting requirements that must be developed and in place prior to the commencement of the construction phase.

## 6.7 ENVIRONMENTAL INCIDENT MANAGEMENT

The construction contractors must adhere to the hazard and incident reporting protocols to be developed by the Contractor. A report must be completed for all incidents, and appropriate action taken where necessary to minimise any potential impacts. DFFE must be informed of any environmental incidents, in accordance with legislative requirements, should this be necessitated by a major environmental incident.

## 6.8 MANAGEMENT REVIEW

A formal management review should be conducted in which the internal audit reports, written by the ESO, and based on frequent inspections and interactions with the ECO and review of the periodic reports, including audit reports by the independent external auditor - will be reviewed. The purpose of the review is to critically examine the effectiveness of the EMPr and its implementation and to decide on potential modifications to the EMPr as and when necessary. The process of management review will be to keep to the principle of continual improvement.

Management review should take place when the liaison committee, consisting of representatives from the Contractor, construction Subcontractors (as appropriate), ECO and other parties or I&APs deem them necessary or on a quarterly basis. The purpose of these quarterly meetings will be to review the progress of the Contractor in implementing and complying with their obligations in terms of this EMPr for the duration of the project. Where necessary, management review will take place more frequently than the required quarterly meetings.

## 7 REPORTING

### 7.1 METHOD STATEMENTS

Method Statements must be completed by the Contractor, an individual that is competent with the tasks to be undertaken, for each activity which requires a Method Statement as specified in the EMPr or as requested by the ECO. Each Method Statement must be submitted to the ECO and the Applicant for approval. For the purposes of the environmental specification, a Method Statement is defined as:

*“A written submission by the Contractor to the ECO setting out the plant, materials, labour and method the Contractor proposes to carry out an activity, in such detail that the ECO is enabled to assess whether the Contractor’s proposal is in accordance with the EMPr and/or will produce results in accordance with EMPr.”*

The Method Statement must include details of the:

- Construction procedures;
- Materials and equipment to be used;
- Transportation of the equipment to- and from site;
- How the equipment and/or 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 and non-compliance with the specifications; and
- Any other information deemed necessary by the Engineer.

Method Statements can be for once-off tasks or a series of tasks which are often repeated. The risks are identified during the various work stages when a Method Statement is prepared. Steps taken to reduce the potential risk associated with these stages can then be determined. The sequential steps and actions to be followed by the persons carrying out the works are written down. This sequence of steps should include all environmental and safety aspects relevant to the task being executed.

As a minimum, the Contractor should produce the following Method Statements:

- Site Dust Management;
- Solid Waste Management;
- Hazardous Material Management;
- Hydrocarbon Management;
- Site Clearing and Topsoil Management;
- Fire Management;
- Noise Management;
- Concrete Mixing;
- Pollution Control;
- Site Access and Traffic Management; and
- Incident and Emergency Response Management.

The Method Statements should be submitted to the ECO and the Applicant not less than twenty (20) days prior to the intended date of commencement of the activity, or as directed by the ECO. The Contractor must not commence with an activity until all required Method Statements have been approved by the ECO and the Applicant. The ECO should provide comment on the methodology and procedures proposed by the Contractor, but the ECO will not be responsible for the Contractor’s chosen measures of impact mitigation

and emergency/disaster management systems. Approval of the Method Statements should not be withheld unreasonably.

All control measures detailed in the Method Statement must be the subject of "toolbox" talks prior to the initiation of works. By introducing or reaffirming these measures during the "toolbox" talk, everyone involved should have a clear understanding of the work to be carried out, as well as the safe work method sequences and equipment required.

**AN EXAMPLE OF A METHOD STATEMENT LAYOUT IS PROVIDED IN [APPENDIX C](#).**

## **7.2 GOOD HOUSEKEEPING**

The Contractor must undertake "good housekeeping" practices during the Construction Phase. This will help avoid disputes on responsibility and allow for the smooth running of the contract as a whole. Good housekeeping extends beyond the wise practice of construction methods to include the care for and preservation of the environment within which the construction is situated.

## **7.3 RECORD KEEPING**

The ECO must continuously monitor the Contractor's adherence to the approved impact prevention procedures and the ECO must issue the Contractor with a notice of non-compliance whenever transgressions are observed. The ECO should document the nature and magnitude of the non-compliance in a designated register, the actions taken to discontinue the non-compliance, the actions taken to mitigate its effects and the results of the actions. The non-compliance should be documented and reported to the Applicant in the monthly reports. These reports must be made available to the DFFE when requested.

## **7.4 DOCUMENT CONTROL**

The Contractor is responsible for establishing a procedure for electronic document control. The document control procedure should comply with the following requirements:

- Documents must be identifiable by organisation, division, function, activity, and contact person;
- Every document should identify the personnel and their position(s), who drafted and compiled the document(s), who reviewed and recommended approval, and who finally approved the document for distribution; and
- All documents should be dated, provided with a revision number and reference number, filed systematically, and retained for a five (5) year period.

The Contractor must ensure that documents are periodically reviewed and revised, where necessary, and that current versions are available at all locations where operations, essential to the functioning of the EMPr, are performed. All documents must be made available to the ECO and other independent external auditors.

## 8 ENVIRONMENTAL AWARENESS

### 8.1 ENVIRONMENTAL TRAINING

The Contractors must ensure that their employees and any third party, who carries out all or part of the Contractors' obligations, is adequately trained with regard to the implementation of the EMPr and the general environmental legal requirements and obligations.

Environment and health awareness training programmes should be targeted at three (3) distinct levels of employment, i.e. the executive, middle management, and labour. Environmental awareness training programmes should contain the following information:

- The names, positions, and responsibilities of personnel to be trained;
- The framework for appropriate training plans;
- The summarised content of each training course; and
- A schedule for the presentation of the training courses.

The ECO must ensure that records of all training interventions are kept in accordance with the record-keeping and documentation control requirements as set out in this EMPr. The training records must verify each of the targeted personnel's training experience. The Applicant must ensure that adequate environmental training takes place. All employees must be given an induction presentation on environmental awareness and the content of the EMPr. The presentation should be conducted in the language of the employees to ensure it is understood. The environmental training must, as a minimum, include the following:

- The importance of conformance with all environmental policies;
- The environmental impacts, actual or potential, of their work activities;
- The environmental benefits of improved personal performance;
- Their roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirement of the Agency's environmental management systems, including emergency preparedness and response requirements;
- The potential consequences of departure from specified operating procedures;
- The mitigation measures required to be implemented when carrying out their work activities;
- Environmental legal requirements and obligations;
- Details regarding floral and faunal species of special concern and protected species, and the procedures to be followed should these be encountered during the construction of construction camps;
- The importance of not littering;
- The importance of using supplied ablution facilities;
- The need to use water sparingly;
- Details of and encouragement to minimise the production of waste and re-use, recover and recycle waste where possible; and the
- Details regarding archaeological and/or historical sites which may be unearthed during construction and the procedures to be followed should these be encountered.

**RECOMMENDED ENVIRONMENTAL EDUCATION MATERIAL IS PROVIDED IN APPENDIX A.**

### 8.2 MONITORING OF ENVIRONMENTAL TRAINING

The Contractor must monitor the performance of construction workers to ensure that the points relayed during their induction have been properly understood and are being followed. If necessary, the ECO and/or a translator should be called to the site to further explain aspects of environmental or social behaviour that are unclear. Toolbox talks are recommended.



## 9 ENVIRONMENTAL MONITORING

### 9.1 GENERAL ENVIRONMENTAL MONITORING

A monitoring programme will be implemented for the duration of the construction of the Soutrivier North WEF and associated infrastructure. This programme will include:

- Establishing a baseline through the taking of photographs of identified environmental aspects and potential impact sites along the routes prior to construction.
- Bi-weekly (fortnightly) monitoring during the first month of construction where after monthly audits will be conducted by the ECO for the remainder of the construction phase to ensure compliance to the EMPr conditions, and where necessary make recommendations for corrective action. These audits can be conducted randomly and do not require prior arrangement with the Project Coordinator. The ESO, who will report to the ECO, will be on-site daily to monitor the above.
- While construction is taking place at the Soutrivier North WEF, the ECO must be on-site at bi-weekly to ensure that protected plant and tree species are adequately demarcated. The ESO will be on site daily to ensure that these conditions are adhered to.
- Compilation of an audit report with a rating of compliance with the EMPr. The ECO must keep a photographic record of any damage to areas outside the demarcated site and construction area. The date, time of damage, type of damage and reason for the damage shall be recorded in full to ensure the responsible party is held liable. All claims for compensation emanating from damage should be directed to the ECO for appraisal. The Contractor will be held liable for all unnecessary damage to the environment. A register must be kept of all complaints from the landowners and/or the community. All complaints and/or claims should be handled immediately to ensure timeous rectification and/or payment by the responsible party.

### 9.2 AVIFAUNAL AND BAT MONITORING

Prior to construction, an avifaunal specialist and bat specialist should be consulted in order to determine the requirements for monitoring of the avifauna and bats present in the vicinity of the Soutrivier North WEF; pre- and post-construction. The monitoring programmes must be kept with the approved Final EMPr.

## 10 MANAGEMENT PLANS

The following management plans must be implemented during the relevant phases of the development of the Soutrivier North WEF and associated infrastructure:

1. Open Space Management Plan
2. Watercourse and Wetland Management Plan
3. Faunal Relocation Plan
4. Botanical Search and Rescue Plan
5. Site Clearing Plan
6. Rehabilitation and Landscape Management Plan
7. Alien Vegetation Management Plan
8. Fire Management Plan
9. Traffic, Transportation and Road Maintenance Management Plan
10. Stormwater Management Plan
11. Erosion Management Plan
12. Waste Management Plan
13. Emergency Response Plan

### 10.1 OPEN SPACE MANAGEMENT PLAN

All recommendations of the Alien Vegetation, Rehabilitation, Fire and Flora and Fauna Management Plans are applicable to open space areas. For the purposes of this Management Plan, Open Space areas should include all areas impacted by construction activities including all approved buffers.

The following issues should be addressed:

- Open space areas should be kept as contiguous blocks of vegetation as far as possible and no additional barriers (except for approved roads and fences) should be constructed that may impede faunal movement.
- All open space areas must be kept alien and weed free.
- Only indigenous species from a list approved by the ECO may be used for any rehabilitation work in open space areas.
- No waste should be disposed of in open space areas, including but not restricted to cigarette butts and uneaten foodstuffs (i.e. fruit cores and peels) that may attract scavengers. It is recommended that receptacles are placed strategically to minimise this, especially during the construction phase.
- A search and rescue operation must be undertaken by a qualified botanist/ horticulturalist prior to commencement of construction. All SCC identified within the development footprints must be transplanted to a refuge area.
- Cleared vegetation must not be piled onto adjacent intact vegetation outside of the designated footprint, even for temporary storage.
- No collection of indigenous plants may be allowed on the property, outside of those undertaken by the designated person(s).
- Employees should undergo environmental awareness training and be sensitized to the need to avoid disturbance to the indigenous vegetation outside the development footprints.
- Rehabilitation guidelines for the entire development must prioritise the use of indigenous grass, tree, and shrub species in the soil stabilisation landscaping of the development once construction is completed, if required.

### 10.2 WATERCOURSE AND WETLAND MANAGEMENT PLAN

The following is recommended for the conservation of drainage habitat on the site:

- Although no hardstands are currently located within 30 m of a channel edge, future deviations of the layout must take in consideration that no hardstanding surfaces must be constructed within 30 m from a channel edge, except for roads and cable crossings.
- Any stormwater management features must be suitably designed and constructed to maintain stormwater flow to acceptable levels and minimise risk of erosion and scouring.
- Stormwater runoff must not be discharged directly into any drainage lines or seeps, where it could lead to erosion.

### 10.3 FAUNAL RELOCATION PLAN

- No fauna present on the property may be wilfully harmed unless it threatens the life of an employee.
- Hunting, disturbance, and collection of animals by employees must be prohibited.
- Construction areas must be screened for slow moving fauna before any activities commence and removed, if necessary.
- Any animals injured by the construction activities should be taken to a veterinarian for treatment.
- Minimise impacts on faunal habitat by adhering to the botanical specialists' recommendations.
- Vehicle speeds should be kept to a minimum by using informative signage and traffic calming methods.
- If certain areas are found to involve unusually high mortality rates, then suitable mitigation (e.g. the erection of low fences alongside the problem area) may be required.
- Monitor excavations daily and rescue any trapped fauna. When filled with water, the excavations should be checked twice a day. Release the rescued fauna into a suitable habitat adjacent to the study area.
- Domestic waste should be placed in suitable covered containers and removed from the site on a regular basis to reduce the attraction of scavenging animals, e.g. Vervet Monkeys.
- External and internal fences must be monitored for traps.
- In terms of the conducted survey, the areas demarcated for clearing do not pose a risk/threat to mammals, for example: the presence of mammals was minimal.
- If a mammal or reptile is trapped within an area where construction is taking place, then a professional handler must be called upon to remove the mammal or reptile.
- Protective clothing, such as gloves, should be used when handling mammals.
- All staff tasked to capture and relocate mammals should be inoculated against Rabies and Tetanus.
- Immobilizers and/or tranquilizers must not be used on the mammals.

### 10.4 BOTANICAL SEARCH AND RESCUE

The floral SCC identified during the site investigation undertaken for the proposed Soutrivier Central WEF are all classified as Least Concern but protected either in terms of the Northern Cape Nature Conservation Act (NC NCA) (Act No. 9 of 2009) or the Provincial Nature Conservation Ordinance (PNCO) (Act No. 19 OF 1974), or both. According to the South African National Biodiversity Institute (SANBI) Red List of South African Plants a species is classified as Least Concern when it has been evaluated against the IUCN criteria and does not qualify for any of the above categories. Species classified as Least Concern are considered at low risk of extinction. Widespread and abundant species are typically classified in this category.

Permit applications for any protected flora found during the micro-siting of the Soutrivier Central WEF must be applied for from the Northern Cape Department of Nature Conservation (DENC), the Northern Cape Department of Agriculture, Forestry and Fisheries (DAFF), the National Department of Forestry or the Fisheries and the Environment (DFFE), depending on the species.

## 10.5 SITE CLEARING PLAN

### VEGETATION CLEARING

- Before clearing of vegetation, the Contractor should ensure that all litter and non-organic material is removed from the area to be cleared.
- Vegetation clearing must take place in a phased manner in order to retain vegetation cover for as long as possible in order to reduce the size of areas where dust can be generated by wind.
- All seed-bearing invasive alien vegetation must be removed from site.
- Removed vegetation must not be dumped onto adjacent intact vegetation and topsoil must be removed separately.
- All indigenous plant material removed from cleared areas should be stockpiled for mulching or temporarily stockpiled in a demarcated area, which meets the satisfaction of the ESO and the ECO, before disposal at an approved landfill site.
- The use of herbicides is prohibited, unless approved by the ESO and the ECO.
- The Contractor should submit a site clearing Method Statement to the ESO and the ECO for approval. This Method Statement should include the details of the phasing of the clearing and how this will be done, where and how cleared material will be stored and/or disposed of, etc.

### TOPSOIL CLEARING

- Topsoil (a layer of approximately 100 - 150 mm) should be removed from areas to be disturbed during construction and safely stockpiled for landscaping purposes.
- All plant material (grasses, herbs and larger bushclump species) removed from the site are to be mixed into the topsoil.
- Topsoil stockpiles should be convex and should not exceed a height of 1.5 m.
- Stockpiles must be located in areas agreed to by the ESO and the ECO.
- Topsoil stockpiles must not be subject to compaction greater than 1 500 kg/m<sup>2</sup> and should not be pushed by a bulldozer for more than 50 m.
- Topsoil stockpiles must be monitored regularly to identify any alien plants, which must be removed when they germinate to prevent contamination of the seed bank.
- Appropriate measures, as agreed to by the ESO and the ECO, should be taken to protect topsoil stockpiles from erosion by wind or water by providing suitable stormwater and cut off drains, containment using hessian or similar material and/or by establishing suitable temporary vegetation.
- Stockpiles should not be covered with materials such as plastic which could cause it to compost or which could kill the seed bank.
- The Contractor must be held responsible for the replacement, at their own cost, for any unnecessary loss of topsoil due to their failure to work according to the requirements of this EMP and the approved Method Statement.

## 10.6 REHABILITATION AND LANDSCAPE MANAGEMENT PLAN

### SITE VEGETATION

Re-vegetating and rehabilitating the site, once constructed, through a comprehensive landscaping effort will benefit the faunal species which find refuge on the site. Linked to this, is the creation, preservation, and maintenance of tracts of natural and ornamental vegetation in all stages of ecological succession, interconnected by corridors or green belts for escape, foraging, breeding and exploratory movements. In terms of the scope of the construction activities, landscaping and rehabilitation will be minimal; many instances will require clean-up activities together with planting ground-stabilising vegetation.

Rehabilitation and landscaping efforts should focus on rehabilitating the following areas:

- Road verges after road construction is completed.
- Stormwater soaks away features and landscaped areas.

- The transformed portions of the site which have not been developed must be rehabilitated by planting indigenous plant species occurring in the area.
- Areas where pockets of alien invasive species have been removed.
- Areas not disturbed by the construction activities, but from previous land use, or those where invasive species have been removed, must be identified by a suitably qualified botanist as suitable sites for relocating plant SCC.

The ECO must approve a list of indigenous plants to be used during rehabilitation prior to the commencement of rehabilitation activities.

According to the South Africa, Lesotho and Swaziland Vegetation Map (South African National Biodiversity Institute, 2018), the proposed infrastructure is situated in an area classified as containing Upper Karoo Hardeveld and Eastern Upper Karoo.

Upper Karoo Hardeveld. This vegetation type is found throughout the Northern, Western and Eastern Cape Provinces and is characterised by discrete areas of slopes and ridges. This unit is generally found between 1 000–1 900 masl. The Steep slopes of these koppies and ridges are often covered with large boulders and stones which supports sparse dwarf Karoo scrub along with drought-tolerant grasses of genera such as *Aristida*, *Eragrostis* and *Stipagrostis*. (Mucina and Rutherford, 2006) Upper Karoo Hardeveld is classified as LEAST THREATENED with a conservation target of 21%. There is only approximately 3% statutorily conserved in Karoo National Park and Karoo Nature Reserve. While this is one of the richer floras found within the Nama Karoo Biome its only forms a small part of the project site.

Eastern Upper Karoo occurs in the Northern Cape, Eastern Cape and Western Cape and is associated with a flat to gently sloping topography (Mucina and Rutherford, 2006). It is dominated by dwarf microphyllus shrubs and grasses belonging to the *Aristida* and *Eragrostis* genera. This vegetation type is classified as **Least Threatened** with a conservation target of 21%. A portion of this vegetation type has been conserved in Mountain Zebra and Karoo National Parks as well as in Oviston, Commando Drift, Rolfontein and Gariep Dam Nature Reserves. This vegetation type occurs in the low lying, flat areas of the affected properties.

A suitably qualified Botanist must identify Plant SCC within the development footprints which require relocation prior to construction. Once Plant SCC have been identified within the construction areas, permits must be obtained for the destruction and/or for the removal for transplanting of the individuals. The removed Plant SCC must either be transplanted in areas adjacent with a similar habitat, in which construction activities will not take place, or be stored in a nursery until used for rehabilitating the disturbed areas within the site. The recommended out-planting procedure must be followed to ensure the success of the transplanted Plant SCC, as per Table 1 below.

**Table 1: Recommended Out-Planting Procedure.**

TASKS	METHOD
<p><b>PLOT PREPARATION</b></p>	<p>The plots should be prepared as follows:</p> <ul style="list-style-type: none"> <li>• Prior to rehabilitation of the site, all remnants of foreign debris must be removed from the site.</li> <li>• All plots should first be covered with 1 m deep subsoil and then with topsoil (minimum depth of 10 cm). Soils should be manually spread evenly over the surface. Topsoil must be spread to the original depth (10 cm), and deeper where sufficient topsoil remains.</li> <li>• As topsoil will contain all cleared vegetation, no additional treatment will be required. However, to avoid erosion and increase nitrogen content, it might be necessary to sow a cover crop of commercially available Rye Grass (<i>Lolium perenne</i>). Although not indigenous, it is recommended as it has been used successfully elsewhere, is annual so dies off, is able to bind soil, and increases nutrients and soil mycorrhiza in the sand. This all improves the success of indigenous seeding and planting. Seed at the rate of 50 kg per hectare.</li> </ul>

TASKS	METHOD
<p><b>PLANT PREPARATION</b></p>	<p>Plants must undergo a period of ‘hardening-off’ during which they have been exposed to full, direct sunlight and been under a reduced watering regime.</p> <p>The individual plants destined for each plot should be grouped into plot-specific, marked baskets, before they leave the nursery. Each plant should be labelled with an aluminium label, giving species code, and a specific numeral identifying the plot.</p> <p>Before the out-planting commences, the equipment necessary for the proper handling and placing of all required materials should be on hand, in good condition and to acceptable approved standards.</p> <ul style="list-style-type: none"> <li>• Planting should preferably be done during the rainy season.</li> <li>• Unless otherwise specified by the ESO or the ECO, excavate square holes of 800 mm x 800 mm x 800 mm on average for trees and 500 mm x 500 mm x 500 mm on average for shrubs.</li> <li>• Backfill planting holes with topsoil. As much of the soil from container plants as possible must be retained around the roots of the plant during planting.</li> <li>• The soil must cover all the roots and be well firmed down to a level equal to that of the surrounding <i>in situ</i> material</li> <li>• After planting, each plant must be well watered, adding more soil upon settlement if necessary.</li> <li>• Stake all trees and tall aloes using three (3) weather-resistant wooden or steel stakes anchored firmly into the ground. Two (2) of the three (3) stakes should be located on the windward side of the plant. Galvanised wire binding, 3 mm thick, covered with a 20 mm diameter plastic hosepipe must be tied tightly to the stakes, half to two thirds the height of the tree above the ground and looped around the trunk of the tree.</li> <li>• Place stakes at least 500 mm apart and away from the stem and roots of the tree, so as not to damage the tree or its roots.</li> <li>• Thoroughly water plants as required until the plants are able to survive independently (i.e. depending on the rainfall).</li> <li>• A raised circular 200 mm high subsoil berm, placed 500 mm (shrubs) to 750 mm (trees) from the plant’s stem, must be provided for the watering. Do not simply leave the excavated plant hole partially backfilled for this purpose – the berm must be raised above the natural soil level.</li> <li>• Water aloes and bulbs once directly after transplanting to settle the soil</li> <li>• Remove stakes and wire binds over time as required, as plants become established.</li> <li>• Herbs, shrubs, and trees should be planted at a density of at least 1 plant per 6,25 m<sup>2</sup> or 1600 plants per hectare.</li> </ul>
<p><b>MAINTENANCE</b></p>	<ul style="list-style-type: none"> <li>• Water all transplanted plants, as specified.</li> <li>• Watering must commence and continue immediately after transplanting. Apply the following watering regime: Early morning and evenings for the first week; Then once a day for the next week; then twice a week until there is evidence of new shoots, whereafter watering is stopped.</li> <li>• Check all plants for pests and diseases on a regular basis and treat the plants using approved methods and products as per manufacturers specifications.</li> <li>• Control weeds by means of extraction, cutting or other approved methods.</li> <li>• For planted areas that have failed to establish, replace plants with the same species as originally specified. The same species must be used unless otherwise specified by the ESO and/or the ECO.</li> </ul>

In order to rehabilitate transformed and invaded areas, the following landscaping techniques should be employed:

- Clearing of vegetation should take place in accordance with the construction programme, instead of exposing large tracts of land simultaneously.
- Clearing of invaded areas should be undertaken as per the Alien Vegetation Management Plan.
- No re-useable topsoil should be removed from the site.
- Grass sods should be removed from areas to be cleared and stored for later use during rehabilitation.

- Sods used in re-vegetation should be obtained directly from the veld, but not from the identified sensitive areas. Veld sods should contain at least a 50 mm topsoil layer, and the roots must be minimally disturbed. They should either be obtained from the near vicinity of the site from an area selected by the ESO or the ECO, or from areas of the proposed development site that are earmarked for development. The soil should be compatible with that removed from the area to be re-vegetated and must not have been compacted by heavy machinery.
- Indigenous seeds may be harvested for purposes of re-vegetation in areas that are free of alien invasive vegetation, either at the site prior to clearance or from suitable neighbouring sites.
- The stockpiled vegetation from the clearing operations should be reduced to mulch.
- Indigenous plant material must be kept separate from alien material. The indigenous vegetative material should either be reduced by mechanical means (chipper) or by hand-axing to sticks no longer than 100 mm. The chipped material should be mixed with the topsoil at a ratio not exceeding 1:1.
- Mulch is to be harvested from areas that are to be denuded of vegetation during construction activities, provided that they are free of seed-bearing alien invasive plants.
- No harvesting of vegetation may be done outside the area to be disturbed by construction activities.
- Mulches should be collected in such a manner as to restrict the loss of seed.
- Brush-cut mulch should be stored for as short a period as possible, and seed released from stockpiles should be collected for use in the rehabilitation process.
- Re-vegetated areas should be monitored every three (3) months for the first twelve (12) months and every six (6) months thereafter.
- Re-vegetated areas showing inadequate surface coverage (less than 30% within 9 months after re-vegetation) should either be re-vegetated from scratch, or addition infill planting might be required. The ECO should advise.
- The Contractor must be responsible for maintaining the desired level of moisture necessary to maintain vigorous and healthy growth in re-vegetated areas. The quantity of water applied at one time should be sufficient to penetrate the soil to a minimum depth of 800 mm, where appropriate, and at a rate that will prevent saturation of the soil.
- Water used for the irrigation of re-vegetated areas should be free of chlorine and other pollutants which could have a detrimental effect on the plants.
- All seeded, planted, or sodded grass areas and all shrubs or trees planted are to be irrigated at regular intervals.
- Where herbicides are used to clear vegetation, species-specific chemicals should be applied to individual plants only. General spraying should be strictly prohibited.

### 10.7 ALIEN VEGETATION MANAGEMENT PLAN

Henderson (2001) provides the invasive status classification, as outlined in the Conservation of Agricultural Resources Act (CARA) (Act No. 43 of 1983a). These plants can be classified as Category 1, 2 or 3 species, and as a 'Declared Weed' or 'Declared Invader' according to their level of invasiveness in South Africa. The description of the above-mentioned classifications are:

- **Category 1 Plants**
  - Are prohibited and must be controlled.
- **Category 2 Plants**
  - (Commercially used plants) may be grown in demarcated areas providing that there is a permit and that steps are taken to prevent their spread.
- **Category 3 Plants**
  - (Ornamentally used plants) may no longer be planted; existing plants may remain, as long as all reasonable steps are taken to prevent the spreading thereof, except within the floodline of watercourses and wetlands.
- **Declared Weed (category 1)**

- Prohibited on any land or water surface in South Africa.
- Must be controlled or eradicated where possible (except in biological control reserves).
- **Declared Invader (category 2)**
  - Allowed only in demarcated areas under controlled conditions.
  - Import of propagative material and trading allowed only by permit holders.
  - Outside demarcated areas must be controlled or eradicated where possible (except in biological reserves).
  - Prohibited within 30 m of the 1:50 year floodline of watercourses or wetlands unless authorisation is obtained.
- **Declared Invader (category 3)**
  - No further plantings allowed (except with special permission).
  - No trade of propagative material.
  - Existing plants may remain but must be prevented from spreading.
  - Prohibited within 30 m or the 1:50 year floodline of watercourses or wetlands, or as directed by the executive officer.

It is essential that alien invasive species be removed from the infrastructure development site. Following the Working for Water guidelines for effective alien vegetation removal (DWAF, 2009), an alien removal programme should consist of the following three (3) phases:

- I. Initial control: Clearing and eradication of alien invasive stands so as to drastically reduce the existing population.
- II. Follow-up control: Control of re-growth (including seedlings, root suckers and coppice growth); which should be conducted annually for the first five (5) years.
- III. Maintenance control: Sustain alien plant numbers with ongoing annual monitoring for the life of the project, and if necessary, implement additional control methods to avoid re-establishment of alien invasive stands.

**ALIEN PLANT SPECIES IDENTIFIED WITHIN THE INFRASTRUCTURE DEVELOPMENT SITE AND SURROUNDS**

- ***Opuntia stricta*** (Category 1b: PROHIBITED/Exempted if in Possession or Under control).  
A person in control of a Category 1 b Listed Invasive Species must control the listed invasive species in compliance with sections 75(1), (2) and (3) of the Act. A person contemplated in sub-regulation (2) must allow an authorised official from the Department to enter onto the land to monitor, assist with or implement the control of the listed invasive species, or compliance with the Invasive Species Management Programme contemplated in section 75(4) of the Act. - [www.environment.co.za](http://www.environment.co.za).



- ***Populus spp.*** (Category 2: PERMIT REQUIRED) Category 2 Listed Invasive Species are those species listed by notice in terms of section 70(1)(a) of the Act as species which require a permit to carry out a restricted activity within an area specified in the Notice or an area specified in the permit, as the case may be. A landowner on whose land a Category 2 Listed Invasive Species occurs or person in possession of a permit, must ensure that the specimens of the species do not spread outside of the land or the area specified in the Notice or permit. Unless otherwise specified in the Notice, any species listed as a Category 2 Listed Invasive Species that occur outside the specified area



contemplated in sub-regulation (1), must, for purposes of these regulations, be considered to be a Category 1 b Listed Invasive Species and must be managed according to Regulation 3. Notwithstanding the specific exemptions relating to existing plantations in respect of Listed Invasive Plant Species published in Government Gazette No. 37886, Notice 599 of 1 August 2014 (as amended), any person or organ of state must ensure that the specimens of such Listed Invasive Plant Species do not spread outside of the land over which they have control. - [www.environment.co.za](http://www.environment.co.za).



Additional alien vegetation species could be present within the site. The ECO, advised by a suitably qualified Botanical Specialist, should assist in the identification of alien vegetation species and advise on suitable methods of removal and disposal.

**WEED REMOVAL (INITIAL CONTROL PROGRAMME FOR ALL ALIEN VEGETATION ENCOUNTERED)**

There are a number of possible methods which can be used to control alien invasive species; these include mechanical, chemical, biological, and mycoherbicide control. In addition, integrated control methods consist of the use of a combination of these methods to control alien vegetation. This section outlines possible techniques used in mechanical and chemical control methods only, as biological and mycoherbicide control is not recommended for this site and therefore not discussed further.

Mechanical Control Methods

The Agricultural Research Council (ARC)(2014) describes mechanical control as damaging or removing the plant by physical action. Various methods could be used, including uprooting/hand pulling, slashing, mowing, felling, ringbarking or bark stripping (ARC, 2014). This method of alien vegetation removal is best suited to small areas or sparse infestations. The following mechanical methods for removal are recommended:

- Hand pulling: Grip the seedlings or saplings low down and pull out by hand (using gloves). Make use of a hoe for plants that cannot be pulled out with ease.
- Ring barking: Bark is removed to from the bottom of the stem to a height of 0.75 – 1.0 m to below ground level. Bush knives or hatchets can be used for debarking.
- Frill or Ring-bark: Using an axe or bush knife, angled cuts are made downward into the cambium layer through the bark in a ring; herbicide is applied into the cuts.
- Cut stump treatment: Stems should be cut as low as practical, as stipulated on the herbicide label. Chemical herbicides are applied in diesel or water as recommended. Applications in diesel should be to the whole stump and exposed roots and in water to the cut area as recommended on the label.

Chemical Control Methods

Chemical control methods involve the use of registered herbicides to kill the target weed (ARC, 2014). Chemical control methods for alien plant removal include using a number of approved environmentally safe herbicides, which are applied to the leaves, stems or stumps of alien invader species.

- Foliar Spray:

- Seedlings – Touchdown
- Young trees – Garlon
- Cut Stumps (larger trees) and then apply:
  - Chopper;
  - Confront (2%); or
  - Timbrel 3A\*.
- Frill (trees) and then apply:
  - Chopper; or
  - Timbrel 3A\*.
- Stem Injection:
  - MSMA;
  - Mamba; or
  - Touchdown.

The *Working for Water Programme: Guide to Control Method and Herbicide Selection for Alien Vegetation* must be followed.

## 10.8 FIRE MANAGEMENT PLAN

It is imperative that the necessary precautions be implemented to minimise this risk of fire within the site and surrounds. The following measures must be implemented to reduce the risk of fires during the construction and operational phases.

### CONSTRUCTION PHASE MANAGEMENT MEASURES

- The Contractor must ensure that all personnel are aware of the fire risk and the need to extinguish cigarettes before disposal, in appropriate waste disposal containers.
- The risk of fire is highest during the drier months and during high wind velocities. To avoid and manage fire risk the following steps should be implemented:
  - Firefighting equipment must be kept on-site and ensure that all personnel are educated on how to use it as well as the procedures to be followed in the event of a fire.
  - Identify the relevant authorities and structures responsible for fighting fires in the area and liaise with them regarding procedures should a fire commence.
  - Ensure that all the necessary emergency contact details are posted at conspicuous and relevant locations.
- Should a Contractor be found responsible for the outbreak of a fire, they must be liable for any associated costs.
- Open fires must not be allowed on-site for the purpose of cooking or warmth. Bona fide braai fires (such braai fires must be limited to the traditional “month end” braais and not individual daily cooking fires) may be lit within the construction camp or site.
- The Contractor must take all reasonable steps to prevent the accidental occurrence or spread of fire. The Contractor must appoint a fire officer who should be responsible for ensuring immediate and appropriate action in the event of a fire.
- The Contractor must ensure that all site personnel are aware of the procedure to be followed in the event of a fire. The appointed fire officer must notify the Fire and Emergency Services in the event of a fire and must not delay doing so until such time as the fire is beyond control.
- The Contractor must ensure that there is basic firefighting equipment on-site at all times. This equipment should, at a minimum, include fire extinguishers and beaters. The Contractor must pay the costs incurred by organisations called to put out fires started by the Contractor, their staff, or any sub-contractor. The Contractor must also pay the costs incurred to reinstate burnt areas as deemed necessary by the RE.

- Any work that requires the use of fire may only take place at that designated area and as approved by the RE. Firefighting equipment must be available in these areas.
- The Contractor should ensure that the telephone number of the local Fire and Emergency Service is displayed at the site offices.
- The Contractor is to ascertain the fire requirements and must submit a fire contingency Method Statement to the ESO and ECO for approval.

#### **OPERATIONAL PHASE MANAGEMENT MEASURES**

Any requirements of the local Fire Protection Association must be adhered to in consultation with the relevant landowners, as per the requirements of the National Veld and Forest Fire legislation, which may include:

- Formation of a Fire Protection Association (FPA).
- Duty to prepare and maintain firebreaks.
- Requirements for firebreaks.
- Readiness for firefighting.
- Actions to fight fires.
- In areas other than designated development footprints, a network of firebreaks must be maintained and overlap with any firebreaks managed by the landowners to ensure that fires are not able to spread over the development.
  - All road reserves will serve as firebreak; and
  - All firebreaks must be maintained as required by the local Fire Chief.
- Firebreaks are to be positioned and prepared in such a way as to cause the least disturbance to soil and biodiversity. Firebreaks should be free from combustible material, e.g. pruned material and leaf litter.
- Ensure that firefighting equipment is maintained and in good working order before the start of each fire season.
- Smoking outside of designated safe areas must not be permitted.
- Flicking of cigarette butts into adjacent vegetation must not be permitted.

Suitable signage must be provided on-site, including entrance warning of fire risk and warnings not to flick cigarette butts into vegetated areas.

#### **10.9 TRAFFIC, TRANSPORTATION AND ROAD MAINTENANCE MANAGEMENT PLAN**

High construction traffic volumes are expected to be generated during the construction period. Measures to manage the impact of these volumes have been identified and are listed below. The local community should be advised of these measures prior to construction commencing and, in particular, prior to the transport of wind turbine components through local media and ward councillors.

- Temporary road construction and traffic accommodation signage, in accordance with Volume 2 Chapter 13 of the SADC Road Traffic Signs Manual, should be displayed at the proposed site in order to create awareness of construction vehicles by other road users and are to ensure that construction vehicle speeds are restricted. Such signage, to be determined by the appointed Contractor as per the required Health and Safety Plan and approved by the Engineer, shall include speed restrictions, warning of construction workers and construction vehicles, and information signs advising motorists of the hours the route will be used by construction vehicles. Such signage should be placed at least:
  - On the approaches to the access points;
  - At the access points to the proposed development; and
  - Be fixed so that it is not affected by wind and is immovable for the duration of construction (i.e. planted in the ground).
- While access to the site can occur from 07:00 to 17:30, every effort should be made to restrict the operation of heavy abnormal construction traffic to periods outside of peak commuter operating times – off-peak periods, between the hours of 08:00 and 17:00 so that impact on commuter traffic is kept to a minimum.

In addition, the Contractor should ensure the following:

- Access to the site must be managed to ensure that no unauthorised vehicles are permitted onto the construction site and to ensure safe entry to- and exit from the site.
- All construction vehicles shall be in possession of the necessary licenses and roadworthy certificates in terms of the National Road Traffic Act (Act No. 93 of 1996).
- Vehicles transporting hazardous substances shall comply with the requirements of the Hazardous Substances Act (Act No. 15 of 1973).
- All abnormal heavy vehicles shall be accompanied by escort vehicles and correctly marked to indicate the abnormal load. The specification of the escort vehicle shall depend on the length and width of the load.
- Vehicles loads shall be secured such that no loads or part thereof fall from the vehicle and damage other road users.
- All vehicles used during construction must be roadworthy, regularly maintained, and repaired when required.
- Drivers of construction vehicles shall be in possession of the necessary licenses in terms of the National Road Traffic Act (Act No. 93 of 1996).
- Construction and operational vehicles travelling on all public roads shall adhere to the posted speed limits.

#### **10.10 STORMWATER MANAGEMENT PLAN**

This Stormwater Management Plan must be implemented during the construction and operation phases of the project. During the implementation of the Stormwater Management Plan, the Contractor must also ensure compliance with applicable regulations and prevent off-site migration of contaminated stormwater and the increase soil erosion. This Stormwater Management Plan serves as a high-level guideline for designers and Contractors to follow measures that allow surface and subsurface movement of water along drainage lines so as not to impede natural surface and subsurface flows. Drainage measures must promote the dissipation of stormwater run-off.

Diligence in stormwater management is essential and a full-time task, even during dry periods, as the lack of it could lead to the degradation of the site over time, rendering it susceptible to serious damage in the event of unexpected flooding, and subsequent potential damage to equipment on-site due to gradual erosion after normal rainfall events, or by unexpected damage due to extreme flood events.

The site must conform to all engineering designs and measures to manage and control water run-off and erosion during or after rainstorms. This will include the following items:

- Run-off control and drains;
- Slope attenuation;
- Silt fences;
- Stormwater channels and catch pits;
- Shade or catch nets; and
- Soil bindings.

The civil design should describe and illustrate the proposed stormwater control measures as stipulated by the Civil Engineer, in compliance with this Stormwater Management Plan:

- Control measures to be implemented before and during the construction period, including the final stormwater control measures (post-construction). All roads and platforms should be designed and built according to SANS 1200 applicable sections to ensure all stormwater measures are properly implemented.

- The location, area/extent (m<sup>2</sup>/ha) and specifications of all temporary and permanent water management structures or stabilisation methods.
- Stone pitching or concrete-lined drains be placed adjacent to roads where required to transfer the water to existing watercourses.
- At the point where stormwater is discharged, energy dissipaters must be constructed to slow the flow of run-off water.
- Mitre drains should be cut in the site roads at appropriate places to ensure water run-off and control.
- All cut-and-fill banks should be covered with stone pitching or crusher stone to ensure bank stabilisation and the elimination of potential erosion.

The aim is to ensure that the stormwater run-off is guided off the construction area, and such that it does not create erosion problems that may require aftercare.

In addition, the following surface water control measures should be implemented:

- Surface water flow must be guided to ensure there is no flow directly to an erosion area.
- Prevent the concentration or flow of surface water or stormwater down cut-and-fill slopes or along pipeline routes or roads and ensure measures to prevent erosion are in place prior to construction.
- Stormwater and any run-off generated by hard surfaces should be discharged into retention swales or areas with rock riprap. These areas must be grassed with indigenous vegetation. These energy dissipation structures must be placed in a manner that flows are managed prior to being discharged back into the natural watercourses, thus not only preventing erosion, but also supporting the maintenance of natural base flows within these systems, i.e. hydrological regime (water quantity and quality) is maintained.
- Mitigate against siltation and sedimentation using the above-mentioned structures and ensure that the structures do not cause erosion.
- Ensure that all stormwater control features have soft engineered areas that attenuate flows, allowing for water to percolate into the local aquifers.
- Minimise and restrict site clearing to areas required for construction purposes only and restrict disturbance to adjacent undisturbed natural vegetation.
- Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment.
- Minimise the diversion of flows into different catchments.
- If implementing dust control measures, prevent over-wetting, saturation and run-off that may cause erosion and sedimentation.
- Watercourse (stream) crossings must not trap any run-off, thereby creating inundated areas, but allow for free-flowing watercourses.

### 10.11 EROSION MANAGEMENT PLAN

This Erosion Management Plan must be implemented prior to construction as well as during the construction and operation phases of the project, along with the Stormwater Management Plan. The Erosion Management Plan must ensure compliance with applicable regulations and prevent off-site migration of contaminated stormwater or increase in soil erosion. This Plan will serve as a high-level guideline for designers and Contractors to follow measures that allow surface and subsurface movement of water along drainage lines that will not impede natural surface and subsurface flows. Drainage measures must promote the dissipation of stormwater run-off.

Diligence in stormwater management and erosion management is essential and a full-time task, even during dry periods, as the lack of management could lead to the degradation of the site over time, placing the site and surrounds at risk to serious damage in the event of unexpected flooding, and subsequent potential

damage to equipment on-site due to gradual erosion after normal rainfall events, or by unexpected damage due to extreme flood events.

The site must conform to all engineering designs and measures to manage and control water run-off and erosion during or after rainstorms. This will include the following items:

- Run-off control and drains;
- Slope attenuation;
- Silt fences;
- Stormwater channels and catch pits;
- Shade or catch nets; and
- Soil bindings.

The civil design should describe and illustrate the proposed erosion control measures as stipulated by the Civil Engineer, in compliance with this Erosion Management Plan:

- Erosion control measures to be implemented before and during the construction period, including the final erosion control measures (post-construction). All roads and platforms should be designed and built according to SANS 1200 applicable sections to ensure all stormwater measures are properly implemented.
- The location, area/extent (m<sup>2</sup>/ha) and specifications of all temporary and permanent water management structures or stabilisation methods.
- Stone pitching or concrete-lined drains be placed adjacent to roads where required to transfer the water to existing watercourses.
- At the point where stormwater is discharged, energy dissipaters must be constructed to slow the flow of run-off water.
- Mitre drains should be cut in the site roads at appropriate places to ensure water run-off and control.
- All cut-and-fill banks should be covered with stone pitching or crusher stone to ensure bank stabilisation and the elimination of potential erosion.

The aim is to ensure that the stormwater run-off is guided off the construction area, and such that it does not create erosion problems within the site and the surrounds.

In addition, the following surface water control measures should be implemented to reduce the risk of erosion:

- Surface water flow must be guided to ensure there is no flow directly into an area which could increase erosion.
- Prevent the concentration or flow of surface water or stormwater down cut-and-fill slopes or along pipeline routes or roads and ensure measures to prevent erosion are in place prior to construction.
- Stormwater and any run-off generated by hard surfaces should be discharged into retention swales or areas with rock riprap. These areas must be grassed with indigenous vegetation. These energy dissipation structures must be placed in a manner that flows are managed prior to being discharged back into the natural watercourses, thus not only preventing erosion, but also supporting the maintenance of natural base flows within these systems, i.e. hydrological regime (water quantity and quality) is maintained.
- Mitigate against siltation and sedimentation using the above-mentioned structures and ensure that the structures do not cause erosion.
- Ensure that all stormwater control features have soft engineered areas that attenuate flows, allowing for water to percolate into the local aquifers.
- Minimise and restrict site clearing to areas required for construction purposes only and restrict disturbance to adjacent undisturbed natural vegetation.
- Large tracts of bare soil are likely to cause dust pollution and increase erosion.

- If implementing dust control measures, prevent over-wetting, saturation and run-off that may cause erosion and sedimentation.
- Watercourse (stream) crossings must not trap any run-off, thereby creating inundated areas, but allow for free-flowing watercourses.

## 10.12 WASTE MANAGEMENT PLAN

The Contractor's intended methods for waste management and waste minimisation must be implemented at the onset of the contract and approved by the ECO. Where required, Method Statements must be compiled and submitted to the ECO for approval. All personnel must be instructed to dispose of all waste in the proper manner.

No waste from construction or otherwise may be disposed of on-site. All waste generated on-site must be removed from the site and disposed of at a licensed waste disposal site. In this regard, adequate litter drums or other suitable containers must be located on-site to ensure that waste generated on-site is disposed of in a suitable and timeous manner. Where possible, some of the construction waste should be recycled and used in construction.

### SOLID AND LIQUID WASTE

During the construction phase, solid waste must be stored in a designated area within the site, which has been approved by the ECO, is covered, tip-proof drums for collection and disposal. All refuse containers must be free of any holes and in good condition. A refuse control system should be established for the collection and removal of refuse to the satisfaction of the ESO and the ECO. As far as possible, general waste (including paper, glass, plastics, aluminium, etc.) should be sorted for recycling. Disposal of solid waste should be at a licensed landfill site, or at a site approved by the DFFE in the event that an existing operating landfill site is not within a reasonable distance from the site. Waste must not be burned.

Any water contaminated by cement must not be allowed to flow freely into the environment. Instead, it must be contained, and solids allowed to settle out. Thereafter, the solid material should be disposed of at a landfill site with other solid waste.

### LITTER

During the construction phase, littering by construction workers must be prohibited on-site. The facilities should be maintained in a neat and tidy condition, and the site is to be kept free of litter throughout the construction phase. Fines should be implemented for persons found littering. All reasonable measures should be taken to reduce the potential for litter and negligent behaviour with regards to the disposal of all refuse. At all places of work, the Contractor must provide litter collection facilities for later safe disposal at a licensed landfill site or at a DFFE approved waste disposal site.

During the operation phase, the area of the development should be cleared of litter on a regular basis. Once collected, this litter must be disposed of at a licensed landfill site or at a DFFE approved waste disposal site.

### HAZARDOUS WASTE

During the construction phase, hazardous waste such as bitumen, oils, oily rags, paint tins, etc., must be disposed of at a DFFE approved hazardous waste landfill site. Special care should be taken to avoid the spillage of hazardous waste and from this waste entering the ground or contaminating water. In the event of the above occurring, the affected areas must be promptly reinstated to the satisfaction of the ECO. As far as possible, maintenance of machinery and vehicles on-site should be avoided. Used oil, lubricants and cleaning materials from the maintenance of vehicles and machinery should be collected in a holding tank and returned to the supplier. Water and oil should be separated in an oil trap. Oils collected in this manner, should be retained in a safe holding tank and removed from site by a specialist oil recycling company for disposal at an approved waste disposal sites for toxic/hazardous materials. Oil collected by a mobile servicing unit should

be stored in the service unit's sludge tank and discharged into the safe holding tank for collection by the specialist oil recycling company. The Contractor must ensure that an emergency preparedness plan is in place for implementation in the case of a spill or substances which can be harmful to an individual or the receiving environment. All used filter materials should be stored in a secure bin for disposal off-site. Hazardous waste must not be stored or stockpiled in any area other than at a site approved by the ECO. Any contaminated soil should be removed and replaced. Soils contaminated by oils and lubricants should be collected and disposed of at a facility designated by the local authority to accept contaminated materials. Washing of vehicles on the construction site should not be permitted as this is likely to result in the release of hydrocarbon-contaminated wash water into the environment.

During the operational phase, hazardous materials on-site (if any) must be disposed of in a DFFE approved hazardous waste landfill site. The Contractor should ensure that an emergency preparedness plan is in place for implementation in the case of a spill or substances which can be harmful to an individual or the receiving environment.

### 10.13 EMERGENCY RESPONSE PLAN

This Emergency Response Plan should be implemented by the Contractor with guidance from the Health, Safety and Environment (HSE) Representative(s) during the Construction, Operational and Decommissioning Phases of the infrastructure development to reduce the likelihood of emergency incidents and to ensure that there will be appropriate responses to unexpected or accidental adverse incidents.

#### EMERGENCY INCIDENCE AVOIDANCE

- Induction Training, which includes a suitable Environmental Education Course and the location of emergency evacuation assembly points, must be given to all employees involved in the Construction, Operational and Decommissioning Phases.
- All impact management actions specified in the EMPr(s) and the Environmental Authorisation must be implemented throughout the phases of development.
- If faunal species are encountered within the site subsequent to the faunal search and rescue procedure, which must be undertaken directly prior to vegetation clearance, these species must only be handled and relocated by a suitably experienced individual.
- A suitably experienced snake wrangler, with the ability to accurately identify snakes, must be present on-site during construction and decommissioning activities.
- A list of snakes which are likely to occur within the site must form part of the Environmental Education Course. In addition, it is recommended that the African Snakebite Institute app is downloaded by the ECO and the HSE Representative.
- Spill kits must be readily available on-site. These spill kits should include absorbent pads, bags, etc. and each refuelling vehicle must have a spill kit.
- A general first aid kit should be kept on-site and managed by a suitably experienced individual, who has received suitable first aid training.
- All vehicles and plants operated on-site must be serviced regularly.
- Tyre puncture repair kits should be kept on-site and used by a suitably experienced individual.
- Firefighting equipment must be readily available on-site. This should include rubber beaters and at least one (1) fire extinguisher of a suitable size. The fire extinguisher(s) must be serviced as per the manufacturer's recommendations.
- Fire breaks should be established and maintained where necessary.
- Smoking must only occur in designated areas, as approved by the appointed ECO.
- Open fires must not be permitted unless approval is received from the appointed ECO and the HSE Representative.
- Emergency contact details should be clearly displayed on-site. These should include, but not be limited to, contact details for the nearest:



- Fire Services/Fire Protection Agency (FPA);
- South African Police Services;
- Ambulance; and
- National Crisis Line.
- Fuels, oils and other hazardous materials must be kept in a bunded area under lock and key.
- A suitable number of drip trays must be readily available on-site, and the use of these drip trays must be monitored by the appointed ECO.
- All hazardous chemicals that will be used on-site must have Material Safety Data Sheets (MSDS).
- All hazardous substances must be stored in suitable containers as defined in the Method Statement.
- Hazardous materials must only be handled by trained personnel. The handling of hazardous materials must only be in accordance with the MSDS.
- Employees handling hazardous substances and materials must be aware of the potential impacts and follow appropriate safety measures. Appropriate personal protective equipment must be made available.
- Containers must be clearly marked to indicate contents, quantities, and safety requirements.
- Vehicle speed limits must be indicated on-site and limited to 40 km/hr on gravel roads.
- Employees must not be housed on-site.
- Any incidence of social unrest must be reported to the South African Police Services.
- Any incidence of theft must be reported to the South African Police Services.
- Any incidence of poaching must be reported to the South African Police Services.
- Weather forecasts should be observed, at least on a weekly basis, to plan for any potentially risky weather events.
- Additional safety measures must be implemented during periods of heavy rainfall, high wind speeds, snowfall, etc. During such periods, the recommended speed limit of 40 km/hr should be reduced to 30 km/hr.

## **EMERGENCY RESPONSES**

### Hazardous Substance Spills

In the event that an accidental spill of fuel, oil or other hazardous substances occurs, these actions must be taken immediately to isolate, control and manage the spill:

- Appropriate actions, in accordance with the approved (prior to construction) Method Statement(s), must be taken to isolate and contain the spill.
- The spill must be contained using spill kits; by applying suitable absorbent material to the spill and removing the contaminated soil (ground spills), or by using booms (watercourse spills).
- All spills must be treated with a matter of urgency.
- Used spill kit material and contaminated soil must be temporarily stored in a designated area on-site prior to disposal at a registered hazardous waste disposal site by a suitable service provider.
- The ECO and the HSE Representative must be informed of the incident as soon as possible, and an incident report must be completed which includes photographs of the spill, the measures taken to contain the spill and remediate the location of the spill as well as the success of the measures taken.

### Fires

In the event of a fire, these actions must be taken immediately to control and extinguish the fire:

- Contact the Fire Services as soon as possible.
- Make use of the rubber beaters and fire extinguisher, the minimum firefighting equipment which should be available on-site, to control the fire until the Fire Services arrive.
- Should any employees have minor burns resulting from the fire, these burns should be treated with a burn dressing from the available first aid kit followed by an appointment with a suitably qualified healthcare professional.

- Should any employees have major burns resulting from the fire, an ambulance must be called immediately, and the burns must be treated by a suitably qualified healthcare professional.
- The ECO and the HSE Representative must be informed of the incident as soon as possible, and an incident report must be completed which includes photographs, the measures taken to contain the fire and remediate the affected area.

#### Emergency Evacuation

An Emergency Evacuation Method Statement must be compiled for approval from the appointed ECO and the HSE Representative prior to the commencement of the construction phase. Should emergency evacuation of the site be required, the following should be done as a matter of urgency:

- All employees must gather at the predetermined emergency evacuation assembly points and await the Contractor's instructions as per the approved Emergency Evacuation Method Statement.
- The ECO and the HSE Representative must compile an incident report must be completed which includes the identification of the snake, the location where the incident occurred, the location in which the snake was relocated to and the measures are taken to ensure the safety of the snake bite victim.

#### Severe Weather Conditions

A Method Statement must be compiled for approval from the appointed ECO and the HSE Representative prior to the commencement of the construction phase for the protocols relating to severe weather conditions. Should severe weather conditions be forecast, which could increase the risk of employees travelling to site or undertaking the necessary activities on-site, temporary site closure should be considered, and all necessary site closure measures must be put in place.

#### Snake Bites

In the event of a snake bite, these actions must be taken immediately:

- An ambulance must be contacted immediately.
- All efforts must be taken to obtain a description of the snake or a photograph in order to correctly identify the snake for treatment purposes.
- The snake must be captured by a suitably qualified snake wrangler and safely relocated away from the site.
- The ECO and the HSE Representative must be informed of the incident as soon as possible, and an incident report must be completed which includes the identification of the snake, the location where the incident occurred, the location in which the snake was relocated to and the measures are taken to ensure the safety of the snake bite victim.

#### Injury, Illness or Death Onsite

Should an employee obtain a minor injury or illness on-site, a suitably trained individual should provide treatment from the first aid kit, followed by an appointment with a suitably qualified healthcare professional (if deemed necessary) and allowed to rest until fully recovered (if necessary).

Should an employee obtain a major injury or show signs of severe illness on-site, an ambulance must be contacted immediately so that the employee can be treated by a doctor.

Should an employee die on-site, an ambulance, as well as the South African Police Services, must be contacted immediately. Those present at the time of the death should engage with the South African Police Services and they should receive the necessary counselling and support.

The ECO and the HSE Representative must be informed of all injuries, illnesses and/or deaths which occur on-site. An incident report must be completed for every incident as well as the steps taken to ensure the safety of the employees.

**COMPLIANCE**

The ECO and HSE Representative must monitor and keep records of all emergency incidents on-site. These incidents must be included in the Audits Reports during the relevant phases of the development and the Contractor and Developer must be made aware of all incidents. In addition, the landowners must be notified of all incidents which occur within their properties.

## 11 CLOSURE PLANNING

The Contractor must clear and clean the site and ensure that all equipment and residual materials, not forming part of the permanent works, are removed from site before issuing the completion certificate or as otherwise agreed.

### 11.1 POST-CONSTRUCTION AUDIT

A post-construction audit must be carried out and submitted to DFFE at the expense of the Applicant. Objectives should be to audit compliances with the key components of the EMPr, to identify main areas requiring attention and recommend priority actions. The post-construction audit must be submitted to DFFE within three (3) months of completion of the development and prior to the operational phase. Results of the audits should inform changes required to the specifications of the EMPr or additional specifications to deal with any environmental issues which arise on-site and have not been dealt with in the current document.

### 11.2 GENERAL REVIEW OF THE EMPR

The EMPr must be reviewed by the ECO on an ongoing basis. Based on observations during site inspections and issues raised at site meetings, the ECO should determine whether any procedures require modification to improve the efficiency and applicability of the EMPr on site. Any such changes or updates must be registered in the ECO's record, as well as being included as an annexure to this document. Annexures of this nature must be distributed to all relevant parties.

## 12 CONCLUSIONS

### 12.1 IMPACT MANAGEMENT OUTCOMES

The successful implementation of the impact management actions, stipulated in Chapter 5 of this EMPr, for each phase of the Soutrivier North WEF Development will result in the avoidance, management and/or mitigation of the identified impacts and risks associated with the development. In addition, the implementation of the recommended management plans, in Chapter 10 of this EMPr, should further contribute to the avoidance, reduction and/or management of potential impacts resulting from the various stages of the Soutrivier North WEF. The general impact management outcomes of this EMPr are to:

- To reduce the adverse impacts and enhance the benefits of the development.
- Preserve faunal and floral species and their associated habitats within identified sensitive areas and outside of the development footprint.
- To reduce the adverse impacts on avifaunal species due to the construction of the overhead line.
- To reduce the adverse impacts on avifaunal species due to the construction of the wind turbines.
- Preserve SCC within the development footprint.
- Maintain soil and vegetation cover, through the implementation of erosion control, stormwater management, and alien vegetation management measures.
- Undertake activities in a manner which does not place workers or the public at risk in terms of health and safety.
- Prevent, and where not possible, control fires to protect public health, the environment and any properties in the vicinity of the development.
- Reduce the potential for pollution, in terms of air pollution, land pollution, water pollution, and noise pollution.
- Preserve cultural heritage and palaeontological resources of significance.
- Rehabilitate disturbed areas to their natural state or a near-natural state.
- Manage and maintain the operational development to reduce adverse impacts associated with the operation of the development and to ensure sustainable development.

### 12.2 CONCLUDING STATEMENTS

Although all foreseeable actions and potential mitigations or management actions are contained in this document, the EMPr should be seen as a day-to-day management document. The EMPr thus sets out the environmental and social standards, which would be required to minimise the negative impacts and maximise the positive benefits of the Soutrivier North WEF as detailed in the EIR and associated specialist reports. The EMPr could thus change daily, and if managed correctly lead to successful planning and design, construction, operational, and decommissioning phases.

All attempts should be made to have this EMPr available, as part of any tender documentation, so that the engineers and contractors are made aware of the potential cost and timing implications needed to fulfil the implementation of the EMPr, thus adequately costing for these.






13 APPENDIX A

EXAMPLE OF AN ENVIRONMENTAL EDUCATION COURSE OUTLINE







[www.webweaver.nu/clipart/environmental.shtml](http://www.webweaver.nu/clipart/environmental.shtml)
















### Reasons why should we look after the environment

-  We have a right to a clean environment
-  A clean environment is essential to healthy living
-  All our basic needs come from the environment
-  A contract has been signed – development vs the environment
-  Penalties / fines could be issued

## How to look after the environment

-  Report issues
-  Teamwork
-  Follow the set rules and guidelines (EA, EMPr, Method statements etc.)
-  Conserve, reuse and recycle

## Tips and Guidelines

-  Workers and equipment should not be allowed outside demarcated areas
-  No swimming or polluting of water bodies allowed
-  No damage / disturbance to vegetation or water bodies without consent / permits
-  No disturbance allowed in no-go areas
-  No hunting of animals
-  Report all fires
-  No burning or burying of waste
-  No smoking near hazardous materials
-  Training on fire fighting equipment
-  Hazardous materials to be stored in designated and bunded areas
-  Spill kits and drip trays a must
-  Report all spills
-  Control dust and Noise
-  Maintain construction vehicles
-  Availability and maintenance of sanitation facilities



### Tips and Guidelines

- 🍃 Only eat in designated areas
- 🍃 Do not litter
- 🍃 Vehicles to remain on approved tracks and adhere to speed limit
- 🍃 Ensure emergency phone numbers are available
- 🍃 Ensure PPE is worn
- 🍃 Report fires, leaks and injuries
- 🍃 Ask if unsure





**14 APPENDIX B**

**COPY OF ENVIRONMENTAL AUTHORISATION**

15 APPENDIX C

EXAMPLE OF A METHOD STATEMENT

METHOD STATEMENT

CONTRACT: ..... DATE: .....

PROPOSED ACTIVITY (give title of Method Statement and reference number from the EMPr):

WHAT WORK IS TO BE UNDERTAKEN (give a brief description of the works):

WHERE ARE THE WORKS TO BE UNDERTAKEN (where possible, provide an annotated plan and a full description of the extent of the works):

START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:

Start Date:

End Date:

HOW ARE THE WORKS TO BE UNDERTAKEN (provide as much detail as possible, including annotated sketches and plans where possible):

\* Note: Please attach additional pages should you require more space.

**DECLARATIONS**

**1) ENVIRONMENTAL CONTROL OFFICER (ECO)**

The work described in this Method Statement, if carried out according to the methodology described, is satisfactorily mitigated to prevent avoidable environmental harm:

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Print name)

Date: \_\_\_\_\_

**2) PERSON UNDERTAKING THE WORKS**

I understand the contents of this Method Statement and the scope of the works required of me. I further understand that this Method Statement may be amended on application to other signatories and that the ECO will audit my compliance with the contents of this Method Statement

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Print name)

Date: \_\_\_\_\_

16 APPENDIX D

APPENDIX 2 - CHANCE FOSSIL FINDS PROCEDURE: Victoria West WEF Cluster between Loxton and Victoria West, Northern Cape Province	
Province & region:	Northern Cape (Pixley Ka-Seme District, Ubuntu Local Municipality)
Responsible Heritage Management Agencies	SAHRA for N. Cape: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Phone: +27 (0)21 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za
Rock unit(s)	Abrahamskraal Formation and Teekloof Formation (Lower Beaufort Group), Late Caenozoic alluvium.
Potential fossils	Fossil skulls, postcrania of tetrapods, amphibians, fish as well as rare petrified wood, vertebrate and invertebrate burrows within bedrocks. Mammalian bones, teeth & horn cores, freshwater molluscs, calcretised trace fossils & rhizoliths and plant material in alluvium.
ECO / ESO protocol	1. Once alerted to fossil occurrence(s): alert site foreman, stop work in area immediately ( <i>N.B.</i> safety first!), safeguard site with security tape / fence / sand bags if necessary.
	2. Record key data while fossil remains are still <i>in situ</i> : <ul style="list-style-type: none"> <li>• Accurate geographic location – describe and mark on site map / 1: 50 000 map / satellite image / aerial photo</li> <li>• Context – describe position of fossils within stratigraphy (rock layering), depth below surface</li> <li>• Photograph fossil(s) <i>in situ</i> with scale, from different angles, including images showing context (e.g. rock layering)</li> </ul>
	3. If feasible to leave fossils <i>in situ</i> : <ul style="list-style-type: none"> <li>• Alert Heritage Resources Agency and project palaeontologist (if any) who will advise on any necessary mitigation</li> <li>• Ensure fossil site remains safeguarded until clearance is given by the Heritage Resources Agency for work to resume</li> </ul>
	3. If <i>not</i> feasible to leave fossils <i>in situ</i> (emergency procedure only): <ul style="list-style-type: none"> <li>• <i>Carefully</i> remove fossils, as far as possible still enclosed within the original sedimentary matrix (e.g. entire block of fossiliferous rock)</li> <li>• Photograph fossils against a plain, level background, with scale</li> <li>• Carefully wrap fossils in several layers of newspaper / tissue paper / plastic bags</li> <li>• Safeguard fossils together with locality and collection data (including collector and date) in a box in a safe place for examination by a palaeontologist</li> <li>• Alert Heritage Resources Agency and project palaeontologist (if any) who will advise on any necessary mitigation</li> </ul>
	4. If required by Heritage Resources Agency, ensure that a suitably-qualified specialist palaeontologist is appointed as soon as possible by the developer.
5. Implement any further mitigation measures proposed by the palaeontologist and Heritage Resources Agency	
Specialist palaeontologist	Apply for Fossil Collection Permit Record / submit Work Plan to the relevant Heritage Resources Agency. Describe and judiciously sample fossil remains together with relevant contextual data (stratigraphy / sedimentology / taphonomy). Ensure that fossils are curated in an approved repository (e.g. museum / university / Council for Geoscience collection) together with full collection data. Submit Palaeontological Mitigation report to Heritage Resources Agency. Adhere to best international practice for palaeontological fieldwork and Heritage Resources Agency minimum standards.