



**SOUTH AFRICA MAINSTREAM RENEWABLE  
POWER DEVELOPMENTS (PTY) LTD**

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**Proposed Development of the  
Heuweltjies Wind Energy Facility  
and Associated Infrastructure near  
Beaufort West in the Western Cape  
Province**

**Draft Environmental Management  
Programme**

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**SOUTH AFRICA MAINSTREAM RENEWABLE POWER  
DEVELOPMENTS (PTY) LTD**

**HEUWELTJIES WIND ENERGY FACILITY**

**DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME**

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# **SOUTH AFRICA MAINSTREAM RENEWABLE POWER DEVELOPMENTS (PTY) LTD**

## **HEUWELTJIES WIND ENERGY FACILITY**

### **DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME**

#### **1. INTRODUCTION**

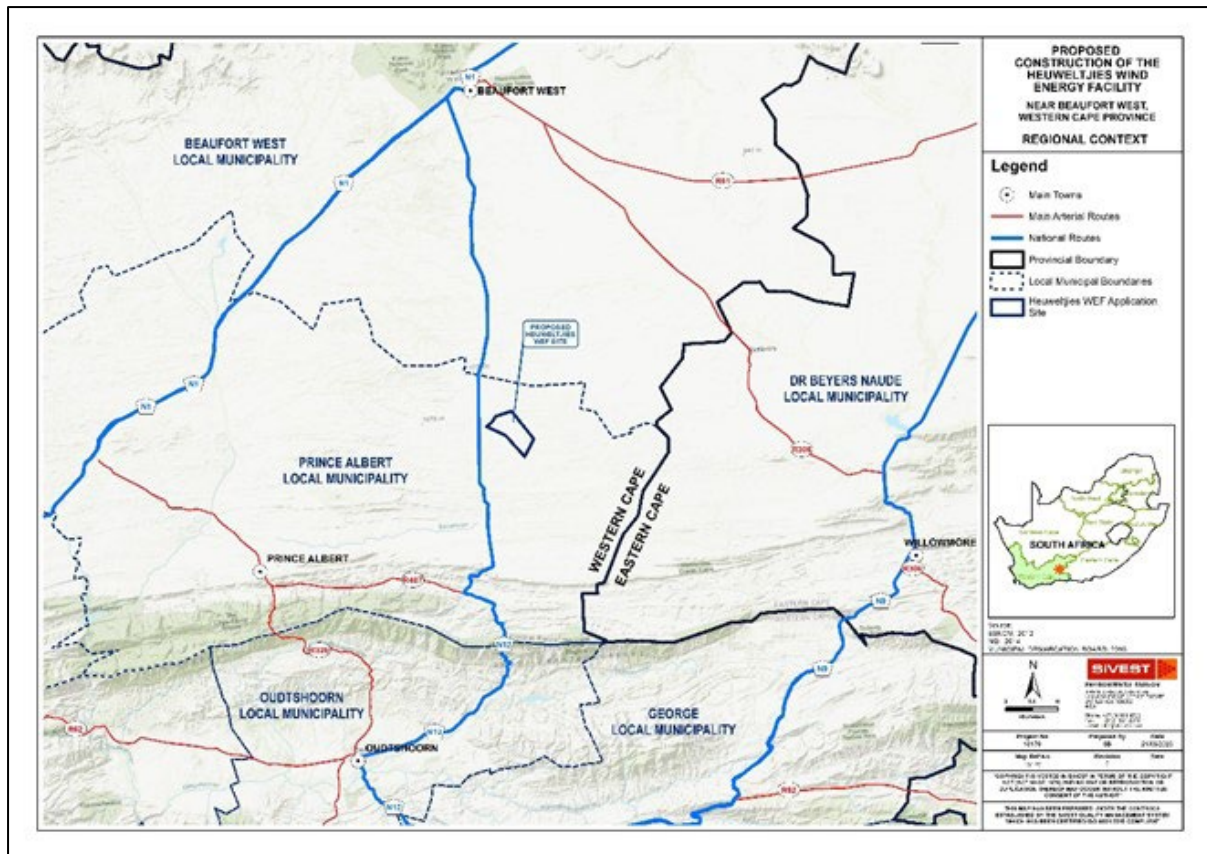
South Africa Mainstream Renewable Power Developments (Pty) Ltd (hereafter referred to as 'Mainstream') is proposing the development of the Heuweltjies Wind Energy Facility (WEF) and associated infrastructure near the town of Beaufort West in the Prince Albert Local Municipality, which falls within the Central Karoo District Municipality (**Figure 1**) (**DFFE Reference Number: 14/12/16/3/3/2/2263**). The overall objective of the proposed development is to generate electricity by means of renewable energy technologies capturing wind energy to feed into the national grid. The proposed development will have a maximum total generation capacity of up to 240 megawatts (MW).

SiVEST Environmental Division has subsequently been appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the required Draft Environmental Management Programme (EMPr) (in line with the National Environmental Management Act, 1998 (Act 107 of 1998)) for the proposed construction of the Heuweltjies WEF, Battery Energy Storage System (BESS) and associated infrastructure.

This EMPr provides a set of guidelines for the environmental management of all works executed by the Developer, Engineer, Contractor and Sub-contractor/s to have a minimum impact on the environment in accordance with all relevant legislation, policies and standards. In this context, it should be viewed as a dynamic or "living" document which may require updating or revision during the life cycle of the development to address new circumstances as the need arises. It is essentially a written plan of how the environment is to be managed in practical and achievable terms. The EMPr shall be deemed to have contractual standing on the developer and contractors onsite.

The effectiveness of the EMPr is limited by the level of adherence to the conditions set forth in this report by the Developer, Engineer and the Contractor and Sub-contractors. It is further assumed that compliance with the EMPr will be monitored and audited on a regular basis as set out in the EMPr and contractual clauses.





**Figure 1: Site Locality**

## 1.1 Content Requirements for an Environmental Management Programme

The content requirements for an EMPr (as provided in Appendix 4 of the EIA Regulations 2014, as amended), as well as details of which section of the report fulfils these requirements, are shown in **Table 1** below.

**Table 1: Content requirements for a EMPr**

2014 EIA Regulations, as amended.	Requirements for an EMPr	Location in this EMPr
Appendix 4, Section 1. (1)	An EMPr must comply with section 24N of the Act and include -	Refer to relevant reference sections below:
Appendix 4, Section 1 (a)	Details of –	-
	(i) The EAP who prepared the EMPr; and	Section 3.1 Section 3.2
	(ii) The expertise of that EAP to prepare an EMPr, including a curriculum vitae.	Section 3.2
Appendix 1, Section 3 (b)	a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section 4.1
Appendix 4, Section 1 (c)	a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the	Figure 1 and Figure 5

2014 EIA Regulations, as amended.	Requirements for an EMPr	Location in this EMPr
	environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	
Appendix 4, Section 1 (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;	Section 9
Appendix 4, Section 3 (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; and (iv) comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable;	Section 9
Appendix 4, Section 3 (g)	the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 9
Appendix 4, Section 3 (h)	the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 9
Appendix 4, Section 3 (i)	an indication of the persons who will be responsible for the implementation of the impact management actions;	Section 8 Section 9
Appendix 4, Section 3 (j)	the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 9
Appendix 4, Section 3 (k)	the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 9
Appendix 4, Section 3 (l)	a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 9
Appendix 4, Section 3 (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	Section 11
Appendix 4, Section 3 (n)	any specific information that may be required by the competent authority.	Section 7.3 Section 10
Appendix 4 Section 2	Where a government notice gazetted by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.	Generic EMPr has been compiled and included.

## 2. DETAILS OF APPLICANT

### 2.1 Name and contact details of the Applicant

**Table 2: Name and contact details of the applicant**

<b>Business Name of Applicant</b>	South Africa Mainstream Renewable Power Developments (Pty) Ltd
<b>Physical Address</b>	4th Floor Mariendahl House, Newlands on Main, Cnr Main Road and Campground, Claremont, Cape Town
<b>Postal Address</b>	PO Box 45063, Claremont, Cape Town
<b>Postal Code</b>	7735
<b>Telephone</b>	073 871 5781
<b>Fax</b>	021 671 5665
<b>Email</b>	eugene.marais@mainstreamrp.com

## 3. DETAILS AND EXPERTISE OF THE EAP

### 3.1 Name and contact details of the Environmental Assessment Practitioner (EAP)

The table below provides the name and contact details of the Lead EAP for the project:

**Table 3: Name and contact details of the Environmental Consultant who prepared the report**

<b>Business Name of EAP</b>	SiVEST SA (PTY) Ltd
<b>Name of Lead EAP</b>	Rendani Rasivhetshele
<b>Physical Address</b>	12 Autumn Road, Rivonia
<b>Postal Address</b>	PO Box 2921, Rivonia
<b>Postal Code</b>	2128
<b>Telephone</b>	011 798 0600
<b>Fax</b>	-
<b>Email</b>	<a href="mailto:rendanir@sivest.com">rendanir@sivest.com</a>

### 3.2 Names and expertise of the EAPs

The table below provides the names of the people who prepared this report and their expertise:

**Table 4: Names of EAP's involved in the preparation of this report**

<b>Name of representative of the EAP</b>	<b>Educational Qualifications</b>	<b>Professional Affiliations</b>	<b>Exp (years)</b>
Michelle Nevette	MSc Environmental Science	SACNASP Registration No. 120356 EAPASA Registration No. 2019/1560 IAIAsa	21
Natalie Pullen	MSc (Environmental Biotechnology)	EAPASA Registration No. 2018/132 IAIAsa	19
Rendani Rasivhetshele – EAP	BSc Honours Environmental Management	EAPASA Registration No. 2019/1729	7

CV's of SiVEST personnel and EAP declaration are attached in **Annexure A**.

### 3.3 Names and expertise of the specialists

Specialist studies have been conducted in terms of the Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(A) and (H) And 44 of the NEMA when applying for EA, as well as the EIA Regulations, 2014 (as amended). The table below provides the names of the specialists involved in the project:

**Table 5: Names of specialists involved in the project**

Company	Name of representative of the specialist	Specialist	Educational Qualifications	Experience (years)
SiVEST SA (Pty) Ltd	Kerry Schwartz	Visual Impact Assessment	BA (Geography) GTc GISc 1187	25
SiVEST SA (Pty) Ltd	Merchandt Le Maitre	Transportation Impact Assessment	N Dip: Civil Engineering B Tech: Civil Engineering Pr.Tech.Eng. (Reg. No. 2018300094)	16
PGS Heritage (Pty) Ltd	Wouter Fourie	Heritage Impact Assessment	Professional Archaeologist with the Association of Southern African Professional Archaeologists (ASAPA) Accredited Professional Heritage Practitioner with the Association of Professional Heritage Practitioners (APHP)	22
	John Almond	Palaeontological Impact Assessment	PhD (Palaeontology) Palaeontological Society of South Africa, Associated of Professional Heritage (W Cape)	40
	Nikki Mann	Archaeological Assessment	MSc Archaeology Professional Archaeologist with ASAPA	7
	Emmylou Bailey	Cultural Landscape Assessment	MA Archaeology and Heritage Management APHP, ASAPA	15
Gage Consulting	Duan Gage	Desktop Geotechnical Assessment	Professional registered SACNASP, PrNatSci (137543), MSAIEG, Master of Science (Engineering Geology), *Doctoral Candidate (Engineering Geology)	4
Johann Lanz Consulting	Johann Lanz	Agriculture and Soils Impact Assessment (desktop)	MSc (Environmental Geochemistry)	24

Company	Name of representative of the specialist	Specialist	Educational Qualifications	Experience (years)
Enviro Acoustic Research	Morné de Jager	Noise Impact Assessment	B Ing (Chemical) SAAI, ASA	14
ACER (Africa) Environmental Consultants	Lloyd McFarlane	Social Impact Assessment (desktop)	MSc Environmental Science (Sustainable development).	10
EnviroSci (Pty) Ltd	Dr Brian Colloty	Surface Water Impact Assessment Biodiversity Impact Assessment	PhD (Botany – Estuaries & Mangroves) Pr. Sci. Nat. 400268/07	25
Chris Van Rooyen Consulting	Chris van Rooyen	Avifaunal Impact Assessment	BA LLB	22
	Albert Froneman	Avifaunal Impact Assessment	MSc (Conservation)	22
Stephanie Dippenaar Consulting	Stephanie Dippenaar	Bat Impact Assessment	MEM (master's in environmental management)	22

## 4. ACTIVITY INFORMATION

### 4.1 Project Description

The proposed Heuweltjies WEF will comprise of up to thirty-eight (38) wind turbines with a maximum total energy generation capacity of up to approximately 240MW. The electricity generated by the proposed WEF development will be fed into the national grid via a 132kV overhead power line. The 132kV overhead power line will however require a separate EA and is subject to a separate BA process. In summary, the proposed Heuweltjies WEF will include the following components:

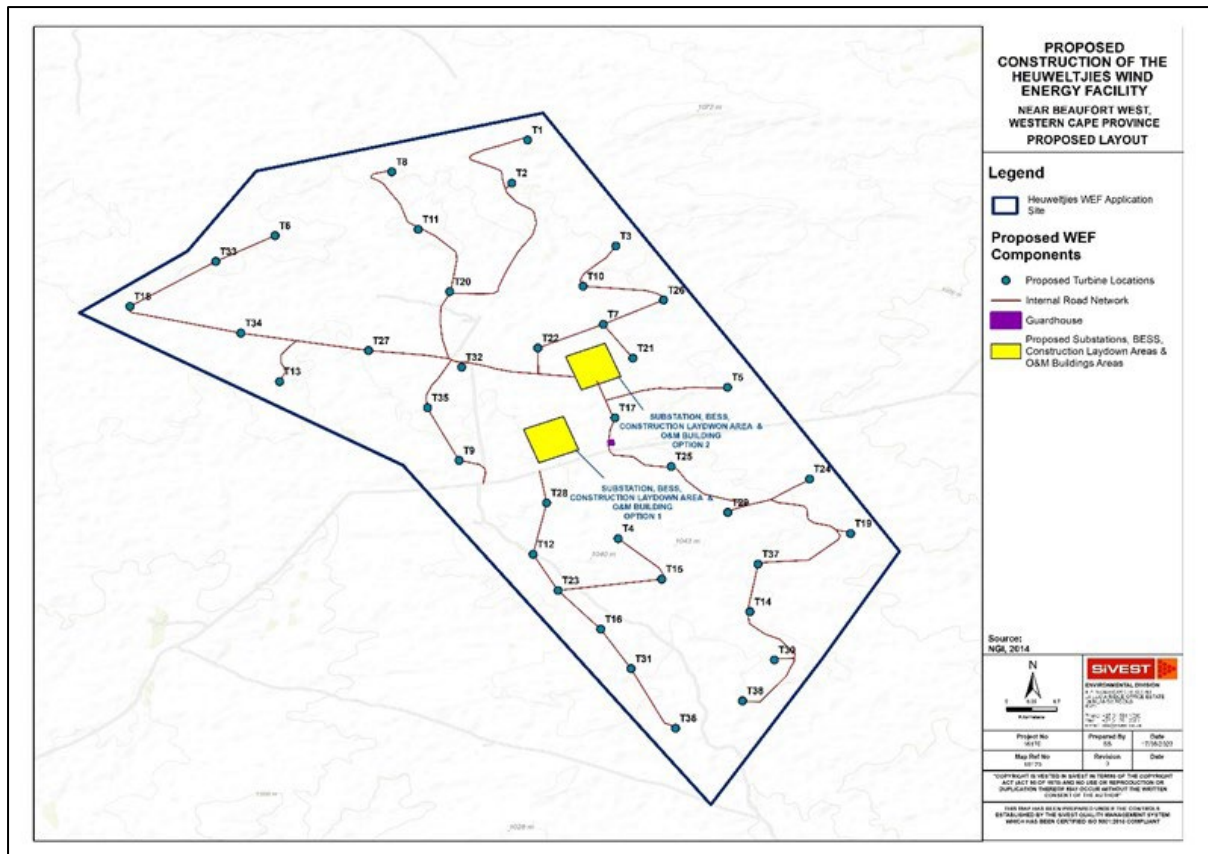
- Up to thirty-eight (38) wind turbines, each between, with a maximum export capacity of approximately 240MW. This will be subject to allowable limits in terms of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP).
- Each wind turbine will have a hub height of up to 120m to 200m and rotor diameter of up to approximately 200m.
- Permanent compacted hardstand areas / platforms (also known as crane pads) of approximately 90m x 50m (total footprint of approx. 4 500m<sup>2</sup>) per turbine during construction and for on-going maintenance purposes for the lifetime of the proposed development.
- Each wind turbine will consist of a foundation of up to approximately 15m x 15m in diameter. In addition, the foundations will be up to approximately 3m in depth.
- Electrical transformers (690V/33kV) adjacent to each wind turbine (typical footprint of up to approximately 2m x 2m) to step up the voltage to 11-33kV.
- Associated infrastructure of approximately 25ha which includes:
  - One (1) new 11-33kV/132kV IPP on-site substation including associated equipment and infrastructure the proposed substation will be a step-up substation and will include an Eskom portion and an IPP portion, hence the substation has been included in the WEF EIA and in the

grid infrastructure (substation and 132kV overhead power line) BA to allow for handover to Eskom. Following construction, the substation will be owned and managed by Eskom.

- A BESS will be located next to the onsite 11-33kV/132kV substation. The storage capacity and type of technology will be determined at a later stage during the development phase, but most likely comprise an array of containers, outdoor cabinets and/or storage tanks.
- One (1) construction laydown / staging area. It should be noted that no construction camps will be required in order to house workers overnight as all workers will be accommodated in the nearby town.
- Operation and Maintenance (O&M) buildings, including offices, a guard house, operational control centre, O&M area / warehouse / workshop and ablution facilities to be located on the site identified for the substation.
- The wind turbines will be connected to the proposed substation via medium voltage (11-33kV) underground cabling and overhead power lines.
- Internal roads with a servitude up to approximately 8m wide will provide access to each wind turbine. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary. Turns will have a radius of up to 50m for abnormal loads (especially turbine blades) to access the various wind turbine positions. It should be noted that the proposed application site will be accessed via the N12 National Route.
- A wind measuring lattice (approximately 140m in height) mast has already been strategically placed within the wind farm application site in order to collect data on wind conditions.
- No new fencing is envisaged at this stage. Current fencing is standard farm fence approximately 1-1.5m in height. Fencing might be upgraded (if required) to be up to approximately 2m in height; and
- Water will either be sourced from existing boreholes located within the application site or will be trucked in, should the boreholes located within the application site be limited.

The Proposed Layout is reflected below in **Figure 2**.





**Figure 2: Layout showing proposed infrastructure**

Please refer to **Figure 3** below for the typical components of a wind turbine.

A summary of the project technical details is provided in **Table 6** below.

**Table 6: Technical Detail Summary**

Component	Description / Dimensions
Location of site (centre point)	S33° 0' 36.802"E22° 36' 51.982"
Project site – Total extent of the affected property	4017,60 ha
Total extent of the Development area	1672 ha
Turbine number	38
Turbine development area	Hardstand Area = (90m x 50m) x 38 turbines
SG codes	C0610000000001600000 C06100000000011400008
Export capacity	Up to 240 megawatts
Proposed technology	Wind turbines and associated infrastructure
Hub height from ground	120m to 200m
Rotor diameter	Up to 200m
Substation and O&M building area	This will be included in the 11-33kV portion/yard of the 25-ha on-site substation area on the IPP portion of the onsite substation.

Component	Description / Dimensions
Construction laydown area	Approximately 3ha
Permanent laydown area	Approximately 3ha
Hard stand areas	Approximately 4 500m <sup>2</sup>
BESS	A BESS will be located next to the onsite 11-33/132kV substation. The storage capacity and type of technology would be determined at a later stage during the development phase, but most likely will comprise an array of containers, outdoor cabinets and/or storage tanks.
Width of internal access roads	The main access road will be approximately 8 - 12 m wide. During construction the roads will be up to 13.5m in some parts (i.e. for bringing in transformers etc), after construction they will be rehabilitated back down to 8m or less.
Length of internal access roads	To be determined based on final layout
Site Access / Internal Roads	<p>The main access road will be approximately 8 – 12 m wide. During construction the roads will be up to 13.5m in some parts (i.e., for bringing in transformers etc), after construction they will be rehabilitated back down to 8m or less.</p> <p>Turns will have a radius of up to 50m for abnormal loads (especially turbine blades) to access the various wind turbine positions. It should be noted that the proposed application site will be accessed via the N12 National Route.</p> <p>During operation, internal roads with a width of up to approximately 5m (excluding reserves) wide will provide access to each wind turbine. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary.</p>
Proximity to grid connection	Approximately 1-7km
Type and height of fencing	No new fencing is envisaged at this stage. Current fencing is standard farm fence approximately 1-1.5m in height. Fencing might be upgraded (if required) to be up to approximately 2m in height.

## 4.2 NEMA Listed Activities

The amended EIA Regulations promulgated under Section 24(5) of the National Environmental Management Act, Act 107 of 1998 and published in Government Notice No. R. 326 list activities which may not commence without environmental authorization from the Competent Authority. The proposed activity is identified in terms of Government Notice No. R. 327, 325 and 324 for activities which must follow a full Environmental Impact Assessment Process.



The project will trigger the following listed activities:

**Table 7: Listed activities in terms of NEMA: EIA Regulations 2014 (as amended in 2017), applicable to the proposed project**

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
<b>Relevant Basic Assessment Activities as set out in Listing Notice 1</b>		
11 (i)	<b>GN R. 327 (as amended) Item 11:</b> The development of facilities or infrastructure for the transmission and distribution of electricity—  (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.	One (1) new 11kV – 33/132kV on-site substation consisting of two (2) portions: IPP portion / yard (11-33kV portion of the shared 11-33kV/132kV portion) and an Eskom portion (132kV portion of the shared 11-33kV/132kV portion which will be prepared and assessed under separate BA) including associated equipment and infrastructure, occupying a total area of approximately 25ha (i.e., 250 000m <sup>2</sup> ).
12 (ii) (a) (c)	<b>GN R. 327 (as amended) Item 12:</b> The development of:  ii) infrastructure or structures with a physical footprint of 100 square metres or more;  where such development occurs- (a) within a watercourse; c if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.	Drainage lines and watercourses are scattered across the proposed site. Roads, underground cables and/or powerlines will cross these watercourses or drainage lines or be within 32m thereof.  The proposed developments will therefore entail the construction of infrastructure with physical footprints of approximately 100m <sup>2</sup> or more within a surface water feature / watercourse or within 32m of a surface water feature / watercourse.
14	<b>GN R. 327 (as amended) Item 14:</b> The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80m <sup>3</sup> or more but not exceeding 500m <sup>3</sup> .	The proposed development will include the construction of an on-site BESS. The storage capacity and type of technology for the proposed BESS will be determined at a later stage during the development phase, but most likely will comprise an array of containers, outdoor cabinets and/or storage tanks.  It should be noted that no stand-alone facilities for the storage of dangerous goods external to the BESS will be constructed as part of the proposed development.
19	<b>GN R. 327 (as amended) Item 19:</b> The infilling or depositing of any material of more than 10 cubic metres into, or the	The proposed development involves the construction of a WEF as well as other associated infrastructure (including the

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
	dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;	<p>IPP portion/ yard of the 11-33kV/132kV shared on-site substation, up to 33kV overhead and / or underground cabling, roads and BESS) within the proposed project site.</p> <p>Although the development footprint of the site area has been designed to avoid the identified surface water features / watercourses as far as possible, some of the internal infrastructure to be constructed will need to traverse surface water features / watercourses. In addition, during construction, soil will need to be removed from surface water features / watercourses for construction purposes where unavoidable.</p>
24 (ii)	<p><b>GN R. 327 (as amended) Item 24:</b> The development of a road -</p> <p>ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres.</p>	<p>Internal roads are required within the project site to provide access to each wind turbine, the shared 11-33kV/132kV on-site substation, as well as to facilitate access throughout the WEF.</p> <p>The main access road will be approximately 8 - 12 m wide. During construction the roads will be up to 13.5m in some parts (i.e. for bringing in transformers etc), after construction they will be rehabilitated back down to 8m or less.</p> <p>Turns will have a radius of up to 50m for abnormal loads (especially turbine blades) to access the various wind turbine positions. It should be noted that the proposed application site will be accessed via the N12 National Route.</p> <p>During operation, internal roads with a width of up to approximately 5m (excluding reserves) wide will provide access to each wind turbine. Internal roads will have a final servitude of 8m during operation. Existing site roads will be used wherever possible, although new</p>

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
		site roads will be constructed where necessary.
28 (ii)	<b>GN R. 327 (as amended) Item 28:</b> Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:  (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;	The total area to be developed for the proposed renewable energy facilities is greater than 1ha and occurs outside an urban area in an area currently zoned as agricultural land.
56 (ii)	<b>GN R. 327 Item 56:</b> The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre -  (ii) where no reserve exists, where the existing road is wider than 8 metres –	Existing roads may require widening of up to 12m and/or lengthening by more than 1km, to accommodate the movement of heavy vehicles and cable trenching activities associated with the WEF and associated infrastructure.
<b>Relevant Scoping and EIA Activities as set out in Listing Notice 2 of the EIA Regulations, 2014 as amended</b>		
1	<b>GN R. 325 (as amended) Item 1:</b> The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more,	The proposed development will entail the construction of a WEF where the respective electricity output will be approximately 240MW. In addition, the proposed WEF developments will be located outside urban areas.
15	<b>GN R. 325 (as amended) Item 15:</b> The clearance of an area of 20 hectares or more of indigenous vegetation.	The proposed WEF development will involve the clearance of more than 20ha of indigenous vegetation. Clearance will also be required for the proposed 11-33/132kV shared on-site substation, O&M building, internal access roads and other associated infrastructure.
<b>Relevant Basic Assessment Activities as set out in Listing Notice 3 of the EIA Regulations, 2014 as amended</b>		
3 (i)	<b>GN R. 324 (as amended) Item 3:</b> The development of masts or towers of any material or type used for telecommunication broadcasting or radio transmission purposes where the mast or tower—	The development of the WEF facility and associated infrastructures will consist of a mast tower used for telecommunication broadcasting and will exceed 15 metres in height. The mast will be located outside urban areas.

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
	(b) will exceed 15 metres in height—  <b>i. Western Cape</b> i. All areas outside urban areas.	
4 i. (ii) (aa)	<b>GN R. 324 (as amended) Item 4:</b> The development of a road wider than 4 metres with a reserve less than 13,5 metres.  <b>i. Western Cape</b> ii. Areas outside urban areas; (aa) Areas containing indigenous vegetation;	The development of the WEF facilities and associated infrastructures is likely to require the development of roads wider than 4m with a reserve of less than 13.5m within areas classified as CBA.  These roads will occur within the Western Cape Province, outside urban areas.
10(i)(ii)	<b>GN R. 324 (as amended) Item 10:</b> The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres  <b>i. Western Cape</b> ii. All areas outside urban areas	The proposed WEF and associated infrastructures will include the storage and handling of goods such as transformer oils and lubricants (considered dangerous) between 30 to 80 cubic metres in the substation area that will need to be authorised.
12(i)(ii)	<b>GN R. 324 (as amended) Item 12:</b> The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.  <b>i. Western Cape</b> ii. Within critical biodiversity areas identified in bioregional plans	The proposed WEF development will involve the clearance of more than 300m <sup>2</sup> or more for the proposed on-site substation, BESS, internal roads and other associated infrastructure.  The provincial CBA spatial data for the Western Cape indicates that majority of the project site falls within the Ecological Support Areas and a small portion of the site overlaps with areas classified as Critical Biodiversity Areas.
14(ii)(a)(c)(i)(ii) (ff)	<b>GN R. 324 (as amended) Item 14:</b> The development of—  (ii) infrastructure or structures with a physical footprint of 10 square metres or more;  where such development occurs—  (a) within a watercourse;	The proposed development will entail the development of infrastructure with physical footprints of 10m <sup>2</sup> or more within a watercourse / surface water feature or within 32m from the edge of a watercourse / surface water feature.  Although the layouts of the respective proposed developments will be designed to avoid the identified surface water features / watercourse as far as possible,

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
	<p>(b) in front of a development setback; or</p> <p>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</p> <p>excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.</p> <p><b>i. Western Cape</b></p> <p>i. Outside urban areas:</p> <p>(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p>	<p>some of the infrastructure / structures will likely need to traverse the identified surface water features / watercourses.</p> <p>The construction of the infrastructure (Substation, BESS, O&amp;M building, MV cabling / powerlines and roads) for the development will occur within Critical Biodiversity Areas (CBAs) located outside of urban areas.</p>
18 i. ii. (aa)	<p><b>GN R. 324 (as amended) Item 18:</b> The widening of a road by more than 4 meters, or the lengthening of a road by more than 1 kilometer-</p> <p><b>i. Western Cape</b></p> <p>ii. All areas outside urban areas:</p> <p>(aa) Areas containing indigenous vegetation</p>	<p>Internal access roads will be required to access the wind turbines as well as the respective 11-33kV/132kV shared substations and BESS.</p> <p>Existing roads will be used wherever possible. Internal access roads will thus likely be widened by more than 4m or lengthened by more than 1km. These roads will occur within the Western Cape Province, outside urban areas. Western Cape Province, outside urban areas.</p>

## 5. LOCATION OF THE ACTIVITY

### 5.1 Regional Locality

The proposed WEF is located approximately 70km south of Beaufort West in the Western Cape Province and is within the Prince Albert Local Municipality, in the Central Karoo District Municipality (**Figure 4**).



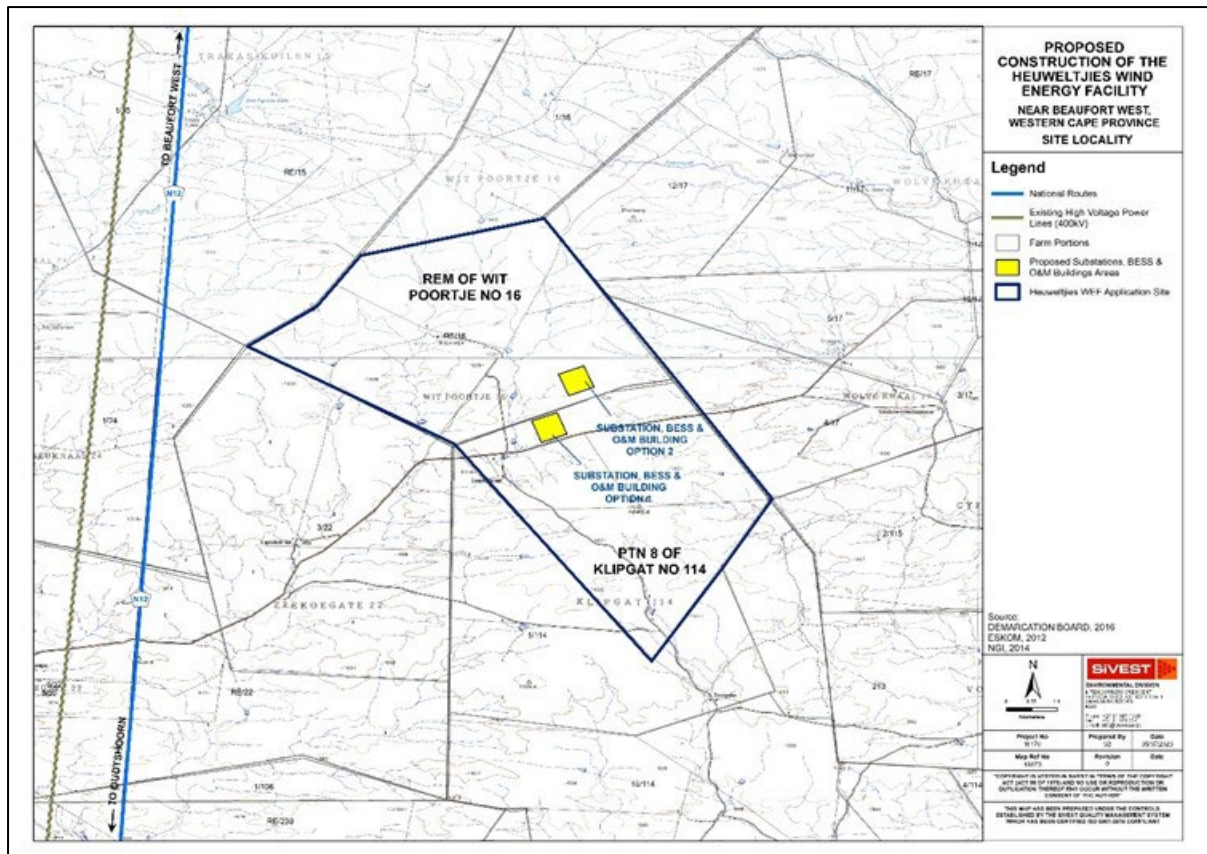


Figure 3: Site Locality Map

## 5.2 Summary of affected properties

Table 8: Summary of affected properties (including SG Codes and Farm Names)

SG CODE	DESCRIPTION
C0610000000001600000	REMAINDER OF THE FARM WITPOORTJE NO. 16
C06100000000011400008	PORTION 8 OF THE FARM KLIPGAT NO.114

## 5.3 Coordinates of the site

### COORDINATES POINTS FOR THE PROPOSED DEVELOPMENT SITE

HEUWELTJIES WEF: APPLICATION SITE		
COORDINATES AT CORNER POINTS (DD MM SS.sss)		
POINT	SOUTH	EAST
1	32° 59' 52.022"S	22° 33' 23.414"E
2	32° 59' 24.155"S	22° 34' 12.270"E
3	32° 58' 47.932"S	22° 34' 43.471"E
4	32° 58' 21.641"S	22° 36' 53.086"E
5	33° 1' 39.803"S	22° 39' 34.384"E
6	33° 3' 34.394"S	22° 38' 9.028"E
7	33° 1' 0.934"S	22° 35' 49.758"E

HEUWELTJIES WEF: APPLICATION SITE		
COORDINATES AT CORNER POINTS (DD MM SS.sss)		
POINT	SOUTH	EAST
COORDINATES AT CENTRE POINT (DD MM SS.sss)		
POINT	SOUTH	EAST
8	33° 0' 36.802"S	22° 36' 51.982"E

**COORDINATES POINTS FOR THE SUBSTATION, BESS, CONSTRUCTION LAYDOWN AND O&M BUILDING AREA**

HEUWELTJIES WEF: Proposed Substation, BESS, Construction Laydown Area & O&M Building Area (Preferred)		
COORDINATES AT CORNER POINTS (DD MM SS.sss)		
POINT	SOUTH	EAST
1	33°0'45.139"S	22°36'45.163"E
2	33°0'39.394"S	22°37'2.648"E
3	33°0'53.631"S	22°37'9.142"E
4	33°0'59.626"S	22°36'51.408"E
COORDINATES AT CENTRE POINT (DD MM SS.sss)		
POINT	SOUTH	EAST
5	33°0'49.385"S	22°36'57.153"E

HEUWELTJIES WEF: Proposed Substation, BESS, Construction Laydown Area & O&M Building Area (Alternative)		
COORDINATES AT CORNER POINTS (DD MM SS.sss)		
POINT	SOUTH	EAST
1	33°0'11.668"S	22°37'3.897"E
2	33°0'6.173"S	22°37'21.131"E
3	33°0'20.91"S	22°37'28.125"E
4	33°0'26.655"S	22°37'10.641"E
COORDINATES AT CENTRE POINT (DD MM SS.sss)		
POINT	SOUTH	EAST
5	33°0'15.915"S	22°37'15.636"E

**COORDINATES POINTS FOR THE GUARDHOUSE**

HEUWELTJIES WEF: Guardhouse		
COORDINATES AT CORNER POINTS (DD MM SS.sss)		
POINT	SOUTH	EAST
1	33°0'49.927"S	22°37'22.727"E
2	33°0'49.836"S	22°37'24.642"E
3	33°0'51.249"S	22°37'24.915"E
4	33°0'51.522"S	22°37'23.092"E
COORDINATES AT CENTRE POINT (DD MM SS.sss)		
POINT	SOUTH	EAST

HEUWELTJIES WEF: Guardhouse		
COORDINATES AT CORNER POINTS (DD MM SS.sss)		
POINT	SOUTH	EAST
5	33°0'50.747"S	22°37'23.821"E

The coordinates for the substation and substation alternatives are listed in the table above. It should be noted that the BESS, Construction laydown and Operation and Maintenance (O&M) Buildings will be housed within the substation footprint.

## 5.4 Study Area Description

According to the South African National Land Cover dataset (Geoterraimage 2018), much of the assessment area is classified as “Bare / Barren Land”, interspersed with patches of low shrubland. While some of these bare / barren areas are representative of transformation due to human activity, in most cases these patches of land are merely undisturbed areas with very sparse vegetation cover. Small tracts of grassland and forested land occur along drainage lines throughout the study area.

The predominant land use in the area (sheep farming) has not transformed the natural landscape across much of the study area to any significant degree and there are no towns or built-up areas in the study area influencing the overall visual character. Thus, there are low levels of human transformation and visual degradation across a significant portion of the study area and the natural character has been retained.

Agricultural activity in the area is restricted by the arid nature of the local climate and areas of cultivation are largely confined to relatively limited areas distributed along drainage lines. As such, the natural vegetation has been retained across much of the study area. Livestock (mostly sheep) and game farming is the dominant activity although the climatic and soil conditions have resulted in low densities of livestock and relatively large farm properties across the area. Thus, the area has a very low density of rural settlement, with relatively few isolated farmsteads in evidence. Built form in much of the study area is limited to isolated farmsteads, including farm worker’s dwellings and ancillary farm buildings, gravel access roads, telephone lines, fences and windmills.

The climate of the area is characterized by a hot semi-arid climate. Beaufort West receives a relatively low mean annual precipitation of 392 mm. The average lowest rainfall is received in June (15 mm) and the highest in March (57 mm), which is a seasonal variation of 42 mm. The maximum midday temperatures for Beaufort West ranges from 31.7°C in January to 18°C in July. The minimum temperatures for Beaufort West ranges from 16.6°C in February to 4.4°C in July. The average temperatures vary during the year by 12.9°C.

The site proposed for the Heuweltjies WEF development is located in an area largely characterised by flat to gently undulating terrain sloping at gradients less than 1:20 (5%) with minor amounts of localised areas seemingly sloping at gradients greater than 1:20, plains interspersed with low ridges and dry river courses. Areas of greater relief are largely concentrated in the northern sector of the study area. Flat to undulating terrain prevails across much of the WEF development site and along the grid connection corridors, with no steep slopes in evidence.

Refer to **Appendix D** for the summary of the specialist findings and recommendations for the Heuweltjies WEF.



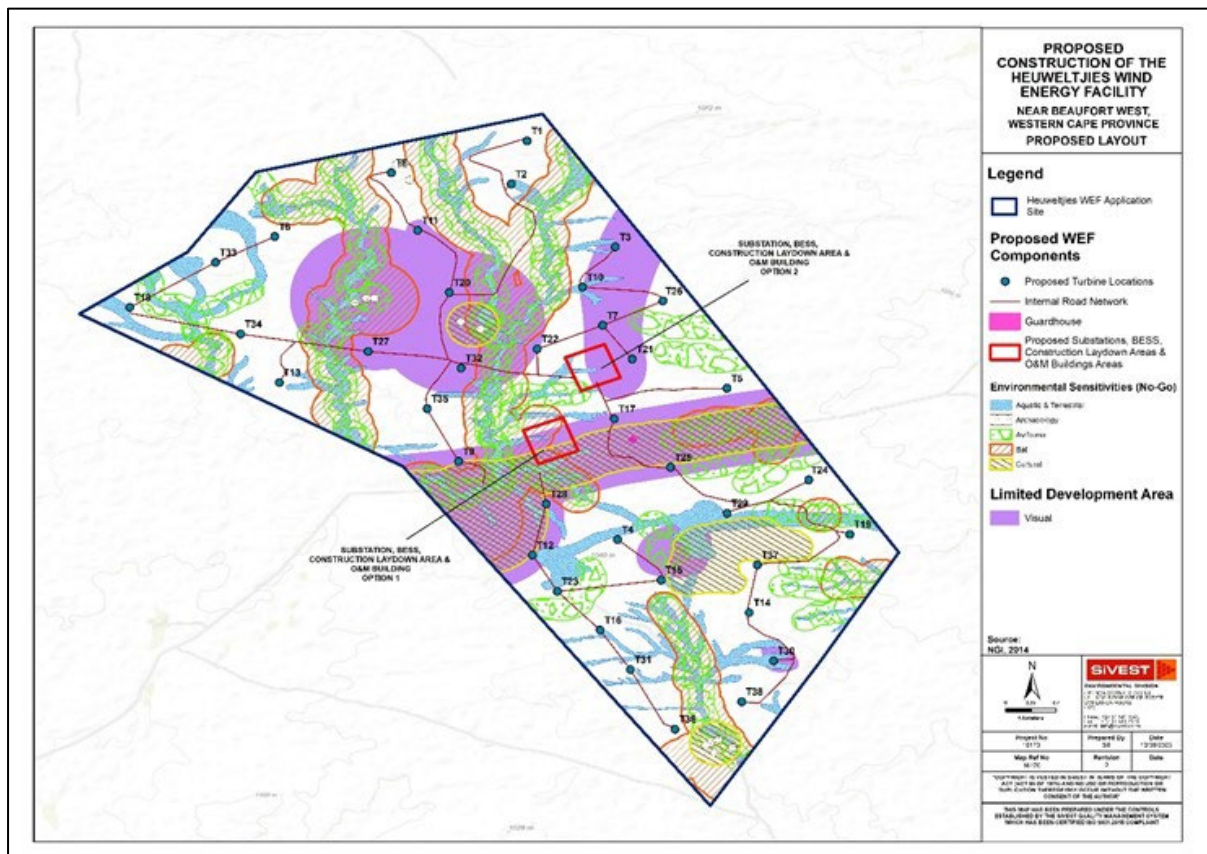


Figure 4: Proposed Layout with Sensitivity Overlay

## 6. ENVIRONMENTAL MANAGEMENT PROGRAMME

### 6.1 Introduction

The EMPr has been prepared in order to comply with the requirements as stipulated in the National Environmental Management Act (No. 107 of 1998).

This EMPr includes:

- Details and expertise of the EAP who prepared the EMPr including curriculum vitae;
- Project Description;
- Facility Illustration Plans;
- Mitigation measures as contained in the Impact Assessment Report;
- Recommendations and conclusions emanating from the specialist studies;
- Impact Management Objectives and Actions; and
- A copy of the EA (if granted).

### 6.2 Aim and Objectives of the EMPr

SOUTH AFRICA MAINSTREAM RENEWABLE POWER DEVELOPMENTS (PTY) LTD

Prepared by:



Project No. 16170  
Description Heuveltes WEF EMPr  
Revision No. 1.0

Date: 05 September 2023

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The aim of the EMPr is to:

- Identify those construction activities identified for the proposed development that may have a negative impact on the environment;
- Outline the mitigation measures that will need to be taken and the steps necessary for their implementation;
- Describe the reporting system to be undertaken during construction.

The objectives of the EMPr are to:

- Identify a range of mitigation measures which could reduce and mitigate the potential adverse impacts to minimal or insignificant levels.
- Provide a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on site.
- Provide management structures that address the comments raised by I&APs pertaining to the development.
- Ensure that the environmental specifications are identified, effective and contractually binding to enable compliance on site.

### 6.3 Layout of the EMPr

The EMPr identifies the four phases of development as:

- Preconstruction Planning Phase Activities (Section 9.1)
- Construction Phase Activities (Section 9.2)
- Operation Phase Activities (Section 9.3)
- Decommissioning Phase Activities (Section 9.4)

The generic and specific provisions are included together under each phase for each environmental consideration. The generic provisions are the general environmental issues, procedures and controls that can be applied to the project and site as a whole. The specific provisions are those environmental issues, procedures and controls that are relevant to a particular section of the site. It should be understood that the EMPr is considered an evolving document and may be amended at any time by the relevant authorities (Department of Forestry, Fisheries and the Environment (DFFE), Department of Water and Sanitation (DWS) etc.).

## 7. LEGAL AND OTHER REQUIREMENTS

### 7.1 Compliance with Applicable Laws

The supreme law of the land is “The Constitution of the Republic of South Africa”, which states: “*Every person shall have the right to an environment which is not detrimental to his or her health or wellbeing*”. Laws applicable to the protection of the environment in terms of Environmental Management (and relating to construction activities) include but are not restricted to:

- Animals Protection Act, Act No. 71 of 1962
- Astronomy Geographic Advantage (Act No. 21 of 2007)

- Civil Aviation Act (Act No.13 of 2009)
- Conservation of Agricultural Resources Act, Act No. 43 of 1983
- Development Facilitation Act No. 67 of 1995
- Environment Conservation Act, Act No. 73 of 1989
- Environmental Planning Act, Act No. 88 of 1967
- Hazardous Substances Act, Act No. 15 of 1973
- Land Survey Act, Act No. 9 of 1921
- Minerals Act, Act No. 50 of 1991
- National Environmental Management: Air Quality Act, Act No. 39 of 2004);
- National Environmental Management: Biodiversity Act, Act No. 10 of 2004, as amended)
- National Environmental Management Act, Act No.107 of 1998
- NEMA EIA Regulations, 2014 (as amended)
- National Environmental Management: Protected Areas Act (NEM: PAA) (Act No. 57 of 2003, as amended)
- National Environmental Management: Waste Act, Act No. 59 of 2008
- National Forests Act (NFA) (Act No. 84 of 1998)
- The National Heritage Resources Act, Act No. 25 of 1999
- National Water Act, Act No. 36 of 1998
- National Road Traffic (Act No. 93 of 1996, as amended)
- Occupational Health and Safety Act, Act No. 85 of 1993
- Provincial and Local Government Ordinances and Bylaws
- Soil Conservation Act, Act No. 76 of 1969
- Subdivision of Agricultural Land (Act No. 70 of 1970, as amended)
- Water Services Act, Act No. 108 of 1997

Several regulations will be applicable to the construction phase of the project. These guidelines are mentioned in the EMPr tables. The EMPr forms part of the Contract Documentation and is thus a legally binding document.

## 7.2 Compliance with the Environmental Management Programme

A copy of the EMPr must be kept on site during the construction period at all times. The EMPr will be made binding on all contractors operating on the site and will be included within the Contractual Clauses. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance with the Environmental Authorisation (EA) issued by DFFE.

It should be noted that in terms of Section 28 of the National Environmental Management Act (NEMA) Act No. 107 of 1998, those responsible for environmental damage must pay the repair costs both to the environment and human health and the preventative measures to reduce or prevent further pollution and/or environmental damage. (The polluter pays principle).

In terms of the EA, non-compliance of the EA may result in invalidation of the EA, criminal prosecution or other actions provided for in the NEMA (as amended) and associated regulations.. The contractor and developer will be held liable for any damage and consequent rehabilitation to environmentally sensitive areas outside the site boundary. In the event of any dispute concerning the significance of a particular impact, the opinion of DFFE in respect of its significance will prevail.

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

### 7.3 Specific Conditions Pertaining to Authorisations

Should DFFE issue an EA, this EMPr will be updated to include any additional pre-construction, construction, operation and decommissioning conditions stipulated in the EA not already included below.

A water use license may become applicable to the proposed project at a later stage.

Specific conditions pertaining to regulatory processes, or Licensee / Holder of the Authorisation requirements, have not been included within the EMPr and will only be included on finalization of the EMPr (pending decision). These conditions are to be undertaken by the Licensee / Holder of the Authorisation prior to the commencement of construction.

## 8. PROJECT RESPONSIBILITIES

### 8.1 Responsible Parties and associated roles

As described above, **Table 8** below provides a summary of the responsible parties and the auditing process to be carried out.

**Table 8: Responsible Parties and Auditing Process**

TITLE	PARTY	ROLE DURING CONSTRUCTION	ROLE DURING OPERATION
Project Developer (Proponent)	South Africa Mainstream Renewable Power Developments (Pty) Ltd	Assume ultimate responsibility	Assume ultimate responsibility
Project Manager	To be appointed by proponent	Project management	N/A
Contractor's Project Manager	Balance of Plant Contractor	Construction management	N/A
Main Contractor/s	There will be multiple contracts placed for the construction phase. These will cover civil earthworks and concrete, structural mechanical and electrical / instrumentation. There could also be the construction camp management contract. These may be managed by the Contractor's Project Manager (or other).	Main Contractor will undertake day to day construction activities covering aspects such as civil earthworks and concrete, structural mechanical and electrical / instrumentation.	N/A

TITLE	PARTY	ROLE DURING CONSTRUCTION	ROLE DURING OPERATION
Environmental Officer	To be appointed by Main Contractors	Day to day environmental responsibility, point of contact for ECO	N/A
Environmental Control Officer	To be appointed by Project developer	Monthly audits	Annual audits
Competent Authority	DFFE	Conduct site visits when necessary.	Conduct site visits when necessary

The above may be updated based on the outcome of the environmental process should additional responsibilities be identified.

## 9. IMPACT MANAGEMENT ACTIONS AND OUTCOMES

### 9.1 Pre-construction Phase

#### 9.1.1 Site preparation

This section deals with the issues relative to site preparation during the pre-construction phase.

**Table 9: Site preparation**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
<b>Specialist Investigations</b>	<ol style="list-style-type: none"> <li>1. An avifaunal walk-through must be undertaken by the avifaunal specialist prior to the construction commencing, to confirm the location and status of all priority species nests within the area of influence of the wind farm.</li> <li>2. Preconstruction biodiversity walk-through of the facility to micro-site roads and turbines.</li> <li>3. A preconstruction micro-survey for access roads, substations, laydown areas and gridlines should be completed with CLA specialist to ensure appropriate buffers are maintained during operational activities.</li> <li>4. Turbine layouts must adhere to the sensitivity areas and buffers, and the layout should be approved by a bat specialist upon finalisation of turbine specifications.</li> <li>5. A pre-construction walkthrough by the ecologist is recommended, who can assist with the development of the Rehabilitation and Monitoring plan, coupled to micro-siting of the final layout.</li> <li>1. A pre-construction walkthrough with an aquatic specialist is recommended and they can assist with</li> </ol>	Holder of the EA/ Relevant specialists	As per specialist requirements.	Ensure the EMP is adhered to.	

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	the development of the stormwater management plan and Aquatic Rehabilitation and Monitoring plan, coupled to micro-siting of the final layout.				
<b>Appointment of ECO</b>	2. Appoint an independent Environmental Control Officer.	Holder of the EA	Undertake regular audits	Avoid construction delays.  Ensure the EMPr is adhered to.	Pre-construction
<b>Site demarcation</b>	1. Before construction begins, all areas to be developed must be clearly demarcated with fencing or orange construction barrier where applicable. 2. All Construction Camps are to be fenced off in such a manner that unlawful entry is prevented and access is controlled. All access points to the Construction Camp should be controlled by a guard or otherwise monitored, to prevent unlawful access. 3. Records of all environmental incidents must be maintained and a copy of these records be made available to provincial department on request throughout the project execution.	Contractor	Undertake regular audits	Prevent unauthorized impact on the environment.  Ensure safety of the workers, public and prevent loss/ damage to equipment.  Ensure the conditions of the EA are adhered to.  Compliance to all legislative requirements.	Pre-construction and throughout construction.
<b>Site clearing</b>	1. Site clearing must take place in a phased manner, as and when required. 2. Areas which are not to be constructed within two months must not be cleared to reduce erosion risks. 3. The area to be cleared must be clearly demarcated and this footprint strictly maintained. 4. Spoil that is removed from the site must be removed to an approved spoil site or a licensed landfill site. 5. The necessary silt fences and erosion control measures must be implemented in areas where these risks are more prevalent.	Holder of the EA/Contractor	Undertake regular audits	Site establishment undertaken responsibly. Sensitive areas identified and avoided. Erosion management plan implemented and hydrological measures in place.	Once off

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
<b>Construction Camp</b>	<ol style="list-style-type: none"> <li>1. 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>2. All construction equipment must be stored within the construction camp.</li> <li>3. All associated oil changes etc. (no servicing) must take place within the camp over a sealed surface such as a concrete slab.</li> <li>4. An area for the storage of hazardous materials must be established that conforms to the relevant safety requirements and that provides for spillage prevention and containment.</li> <li>5. All Construction Camps shall be provided with portable fire extinguishing equipment, in accordance with all relevant legislation and must be readily accessible.</li> <li>6. The Contractor must provide sufficient ablution facilities, in the form of portable / VIP toilets, at the Construction Camps, and shall conform to all relevant health and safety standards and codes. No pit latrines, French drain systems or soak away systems shall be allowed and toilets may not be situated within 100 meters of any surface water body or 1:100-year flood line. A sufficient number of toilets shall be provided to accommodate the number of personnel working in the area.</li> <li>7. The Contractor shall inform all site staff to make use of supplied ablution facilities and under no circumstances shall indiscriminate sanitary activities be allowed.</li> </ol>	Contractor	Undertake regular audits	<p>Prevent unauthorized impact on the environment.</p> <p>Ensure safety of the public and prevent loss/ damage to equipment.</p> <p>Ensure EMP is adhered to.</p> <p>Compliance to all legislative requirements.</p>	Throughout construction



ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	8. No fires will be allowed and the Contractor must make alternative arrangements for heating. LP Gas may be used, provided that all required safety measures are in place. The Contractor shall take specific measures to prevent the spread of fires, caused by activities at the campsites. These measures may include appropriate instruction of employees about fire risks and the construction of firebreaks around the site perimeter.				
<b>Training of site staff</b>	<ol style="list-style-type: none"> <li>1. Environmental awareness training for construction staff, concerning at a minimum the general environmental awareness, conservation of fauna and flora, the prevention of accidental spillage of hazardous chemicals and oil; pollution of water resources (both surface and groundwater), air pollution and litter control and identification of archaeological artefacts.</li> <li>2. Staff operating equipment (such as loaders, etc.) shall be adequately trained and sensitised to any potential hazards associated with their tasks.</li> <li>3. No operator shall be permitted to operate critical items of mechanical equipment without having been trained by the Contractor and certified competent by the Project Manager.</li> <li>4. Staff should be educated as to the need to refrain from indiscriminate waste disposal and/or pollution of local soil and water resources and receive the necessary safety training.</li> <li>5. Staff must be trained in the hazards and required precautionary measures for dealing with these substances</li> </ol>	Contractor	Undertake regular audits	<p>All staff members are aware of the EMPr requirements relevant to them.</p> <p>All waste managed according to the approved Method Statement compiled by the contractor and approved by the engineer and reviewed by ECO.</p>	Throughout construction

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	6. Spillage packs must be available at construction areas.				
<b>SPECIFIC MITIGATION MEASURES</b>					
<b>Aspect: Protection of Riparian and Alluvial Systems</b>	<ol style="list-style-type: none"> <li>1. A detailed monitoring plan must be developed in the pre-construction phase by an aquatic specialist, where any delineated system occurs within 50 m of existing crossings.</li> <li>2. A detailed stormwater management plan and Aquatic Rehabilitation and Monitoring must be developed in the preconstruction phase, detailing the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems.</li> </ol>	Aquatic Specialist	Appointment of specialist	Protection of drainage and ecosystem services	Once off
<b>Aspect: Protection of soil resources Erosion</b>	<ol style="list-style-type: none"> <li>3. Design an effective system of stormwater run-off control, where it is required - that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all accumulation points, and it must prevent any potential down slope erosion. This is included in the stormwater management plan.</li> </ol>	Holder of the EA Engineer/Contractor	Ensure that the storm water run-off control is included in the engineering design.	That disturbance and existence of hard surfaces causes no erosion on or downstream of the site.	Once-off during the design phase.
<b>Aspect: Protection of species of special concern and terrestrial habitats</b>	<ol style="list-style-type: none"> <li>4. Develop and implement a Rehabilitation and Monitoring plan post Environmental Authorisation. This plan should include relocation of suitable plant species, but more importantly protect any topsoil stores and promote the collection of vegetative material and propagules / seed to assist with the revegetation of the site.</li> </ol>	Biodiversity Specialist	Appointment of specialist	Protection of species of special concern and terrestrial habitats	Once off

### 9.1.2 Consultation

This section deals with the issues relative to consultation during the pre-construction phase.

**Table 10: Consultation**

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
<b>Consultation</b>	<ol style="list-style-type: none"> <li>1. Provide a mechanism through which information could be exchanged between the project proponent and stakeholders.</li> <li>2. Identify relevant stakeholders and engage them at applicable stages of the EIA process.</li> <li>3. Inform the public about the proposed construction process.</li> <li>4. Surrounding communities must be kept informed, through the identified and agreed consultation channels, of the commencement of construction.</li> <li>5. Work on site to be restricted to work hours.</li> </ol>	Holder of the EA/ Contractor	As per the NEMA Regulations	Clear communication channels established.	Pre-construction and throughout construction.
<b>Noise</b>	<ol style="list-style-type: none"> <li>1. At all stages, surrounding receptors should be informed about the project, providing them with factual information without setting unrealistic expectations.</li> <li>2. The developer must implement a line of communication (i.e. a help line where complaints could be lodged). All potential sensitive receptors should be made aware of these contact numbers.</li> <li>3. The proposed WEF should maintain a commitment to the local community (people staying within 2,000 m from construction or operational activities) and respond to noise concerns in an expedient fashion. Sporadic and legitimate noise complaints could be raised. For example, sudden and sharp increases in sound levels could result from mechanical malfunctions or perforations or slits in the blades. Problems of this nature can be corrected quickly and it is in the developer's interest to do so</li> </ol>	Holder of the EA	As per specialist requirements.	<p>Clear communication channels established.</p> <p>Ensure that total daytime construction noise levels are less than 52 dBA at all potential NSDs (dwellings used for residential purposes).</p> <p>Ensure that total noise levels due to operational activities are less than 45 dBA at all potential NSDs</p>	Pre-construction and throughout construction.

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
				(dwellings used for residential purposes).  Prevent the generation of nuisance noises.	

### 9.1.3 Agriculture and Soils

This section deals with the issues relative to avifauna during the pre-construction phase.

**Table 11: Agriculture and Soils**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Protection of soil resource - Erosion	1. Design an effective system of stormwater run-off control, where it is required - that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all accumulation points and it must prevent any potential down slope erosion. This is included in the stormwater management plan.	Holder of the EA	1. Ensure that the stormwater run-off control is included in the engineering design	That disturbance and existence of hard surfaces causes no erosion on or downstream of the site	Once-off during the design phase.

### 9.1.4 Avifauna

This section deals with the issues relative to avifauna during the pre-construction phase.

**Table 12: Avifauna**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAME
<b>Avifauna: Mortality due to collisions with the turbines:</b> Mortality of priority avifauna due to collisions with the wind turbines	1. The results of the pre-construction monitoring must guide the lay-out of the turbines, especially as far as proposed no-turbine zones are concerned. No turbines must be constructed in the buffer zones which were identified based on the results of the pre-construction monitoring, with a specific view to limiting the risk of collisions to a variety of birds, including several Red Data species.	Project Developer	1. Design the facility with 200m buffers around dams and water troughs, and 150m buffers around major drainage lines. 2. A 250m circular No-Go (no turbines) buffer zone must be implemented around the Great Kestrel nest at the Heuweltjies application site 3. Implement a 5km no-turbine zone around the Martial Eagle nest on Tower 162 of the Droërivier Proteus 1 400kV HV line.	Prevent mortality of priority avifauna	Once-off during the planning phase.
<b>Avifauna: Mortality due to electrocution:</b> Electrocution of raptors on the internal 11-33kV poles	1. Use underground cabling as much as is practically possible. 2. Where the use of overhead lines is unavoidable due to technical reasons, the Avifaunal Specialist must be consulted to ensure that a raptor friendly pole design is used, and that appropriate mitigation is implemented pro-actively for complicated pole structures e.g. insulation of live components to prevent electrocutions on terminal structures and pole transformers.	Project Developer	1. Design the facility with underground cabling. 2. Consult with Avifaunal Specialist during the design phase of the overhead lines.	Prevent electrocutions	Once-off during the planning phase.

### 9.1.5 Bats

This section deals with the issues relative to bats during the pre-construction phase.

**Table 13: Bats**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Not Applicable					

### 9.1.6 Heritage

This section deals with the issues relative to Heritage during the pre-construction phase.

#### General Recommendations and Mitigation Measures

The project will encompass a range of activities during the construction phase, including vegetation clearance, excavations and infrastructure development associated with the project.

It is possible that cultural material will be exposed during construction and may be recoverable, keeping in mind delays can be costly during construction and as such must be minimised. Development surrounding infrastructure and construction of facilities results in significant disturbance, however foundation holes do offer a window into the past, and it thus may be possible to rescue some of the data and materials. It is also possible that substantial alterations will be implemented during this phase of the project, and these must be catered for. Temporary infrastructure developments are often changed or added to the project as required. In general, these are low impact developments as they are superficial, resulting in little alteration of the land surface, but still need to be catered for.

During the construction phase, it is important to recognize any significant material being unearthed, making the correct judgment on which actions should be taken. It is recommended that the following chance find procedure should be implemented as part of the Environmental Management Programme (EMPr).

### **Chance finds procedure**

- A heritage practitioner / archaeologist should be appointed to develop a heritage induction program and conduct training for the ECO as well as team leaders in the identification of heritage resources and artefacts. The ECO (following this training) can be permitted to provide similar induction and awareness training to contractors that will undertake construction of the project.
- An appropriately qualified heritage practitioner / archaeologist must be identified to be called upon if any possible heritage resources or artefacts are identified.
- Should an archaeological site or cultural material be discovered during construction (or operation), the area should be demarcated, and construction activities halted using the appropriate protocol.
- The qualified heritage practitioner / archaeologist will then need to come out to the site and evaluate the extent and importance of the heritage resources and make the necessary recommendations for mitigating the find and the impact on the heritage resource.
- An induction and training program on managing archaeological resources must be included in the induction programs for the Environmental Control/Site Officer working on the project.
- An assessment of the footprint areas must be done if the project is to commence immediately pre-construction and any findings must be handled through the Chance finds protocol.
- Construction can commence as soon as the site has been cleared and signed off by the heritage practitioner / archaeologist.

### **Possible finds during construction**

The study area occurs within a greater historical and archaeological site as identified during the desktop and fieldwork phase. Soil clearance for infrastructure as well as the proposed development activities, could uncover the following:

- High density concentrations of stone artefact; and
- Unmarked graves.

### **Timeframes**

It must be kept in mind that mitigation and monitoring of heritage resources discovered during construction activity will require permitting for collection or excavation of heritage resources and lead times must be worked into the construction time frames. Guidelines for lead times on permitting are provided below.

### **Lead times for permitting and mobilisation**

Action	Responsibility	Timeframe
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SOUTH AFRICA MAINSTREAM RENEWABLE POWER DEVELOPMENTS (PTY) LTD  
Project No. 16168  
Description Heuweltjies WEF EMP  
Revision No. 1.0

Prepared by:



Preparation for field monitoring and finalisation of contracts	The contractor and service provider	Approximately 1 month
Application for permits to do necessary mitigation work	Service provider – Archaeologist and HWC	Approximately 3 months
Documentation, excavation and archaeological report on the relevant site	Service provider – Archaeologist	Approximately 3 months
Handling of chance finds – Graves/Human Remains	Service provider – Archaeologist and HWC	Approximately 2 weeks
Relocation of burial grounds or graves in the way of construction	Service provider – Archaeologist, HWC, local government and provincial government	Approximately 6 months

**Table 14: Heritage**

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
<b>Paleontology:</b> Disturbance, damage or destruction of fossil remains preserved at or below the ground surface through site clearance of bedrock excavations.	1. Assessment of footprint areas immediately before construction commence. 2. Monitoring of substantial, deeper excavations (> 1m)	Specialist palaeontologist appointed by developer ECO / ESO	Assessment of footprint areas immediately before construction commences in sensitive sectors with recording and judicious collection of fossil material where discovered.  Curation of fossils and site data within an approved repository (museum / university palaeontological collection)	Reporting and safeguarding of significant new fossil finds (e.g. vertebrate bones, teeth, petrified wood, shells) to Heritage Western Cape for potential mitigation.	Before and going throughout Construction Phase



IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
			Visual inspection of excavations  Application of Chance Fossil Finds Protocol  Safeguarding newly exposed fossils - <i>in situ</i> , if feasible – pending mitigation.		
	3. Submission of Work Plan to / application for Fossil Collection permit from responsible Heritage Resources Agency (PRHA) 4. Recording and sampling / collection of significant new fossil finds that have been reported by ECO / ESO	Specialist palaeontologist appointed by developer	Recording of fossil material as well as associated geological data.  Professional sampling / collection of fossils.  Curation of fossils and site data within an approved repository (museum / university palaeontological collection)	Conservation and recording of new fossil material of scientific / conservation value within project area	Triggered by alert from ECO / ESO / PHRA
	5. Palaeontological mitigation reporting to responsible Heritage Resources Agency (PRHA)	Specialist palaeontologist	Submission of Fossil Collection Report to responsible Heritage Resources Agency (PRHA)	Conservation and recording of new fossil material of scientific / conservation value within project area	Following specialist palaeontological mitigation

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
<b>Archaeology</b> General project area	<ol style="list-style-type: none"> <li>1. An induction and training program on managing archaeological resources must be included in the induction programs for the Environmental Control/Site Officer working on the project.</li> <li>2. An assessment of the footprint areas must be done if the project is to commence immediately pre-construction and any findings must be handled through the Chance finds protocol.</li> <li>3. Implement chance find procedures in case where possible heritage finds are uncovered.</li> </ol>	Applicant ECO Heritage Specialist	ECO Monthly Checklist/Report	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 34-36 and 38 of NHRA	During construction and operation
<b>Archaeology</b> Graves and Burial grounds (H006, H016)	<ol style="list-style-type: none"> <li>1. The sites should be demarcated with a 50-meter no-go-buffer-zone and the graves should be avoided and left in situ.</li> <li>2. A Grave Management Plan should be developed for the graves, to be implemented during the construction and operation phases (which needs approval by HWC prior to construction).</li> <li>3. If the site is going to be impacted directly and the graves need to be removed a grave relocation process for these sites is recommended as a mitigation and management measure. This will involve the necessary social consultation and public participation process before grave relocation permits can be applied for with the HWC under the NHRA and National Health Act regulations.</li> </ol>	Applicant ECO	ECO Monthly Checklist/Report	Ensure compliance with relevant legislation and recommendations from HWC under Section 36 and 38 of NHRA	Construction
<b>Archaeology</b> - <b>Historical Structures</b> - that were rated as low heritage significance (H007, H015, H017) and don't fall within an area demarcated for development.	<ol style="list-style-type: none"> <li>1. No mitigation is required.</li> <li>2. The documentation of the site in this HIA report is sufficient and the site can be destroyed without a permit, only with the approval of this report as provided here.</li> </ol>	Holder of the EA	ECO Monthly Checklist/Report	Ensure compliance with relevant legislation and recommendations from HW under Section 36 and 38 of NHRA	Throughout Pre-Construction

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
<b>Archaeology - Historical Structures-</b> that were rated as medium heritage significance (H001, H002, H008, H014, H014/1).	<ol style="list-style-type: none"> <li>1. As the sites are located less than 100m adjacent to an existing farm road, it is possible that the sites will be impacted upon if the road is expanded.</li> <li>2. If there are plans to expand the current farm road, it is recommended that a no-go-buffer-zone of at least 30m is kept to the closest WEF infrastructure.</li> <li>3. If development occurs within 30m of the site, the structure will need to be satisfactorily studied and recorded before impact occurs.</li> <li>4. Recording of the structure i.e. (a) map indicating the position and footprint of the structure (b) photographic recording of the structure (c) measured drawings of the floor plans of the structure.</li> <li>5. A baseline report must be compiled for the site within which the recorded drawings from the previous item as well as all existing information on the structure can be included. This baseline report will then be utilised as a part of the HMP to determine any future unforeseen impacts on the heritage resources.</li> <li>6. The baseline report must be submitted to the relevant heritage authorities with a permit application in the event that the site will be impacted.</li> </ol>	Holder of the EA	ECO Monthly Checklist/Report	Ensure compliance with relevant legislation and recommendations from HW under Section 36 and 38 of NHRA	Throughout Pre-Construction
<b>Archaeology -Stone Age Sites-</b> that were rated as medium heritage significance (H013, H013/1, H013/3) but don't fall	<ol style="list-style-type: none"> <li>1. No mitigation required.</li> <li>2. A 30m buffer is recommended to retain the sites integrity.</li> <li>3. If the site can't be avoided, then it must be sampled by a qualified specialist under a permit issued by SAHRA</li> </ol>	Holder of the EA	ECO Monthly Checklist/Report	Ensure compliance with relevant legislation and recommendations from HWC under	Throughout Pre-Construction

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
within an area demarcated for development.	4. A management plan, for the heritage resources needs then to be compiled and approved for implementation during construction and operations.			Section 36 and 38 of NHRA	
<b>Cultural landscape - Ecological</b>	<ol style="list-style-type: none"> <li>1. Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), should be protected from development of the wind turbines or any associated development during all phases as far possible.</li> <li>2. No wind turbines should be placed within the 1:100-year flood line or the no-go areas specified by the wetland specialist (where advised) of the watercourses. In the context of the sensitivity to soil erosion in the area, as well as potential archaeological resources, it would be a risk to include any structures close to these drainage lines and specialist recommendations must be taken into account in this regard, as advised.</li> <li>3. Identified medicinal plants used for healing or ritual purposes should be conserved during all phases if threatened for use and continued access to these resources must be maintained.</li> <li>4. Careful planning should incorporate areas for stormwater runoff where the base of the structure disturbed the natural soil. Local rocks found on the site could be used to slow stormwater (instead of concrete, or standard edge treatments), and prevent erosion that would be an unfortunate consequence that would alter the character of the site. By using rocks from site it helps to sensitively keep to the character.</li> </ol>	Holder of the EA	Not Applicable	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 38 of NHRA	Throughout Pre-Construction

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
<b>Cultural landscape - Aesthetic</b>	<ol style="list-style-type: none"> <li>Where additional infrastructure (i.e. roads) is needed, the upgrade of existing roads to accommodate the development should be the first consideration.</li> <li>Avoid development of infrastructure (such as buildings, wind turbines and power lines), on crests or ridgelines due to the impact on the visual sensitivity of skylines. The visual impact of turbines can be reduced by distancing them from viewpoints such as roads and farmsteads and placing them in lower lying plains to reduce their impact on the surrounding sensitive cultural landscape.</li> <li>Significant and place-making viewsheds of surrounding ridgelines and distant mountain should be maintained by limiting the placement of turbines or associated infrastructure on opposing sides of any of the regional roads, so that at any time a turbine-free view can be found when travelling through the landscape or at the historic farmsteads.</li> <li>Retain view-lines and vistas focused on prominent natural features such as mountain peaks or hills, as these are important place making and orientating elements for experiencing the cultural landscape.</li> <li>Prevent the construction of new buildings/structures/ new roads on visually sensitive, steep, elevated or exposed slopes, ridgelines and hillcrests.</li> <li>Turbine and new road placement to avoid slopes steeper than 10% with existing farm roads to be used for access to turbines as far possible. The low</li> </ol>	Holder of the EA	Not Applicable	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 38 of NHRA	Throughout Pre-Construction

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<p>gradient is relative to the context of the landscape, which is flat and expansive.</p> <p>7. Due to the scenic and historic significance of the regional road, a buffer of 1000m to either side of the N12 should be maintained for no development associated with the WEF other than sensitive road upgrades, which must not impact on the views from the road.</p> <p>8. Two relevant poorts on the N12 offer views of the vast flat Koup landscape and the Heuweltjies WEF site. 1) A smaller poort alongside the Amospoortjie farmstead as one travels south on the N12 (recommended grading IIIC) which runs through one of the east west ridges of the Koup landscape. 2) On travelling north through the Meiringspoort Pass (Grade II), this portion of the N12 that travels through the Swartberg range, culminates in a poort through the last ridge of the mountain range, which opens up with dramatic views of the vast flat landscape of the Koup Karoo. This poort is located 11kms from the nearest proposed Heuweltjies turbine and is of medium sensitivity at this distance.</p> <p>9. To support the continued occupation of the homesteads on the landscape, the turbines should be placed at a suitable distance from any occupied homestead. Trakaskuilen and Lammerkraal both dated to pre-1965 can be graded IIIB and an 800m buffer would be minimum. Trakaskuilen and Lammerkraal are currently not negatively impacted by the proposed development. Any associated gravesites are graded IIIA.</p>				

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<p>10. Due to the historic and local experience of the landscape from the regional farm road running across the north of Klipgat portion, which links the historically significant farmsteads across the region, a buffer of 300m from the regional road still in use should be maintained for no development associated with the WEF other than sensitive road upgrades which must not impact on the views from the road. (200m no-go turbine buffer and 100m high sensitivity buffer where turbine placement is subject to specialist approval, if required;</p> <p>11. The preferred substation in terms of cultural landscapes assessment is location 2 as it is located further away from the regional road.</p> <p>12. The impact of WEF turbine night lighting on the wilderness landscape is intrusive and overwhelms the rural character of the landscape, giving it an industrial sense of place after dark. Reduce the impact of turbine night lighting by minimizing the number of turbines with lighting to only those necessary for aviation safety such as a few identified turbines on the outer periphery, or use aircraft triggered night lighting. Due to the reduced receptors on the roads at night, the impact of the lighting at night is reserved mainly for farmsteads and other places of overnight habitation such as the surrounding tourist facilities, which would be heavily impacted by the light pollution on a long term and ongoing basis.</p>				
<b>Cultural landscape - Historic</b>	<p>1. Due to the scenic and historic significance of the regional road, a buffer of 1000m (800m no-go</p>	Holder of the EA	Not Applicable	Ensure compliance with relevant	Throughout Pre-Construction

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<p>turbine buffer and 200m high sensitivity buffer where turbine placement is subject to specialist approval, if required) to either side of the N12 should be maintained for no development associated with the WEF other than sensitive road upgrades, which must not impact on the views from the road. The visual impact of the turbines will be 50% less at 1000m distance and therefore this distance will greatly reduce the negative visual impact of the turbines on the experience of the historic road and the values that give it significance.</p> <p>2. The integrity of the historic farmsteads and their associated cultivated areas and relationship to the riverine corridors and other natural elements should be maintained and protected. Due to the nature of the landscape being largely devoid of high vertical elements such as the proposed turbines, the introduction of turbines will fundamentally alter the sense of place and character of the landscape for those living there. Location of proposed turbines should be limited to the identified buffers around the farmsteads as far possible to limit impact to the farmsteads.</p> <p>3. Any development that impacts the inherent character of the werf component should be discouraged and a development buffer of 50m around any graded heritage structure, must be maintained, including the associated cultivated areas, cemeteries and unmarked graves, for all new infrastructure. Klipgat and Witpoortjie ruin complexes, provisionally graded IIIB, should be</p>			legislation and recommendations from SAHRA under Section 38 of NHRA	



IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<p>regarded as distinct cultural landscape features and buffers of 250m around each complex, including homesteads, graves, dams, stone kraals and other water management features are recommended.</p> <p>4. Due to the historic and local experience of the landscape from the farm roads, which link the historically significant farmsteads across the region, a buffer of 300m (200m no-go turbine buffer and 100m high sensitivity buffer where turbine placement is subject to specialist approval, if required) from the farm roads should be maintained for no development associated with the WEF other than sensitive road upgrades which must not impact on the views from the road.</p> <p>5. The existing names of places, routes, watercourses and natural features in the landscape that are related to its use, history and natural character should be retained and used as heritage resources related to intangible heritage.</p> <p>6. Burial grounds and places of worship are automatically regarded as Grade IIIa or higher. Any development that threatens the inherent character of family burial grounds must be assessed and should be discouraged. No development closer than 50m from the boundary of any burial grounds or unmarked graves. No turbines have been proposed for placement near known unmarked burials or family cemeteries. A preconstruction micro-survey of each turbine footprint and any new access roads should be conducted to ensure no</p>				

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<p>further unmarked graves are threatened. These recommendations should be considered together with the AIA report and the AIA recommendations should take preference for stand-alone burial grounds or graves where they are not associated with other heritage features or cultural landscape elements.</p> <p>7. Respect existing patterns, typologies and traditions of settlement-making by promoting the continuity of heritage features. These include: (a) indigenous; (b) colonial; and (c) current living heritage in the form of tangible and intangible associations to place.</p> <p>8. Alterations and additions to conservation-worthy structures should be sympathetic to their architectural character and period detailing.</p>				
<b>Cultural landscape - Socio-economic</b>	<p>1. The findings of this report must be shared with identified interested and affected parties, including non-landowner residents on the development properties, in the EIA public participation process in order to further ascertain any intangible cultural resources that may exist on the landscape that have not been identified. A specialist qualified in recognizing and discussing the significance of intangible heritage resources should be present during the public meetings. The findings should inform the recommendations for appropriate mitigation for impacts to the cultural landscape.</p> <p>2. The continued use of the landscape for human habitation and cultivation by historic residents of the area, should be retained and encouraged as far</p>	Holder of the EA	Not Applicable	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 38 of NHRA	Throughout Pre-Construction

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<p>possible to sustain the continual use pattern and human-environment relationship which is the ultimate significance of this cultural landscape element. The WEF development must allow and support this, including financially, and not degrade this continued relationship.</p> <p>3. The local community on and around the development should benefit from job opportunities created by the proposed development and the development should not cause reduction in economic viability of surrounding properties in excess of those offered by the development. Short-term job opportunities at the expense of long term economic benefit and local employment opportunities must be prevented.</p> <p>4. Local residents must be offered the opportunity for employment on the construction/ decommissioning and operational phases before 'importing' staff from elsewhere.</p> <p>5. Local residents must be offered employment training opportunities associated with WEF developments at all phases.</p>				

### 9.1.7 Noise

This section deals with the issues relative to noise during the Planning phase.

**Table 13: Environmental Management for planning phase**

<b>Objective:</b> Future project activities not to result in disturbing noises		
<b>Project Components:</b>	Future construction activities and operation of WTG	
<b>Potential Impact:</b>	No noise impact during the planning phase	
<b>Activity/Risk source</b>	Future construction activities and operation of WTG	
<b>Mitigation: Target</b>	Night-time noise levels less than 42 dBA (construction phase) and 45 dBA (operational phase) at locations used for residential purposes	
<b>Mitigation: Action / Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Applicant to re-evaluate the noise impact should the layout be revised where any new WTG are introduced within 1,500 m from an NSR	Applicant	Planning phase, before development of WEF
Applicant to re-evaluate the noise impact should the layout be revised where the number of WTG within 2,500 m from an NSR are increased	Applicant	Planning phase, before development of WEF
Applicant to select and implement mitigation measures to ensure that operational noise levels are less than 45 dBA at all verified NSR (if the dwellings will be used for residential purposes during the operational phase)	Applicant	Planning phase, before development of WEF
Applicant to re-evaluate the noise impact once the WTG layout and WTG specifications was finalised	Applicant	Planning phase, before development of WEF
Design and implementation of a noise monitoring programme to define current ambient sound levels at selected NSR before the construction phase start.	ECO	Before the construction phase start
<b>Performance Indicator</b>	Calculated noise levels should be less than 42 dBA at NSR (at night during the construction phase) and less than 45 dBA (at night during the operational phase) at structures used residential purposes	
<b>Monitoring</b>	No monitoring required during planning phase	

### 9.1.8 Visual

This section deals with the issues relative to visual during the planning phase.

**Table 15: Visual**

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Potential alteration of the visual character and sense of place.  Potential visual impact on receptors in the study area.  Potential visual impact on the night time visual environment.	<ol style="list-style-type: none"><li>1. Where possible, fewer but larger turbines with a greater output should be utilised rather than a larger number of smaller turbines with a lower capacity.</li><li>2. Where possible, the operation and maintenance buildings and laydown areas should be consolidated to reduce visual clutter.</li><li>3. Where possible, underground cabling should be utilised.</li><li>4. Turbines should not be located within 800m of an occupied building to avoid shadow flicker impacts.</li></ol>	Holder of the EA/Contractor	As per specialist requirements.	Reduced visual impact	During Design

## 9.2 Construction Phase

### 9.2.1 Construction Camp

This section deals with the issues relative to the construction camp during the construction phase.

**Table 16: Construction Camp**

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAME
<b>Construction Camp:</b> Site of construction camp	<ol style="list-style-type: none"> <li>1. The size of the construction camp must be aligned to the approved laydown area.</li> <li>2. Adequate parking must be provided for site staff and visitors. The Contractor must attend to drainage of the camp site to avoid standing water and / or sheet erosion.</li> <li>3. Suitable control measures over the Contractor's yard, plant and material storage to mitigate any visual impact of the construction activity must be implemented.</li> <li>4. No construction should occur in an area of high or unique agricultural value, or in an area under cultivation.</li> </ol>	Holder of the EA/Contractor	Undertake regular audits	<p>Ensure the conditions of the EA are adhered to.</p> <p>Compliance to all legislative requirements.</p> <p>Impacts avoided or managed as per specialist recommendations.</p>	Once-off
<b>Construction Camp:</b> Storage of materials (including hazardous materials)	<ol style="list-style-type: none"> <li>1. Choice of location for storage areas must take into account prevailing winds, distances to water bodies, general onsite topography and water erosion potential of the soil. Impervious surfaces must be provided where necessary.</li> <li>2. Storage areas must be designated, demarcated and fenced if necessary.</li> </ol>	Holder of the EA/Contractor	As per specialist requirements.	<p>Choice of storage areas carefully considered to avoid impact to environment</p> <p>Correct handling, storage and/or disposal</p>	Throughout Construction

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAME
	<p>3. Storage areas should be secure so as to minimize the risk of crime. They should also be safe from access by unauthorised persons i.e. children / animals etc.</p> <p>4. Fire prevention facilities must be present at all storage facilities.</p> <p>5. Storage areas containing chemical substances / materials must be clearly sign posted.</p> <p>6. Proper storage facilities for the storage of oils, paints, grease, fuels, chemicals and any hazardous materials to be used must be provided to prevent the migration of spillage into the ground and groundwater regime around the temporary storage area(s). These pollution prevention measures for storage must include a bund wall high enough to contain at least 110% of any stored volume, and this must be sited away from drainage lines in a site with the approval of the Project Manager. 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 stormwater events.</p> <p>7. These storage facilities (including any tanks) must be on an impermeable surface that is protected from the ingress of storm water from surrounding areas and that will not infiltrate into the ground in order to ensure that accidental spillage does not pollute local soil or water resources.</p> <p>8. All fuel storage areas must be roofed to avoid creation of dirty stormwater</p>			<p>and/or cleanup of all materials to prevent impact to environment</p> <p>All hazardous substances managed according to approved Method Statement.</p>	

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAME
	<p>9. Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals to be used on site. Where possible the available, MSDS's must additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes.</p> <p>10. Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures.</p> <p>11. An approved waste disposal contractor must be employed to remove and recycle waste oil, if practical. The contractor must ensure that its staff is made aware of the health risks associated with any hazardous substances used and has been provided with the appropriate protective clothing/equipment in case of spillages or accidents and have received the necessary training.</p> <p>12. All excess cement and concrete mixes are to be contained on the construction site prior to disposal off site.</p> <p>13. All major spills as specified in the contractor emergency response procedure of any materials, chemicals, fuels or other potentially hazardous or pollutant substances must be cleaned immediately and the cause of the spill investigated. Preventative measures must be identified and submitted to the MC and ECO for information. Emergency response procedures to be followed and implemented.</p>				



IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAME
<b>Construction Camp:</b> Drainage of construction camp	<ol style="list-style-type: none"> <li>1. Surface drainage measures must be established in the Construction Camps so as to prevent <ul style="list-style-type: none"> <li>• Ponding of water;</li> <li>• Erosion as a result of accelerated runoff; and,</li> </ul> </li> <li>2. Uncontrolled discharge of polluted runoff.</li> </ol>	Holder of the EA/Contractor	As per specialist requirements.	<p>Storm Management Plan provided and accepted prior to construction commencing</p> <p>Storm Management Plan implemented</p> <p>Erosion plan implemented and hydrological measures in place.</p>	Throughout Construction

## 9.2.2 Construction traffic and access

This section deals with the issues relative to construction traffic and access during the construction phase.

**Table 17: Construction Traffic and Access**

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
<b>Construction Traffic and Access:</b> Construction Traffic	<ol style="list-style-type: none"> <li>1. Construction routes and required access roads must be clearly defined.</li> <li>2. Delivery of equipment must be undertaken with the minimum amount of trips to reduce the carbon footprint of these activities</li> </ol>	Holder of the EA/Contractor	As per specialist requirements.	A traffic management strategy developed and implemented throughout the	Throughout Construction

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<ol style="list-style-type: none"> <li>Access of all construction and material delivery vehicles should be strictly controlled, especially during wet weather to avoid compaction and damage to the topsoil structure.</li> <li>Damping down of the un-surfaced roads must be implemented to reduce dust and nuisance.</li> <li>Vehicles and equipment shall be serviced regularly to avoid the contamination of soil from oil and hydraulic fluid leaks etc.</li> <li>Servicing must be done in dedicated service areas on site or else off site if no such area exists.</li> <li>Oil changes must take place on a concrete platform and over a drip tray to avoid pollution.</li> <li>Soils compacted by construction shall be deep ripped to loosen compacted layers and re-graded to even running levels.</li> </ol>			<p>construction and operation phases.</p> <p>Storm Water Management Plan implemented</p> <p>Ensure the EMP is adhered to</p>	
<b>Construction Traffic and Access:</b> Access	<ol style="list-style-type: none"> <li>The main routes on the site must be clearly sign posted and printed delivery maps must be issued to all suppliers and Sub-contractors.</li> <li>Planning of access routes to the site for construction purposes shall be done in conjunction with the Contractor and the Landowner. All agreements reached should be documented and no verbal agreements should be made. The Contractor shall clearly mark all access roads. Roads not to be used shall be marked with a "NO ENTRY for construction vehicles" sign.</li> <li>Access to the site must be via secondary roads as requested by SANRAL.</li> </ol>	Holder of the EA/Contractor	As per specialist requirements.	A traffic management Strategy developed and Implemented throughout the construction and operation phases.	Throughout Construction

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
<b>Construction Traffic and Access:</b> Road Maintenance	<ol style="list-style-type: none"> <li>Where necessary suitable measures shall be taken to rehabilitate damaged areas.</li> <li>Contractors should ensure that access roads are maintained in good condition by attending to potholes, corrugations and stormwater damages as soon as these develop.</li> <li>If necessary, staff must be employed to clean surfaced roads adjacent to construction sites where materials have spilt.</li> <li>Recommendations of the surface water report must be taken into consideration.</li> </ol>	Holder of the EA/Contractor	Undertake regular audits	A traffic management Strategy developed and Implemented throughout the construction and operation phases.	Throughout Construction
<b>Construction Traffic and Access:</b> General	<ol style="list-style-type: none"> <li>The contractor shall meet safety requirements under all circumstances. All equipment transported shall be clearly labelled as to their potential hazards according to specifications. All the required safety labelling on the containers and trucks used shall be in place.</li> <li>The Contractor shall ensure that all the necessary precautions against damage to the environment and injury to persons are taken.</li> <li>Care for the safety and security of community members crossing access roads should receive priority at all times.</li> </ol>	Holder of the EA	Undertake regular audits	<p>A traffic management Strategy developed and Implemented throughout the construction and operation phases.</p> <p>Adhere to Health and Safety Regulations</p>	Throughout Construction

### 9.2.3 Environmental Education and Training

This section deals with the issues relative to environmental education and training during the construction phase.

**Table 18: Environmental Education and Training**

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
<b>Environmental Education and Training:</b> Environmental Training	<ol style="list-style-type: none"> <li>1. Ensure that all site personnel have a basic level of environmental awareness training. The Contractor must submit a proposal for this training to the ECO for approval. Translators are to be used where necessary. Topics covered should include: <ul style="list-style-type: none"> <li>• What is meant by “Environment”</li> <li>• Why the environment needs to be protected and conserved</li> <li>• How construction activities can impact on the environment</li> <li>• What can be done to mitigate against such impacts</li> <li>• Awareness of emergency and spills response provisions</li> <li>• Social responsibility during construction e.g. being considerate to local residents</li> </ul> </li> <li>2. It is the Contractor's responsibility to provide the site foreman with no less than 1 hour's environmental training and to ensure that the foreman has sufficient understanding to pass this information onto the construction staff.</li> <li>3. Training should be provided to the staff members in the use of the appropriate fire-fighting equipment.</li> <li>4. Use should be made of environmental awareness posters on site.</li> <li>5. The need for a “clean site” policy also needs to be explained to the workers.</li> </ol>	Contractor	Undertake regular audits	All construction staff are aware of their environmental responsibility while undertaking their construction work	Throughout Construction

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	6. Staff operating equipment (such as loaders, etc.) shall be adequately trained and sensitized to any potential hazards associated with their tasks.				
<b>Environmental Education and Training:</b> Monitoring of environmental training	1. The Contractor must monitor the performance of construction workers to ensure that the points relayed during their introduction 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.	Contractor	Undertake regular audits	Thorough induction to site.	Throughout Construction

## 9.2.4 Waste Management

This section deals with the issues relative to waste management during the construction phase.

**Table 19: Waste Management**

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
<b>Waste Management:</b> Litter management/general waste	<ol style="list-style-type: none"> <li>1. Refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction site.</li> <li>2. The Contractor shall supply waste collection bins where such is not available, and all solid waste collected shall be disposed of at registered/licensed landfill.</li> <li>3. A housekeeping team should be appointed to regularly maintain the litter and rubble situation on the construction site.</li> <li>4. If possible and feasible, all waste generated on site must be separated into glass, plastic, paper, metal and wood and recycled. An independent contractor can be appointed to conduct this recycling.</li> <li>5. Littering by the employees of the Contractor shall not be allowed under any circumstances.</li> <li>6. Skip waste containers should be maintained on site. These should be kept covered and arrangements made for them to be collected regularly.</li> <li>7. All waste must be removed from the site and transported to a landfill site promptly to ensure that it does not attract vermin or produce odours.</li> <li>8. The Contractor shall provide a method statement with regard to waste management.</li> <li>9. A certificate of disposal shall be obtained by the Contractor and kept on file, if relevant.</li> </ol>	Contractor  The ECO shall monitor the neatness of the work sites as well as the Contractor campsite.	All waste managed according to approved Method Statement	Throughout Construction

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	10. Under no circumstances may solid waste be burnt on site. 11. All waste must be removed promptly to ensure that it does not attract vermin or produce odours.			
<b>Waste Management:</b> Hazardous waste	1. All waste hazardous materials, if present, must be carefully and appropriately stored, and then disposed of off-site at a licensed landfill site, where practical. 2. Contaminants to be stored safely to avoid spillage. 3. Machinery must be properly maintained to keep oil leaks in check 4. All necessary precaution measures shall be taken to prevent soil or surface water pollution from hazardous materials used during construction and any spills shall immediately be cleaned up and all affected areas rehabilitated.	Contractor	All waste managed according to approved Method Statement	Throughout Construction
<b>Waste Management:</b> Sanitation	1. The Contractor shall install mobile chemical toilets on the site. 2. The construction of "Long Drop" toilets are forbidden. Rather, portable toilets are to be used. 3. Staff shall be sensitised to the fact that they should use these facilities at all times. No indiscriminate sanitary activities on site shall be allowed. Under no circumstances may open areas, neighbours fences or the surrounding bush be used as a toilet facility. 4. Ablution facilities shall be within proximity from workplaces and not closer than 100m from any natural water bodies or boreholes. There should be enough toilets available to accommodate the workforce (minimum requirement 1: 15 workers).	Contractor	Staff members aware of EMP requirements and ablutions used and maintained accordingly	Throughout Construction

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<p>Male and females must be accommodated separately where possible.</p> <p>5. Toilets shall be serviced regularly and the ECO shall inspect toilets regularly.</p> <p>6. Potable water must be provided for all construction staff.</p>			
<b>Waste Management:</b> Remedial Actions	<p>1. In the event of an accidental spill or leakage of hazardous substances, such incident(s) must be reported to all relevant authorities, including the Directorate: Pollution and Chemicals Management, in accordance with section 30(5) of the NEMA, 1998 pertaining to the control of incidents.</p> <p>2. Depending on the nature and extent of the spill, contaminated soil must be either excavated or treated on-site.</p> <p>3. Excavation of contaminated soil must involve careful removal of soil using appropriate tools/machinery to storage containers until treated or disposed of at a licensed hazardous landfill site.</p> <p>4. The precise method of treatment for polluted soil must be identified by a suitable specialist. This could involve the application of soil absorbent materials as well as oil-digestive powders to the contaminated soil.</p> <p>5. If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent material.</p> <p>6. If necessary, oil absorbent sheets or pads must be attached to leaky machinery or infrastructure.</p>	Contractor	All waste managed according to approved Method Statement	Throughout Construction



IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<p>7. Materials used for the remediation of petrochemical spills must be used according to product specifications and guidance for use.</p> <p>8. 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.</p>			

### 9.2.5 Agriculture and Soils

This section deals with the issues relative to agriculture and soils during the construction phase.

**Table 20: Agriculture and Soils**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Aspect: Protection of soil resources <b>Erosion</b>	1. Implement an effective system of storm water run-off control, where it is required - that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all accumulation points and it must prevent any potential down slope erosion.	ECO	Undertake a periodic site inspection to verify and inspect the effectiveness and integrity of the storm water run-off control system and to specifically record the occurrence of any erosion on site or downstream. Corrective action must be implemented to the run-off control system in the event of any erosion occurring.	That disturbance and existence of hard surfaces causes no erosion on or downstream of the site.	Every 2 months during the construction phase
Aspect: Protection of soil resources <b>Erosion</b>	1. Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize disturbed soil against erosion.	ECO	Undertake a periodic site inspection to record the occurrence of and re-vegetation	That vegetation clearing does not pose a high erosion risk.	Every 4 months during the construction phase

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
			progress of all areas that require re-vegetation.		
Aspect: Protection of soil resources <b>Topsoil loss</b>	1. If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re-spreading during rehabilitation. During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.	ECO	Record GPS positions of all occurrences of below-surface soil disturbance (e.g. excavations). Record the date of topsoil stripping and replacement. Check that topsoil covers the entire disturbed area.	That topsoil loss is minimised	As required, whenever areas are disturbed.

### 9.2.6 Avifauna

This section deals with the issues relative to avifauna during the construction phase (including pre and post construction activities).

**Table 21: Avifauna**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Avifauna: Displacement due to disturbance associated with the construction of the wind turbines and associated infrastructure	A site-specific CEMPr must be implemented, which gives appropriate and detailed description of how construction activities must be conducted. All contractors are to adhere to the CEMPr and should apply good environmental practice during construction. The CEMPr must specifically include the following:  1. No off-road driving; 2. Maximum use of existing roads, where possible; 3. Measures to control noise and dust according to latest best practice; 4. Restricted access to the rest of the property;	Contractor & ECO	1. Implementation of the CEMPr. Oversee activities to ensure that the CEMPr is implemented and enforced via site audits and inspections. Report and record any non-compliance.  2. Ensure that construction personnel are made aware of the impacts relating to off-road driving.	Prevent unnecessary displacement of avifauna by ensuring that contractors are aware of the requirements of the Construction EMPr (CEMPr.)	1. On a daily basis 2. Weekly 3. Weekly 4. Weekly 5. Weekly

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
The noise and movement associated with the construction activities at the development footprint will be a source of disturbance which would lead to the displacement of avifauna from the area.	5. Strict application of all recommendations in the botanical specialist report pertaining to the limitation of the footprint.		3. Construction access roads must be demarcated clearly. Undertake site inspections to verify. 4. Monitor the implementation of noise control mechanisms via site inspections and record and report non-compliance. 5. Ensure that the construction area is demarcated clearly and that construction personnel are made aware of these demarcations. Monitor via site inspections and report non-compliance.		
Avifauna: Displacement due to habitat transformation associated with the construction of the wind turbines and associated infrastructure	1. Implement rehabilitation of vegetation. 2. Monitor rehabilitation via site audits and site inspections to ensure compliance. Record and report any non-compliance. 3. Vehicle and pedestrian access to the site should be controlled and restricted to the facility footprint as much as possible to prevent unnecessary destruction of vegetation.	Operations Manager /SHE Manager	1. Appointment of rehabilitation specialist to develop Habitat Restoration Plan (HRP). 2. Site inspections to monitor progress of HRP.	Prevent unnecessary displacement of avifauna by ensuring that the rehabilitation of transformed areas is implemented by an appropriately qualified rehabilitation specialist, according to the recommendations of	1. Once-off 2. Once a year

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Total or partial displacement of avifauna due to habitat transformation associated with the vegetation clearance and the presence of the wind turbines and associated infrastructure.				the botanical specialist study.	

### 9.2.7 Bats

This section deals with the issues relative to bats during the construction phase.

**Table 22: Bats**

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
The destruction of active bat roost and features that could serve as bat roosts, such as rock formations,	<ul style="list-style-type: none"> <li>Mitigate disturbance due to construction activities.</li> </ul>	<ol style="list-style-type: none"> <li>Apart from associated infrastructure, construction activities to be kept out of all high bat sensitive areas as far as possible.</li> <li>Rock formations should be avoided during construction as far as possible.</li> </ol>	<ul style="list-style-type: none"> <li>Monitor the efficiency of the EMPR.</li> <li>Monitor whether proposed measures are adhered to.</li> </ul>	<ul style="list-style-type: none"> <li>During construction phase.</li> </ul>	<ul style="list-style-type: none"> <li>Project Developer</li> <li>Bat specialist and ECO.</li> </ul>

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
removal of trees on site, destruction of derelict holes and fragmentation of habitat.		<ol style="list-style-type: none"> <li>3. Destruction of trees should be avoided as far as possible and in cases where trees have to be destroyed, care should be taken not to destroy bat roosts.</li> <li>4. Care should be taken if any dense bushes are destroyed so that no roosts are disturbed or destroyed.</li> <li>5. Aardvark holes or any large derelict holes or excavations should not be destroyed before careful examination for bats.</li> <li>6. The Environmental Control Officer (ECO), or a responsible appointed person, should contact a bat specialist before construction commences so that they know what to look out for during construction.</li> </ol>	<ul style="list-style-type: none"> <li>ECO should be trained to recognize bat species and roost locations before construction starts.</li> </ul>		
Creating new habitat amongst the turbines which might attract bats. This includes buildings with roofs that could serve as roosting space or open water sources from quarries or excavation where water could accumulate.	Creating features which attract bats	<ol style="list-style-type: none"> <li>1. Completely seal off roofs of new buildings (e.g., substations and site buildings). Note, a small bat species could enter a hole the size of 1 cm<sup>2</sup>.</li> <li>2. Roofs need to be regularly inspected during the lifetime of the WEF, and any new holes need to be sealed.</li> <li>3. Excavation areas, quarries or any other artificial depressions should be filled and rehabilitated to avoid creating new areas of open water sources which could attract bats during rainy spells.</li> </ol>	<ul style="list-style-type: none"> <li>Visual inspection and continuous monitoring of high sensitivity areas, erosion prevention, chemical pollution and vehicle activity to prevent habitat destruction.</li> <li>If buildings, trees or structures providing potential roosts need to be demolished, the ECO is required to investigate the features before commencement of the works.</li> </ul>	<ul style="list-style-type: none"> <li>Throughout construction</li> <li>ECO to be present during all site clearance activities</li> <li>Access to bat specialist if ECO needs information or confirmation concerning bat presence</li> </ul>	<ul style="list-style-type: none"> <li>Project Developer.</li> <li>Holder of EA to appoint ECO.</li> <li>Appointed bat specialist to train the ECO, if necessary.</li> </ul>

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
Construction noise, especially at night as well as light disturbance	Mitigate disturbance due to construction activities	<ol style="list-style-type: none"> <li>1. Nightly construction activities should be avoided, or if necessary, minimised to the shortest period possible.</li> <li>2. Except for compulsory civil aviation lighting, artificial lighting during construction should be minimised, especially bright lights or spotlights.</li> <li>3. Apart from avian lighting specifications, lights should avoid skyward illumination.</li> <li>4. Turbine tower lights should be switched off when not in operation, where possible.</li> </ol>	<ul style="list-style-type: none"> <li>• Monitor the efficiency of the EMPR.</li> <li>• Monitor whether proposed measures are adhered to.</li> </ul>	<ul style="list-style-type: none"> <li>• During construction phase.</li> </ul>	<ul style="list-style-type: none"> <li>• Project Developer</li> <li>• Bat specialist and ECO.</li> </ul>

## 9.2.8 Biodiversity

This section deals with the issues relative to biodiversity during the construction phase.

**Table 23: Biodiversity**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
<p>Loss of species of special concern:</p> <p>The construction activities will result in the disturbance of terrestrial habitats that contain listed and or protected plant or animal species. However, none of</p>	<ol style="list-style-type: none"> <li>1. Develop and implement a Rehabilitation and Monitoring plan post Environmental Authorisation. This plan should include relocation of suitable plant species, but more importantly protect any topsoil stores and promote the collection of vegetative material and propagules / seed to assist with the revegetation of the site.</li> <li>2. Rapid regeneration of plant cover must be encouraged by setting aside topsoil during</li> </ol>	Holder of the EA ECO/specialist	Construction Monitoring and audit reports	<p>Impacts avoided or managed as per specialist recommendations.</p> <p>Rehabilitation and Monitoring plan developed and implemented.</p>	Throughout Construction

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
the plant species were observed during this assessment within the buildable area.	earthmoving and replacing onto areas where the re-establishment of plant cover is desirable to prevent erosion.			Ensure the conditions of the EA are adhered to.	
Loss of terrestrial habitats – flora and vegetation: The construction of the proposed infrastructure will require the need to clear vegetation which could then have a secondary impact on ecological connectivity and especially Critical Biodiversity Areas, linked to the large riverine corridors.	<ol style="list-style-type: none"> <li>1. The development of a Rehabilitation and Monitoring plan prior to construction. All alien plant re-growth, which is currently low within the greater region must be monitored and should it occur, these plants must be eradicated within the project footprints.</li> <li>2. Rapid regeneration of plant cover must be encouraged by setting aside topsoil during earthmoving and replacing onto areas where the re-establishment of plant cover is desirable to prevent erosion.</li> </ol>	Holder of the EA ECO/specialist	Construction Monitoring and audit reports	<p>Impacts avoided or managed as per specialist recommendations.</p> <p>Rehabilitation and Monitoring plan developed and implemented.</p> <p>Ensure the conditions of the EA are adhered to.</p>	Throughout Construction
Loss of terrestrial species – fauna: Although most of the species observed are mobile, the increase in vehicle movement could result in an increase in road mortalities.	<ol style="list-style-type: none"> <li>1. Clear demarcation during the construction phase of all undisturbed sensitive areas that are not within the direct footprint of the REF to ensure that there is no uncontrolled access by construction vehicles and labourers.</li> <li>2. ECO / EO (whichever is applicable) must be present on a daily basis to remove any reptiles such as the Karoo Padloper if present.</li> <li>3. Educate contractors as to the importance of the undisturbed conservation areas and importance of avoiding them;</li> <li>4. All vehicles must stick to designated and prepared roads and adhere to the speed limit on site of 40km/hr.</li> </ol>	Holder of the EA ECO/specialist	Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations.	Throughout Construction

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
	5. Mitigating the risk of poaching by fencing in the accommodation compounds of the construction crews, to prevent individuals from wandering in the veld after hours; banning the possession of dogs on site by construction and maintenance staff.				

### 9.2.9 Aquatic/Surface Water

This section deals with the issues relative to aquatic/surface water during the construction phase.

**Table 24: Aquatic/ Surface Water**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
<p>Loss of aquatic species of special concern</p> <p>The construction activities will result in the disturbance of aquatic habitats that may contain listed and or protected plant or animal species. However, none of these were observed during this assessment within the buildable areas proposed.</p>	<p>1. Develop and implementation of a Rehabilitation and Monitoring plan post Environmental Authorisation. This must be developed following the finalisation of the turbine / road layout and a walk down has been completed. This plan should include relocation of suitable plant species, but more important protect any topsoil stores and promote the collection of vegetative material and propagules / seed to assist with the revegetation of the site, if and where possible.</p> <p>2. Rapid regeneration of plant cover must be encouraged by setting aside topsoil during earthmoving and replacing onto areas where the re-establishment of plant cover is desirable to prevent erosion.</p>	Holder of the EA	Construction Monitoring and audit reports	<p>Impacts avoided or managed as per specialist recommendations.</p> <p>Ensure the conditions of the EA are adhered to.</p>	Throughout Construction



ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
<p>Damage or loss of riparian and alluvial systems in the construction phase:</p> <p>Construction could result in the loss of drainage systems that are fully functional and provide ecosystem services within the site especially where new access roads are required or road upgrades will widen any current bridges or drifts. Loss can also include a functional loss, through change in vegetation type via alien encroachment for example.</p>	<ol style="list-style-type: none"> <li>1. Development of a detailed stormwater management plan and Aquatic Rehabilitation and Monitoring plan, prior to construction.</li> <li>2. All alien plant re-growth, which is currently low within the greater region must be monitored and should it occur, these plants must be eradicated within the project footprints and especially in areas near the proposed crossings. Where roads and crossings are upgraded, the following applies:</li> <li>3. Existing pipe culverts must be removed and replaced with suitable sized box culverts, especially where road levels are raised to accommodate any large vehicles.</li> <li>4. River levels, regardless of the current state of the river / water course, must be reinstated thus preventing any impoundments from being formed.</li> <li>5. Where large cut and fill areas are required these must be stabilised and rehabilitated during the construction process, to minimise erosion and sedimentation.</li> <li>6. Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use during the construction phase. Any erosion / sedimentation must be resolved through whatever additional interventions maybe necessary (i.e., extension, energy dissipaters, spreaders, etc).</li> <li>7. A detailed monitoring plan must be developed in the pre-construction phase by an aquatic specialist, where any delineated system occurs within 50 m of existing crossings.</li> </ol>	Holder of the EA	Construction Monitoring and audit reports	<p>Impacts avoided or managed as per specialist recommendations.</p> <p>Ensure the conditions of the EA are adhered to.</p>	Throughout Construction

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
<p>Potential impact on localised surface water quality (construction materials and fuel storage facilities) during the construction and decommissioning phases:</p> <p>During construction earthworks will expose and mobilise earth materials, and a number of materials as well as chemicals will be imported and used on site and may end up in the surface water, including soaps, oils, grease and fuels, human wastes, cementitious wastes, paints and solvents, etc. Any spills during transport or while works area conducted in proximity to a watercourse has the potential to affect the surrounding biota. Leaks or spills from storage facilities also pose a risk and due consideration to the safe design and management of the storage facility must be given. Although unlikely, consideration must also be provided for the proposed BESS, with regard safe</p>	<ol style="list-style-type: none"> <li>1. All liquid chemicals including fuels and oil, including the BESS must be stored in with secondary containment (bunds or containers or berms) that can contain a leak or spill. Such facilities must be inspected routinely and must have the suitable PPE and spill kits needed to contain likely worst-case scenario leak or spill in that facility, safely.</li> <li>2. Washing and cleaning of equipment must be done in designated wash bays, where rinse water is contained in evaporation/sedimentation ponds (to capture oils, grease cement and sediment).</li> <li>3. Mechanical plant and bowsters must not be refuelled or serviced within 100m of a river channel.</li> <li>4. All construction camps, lay down areas, wash bays, batching plants or areas and any stores should be more than 50 m from any demarcated water courses.</li> <li>5. Littering and contamination associated with construction activity must be avoided through effective construction camp management.</li> <li>6. No stockpiling should take place within or near a water course.</li> <li>7. stockpiles must be protected and located in flat areas where run-off will be minimised, and sediment is recoverable.</li> </ol>	Holder of the EA	Construction Monitoring and audit reports	<p>Impacts avoided or managed as per specialist recommendations.</p> <p>Ensure the conditions of the EA are adhered to.</p>	Throughout Construction

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
handling during the construction phase. This to avoid any spills or leaks from this system					

### 9.2.10 Noise

This section deals with the issues relative to noise during the construction phase.

**Table 25: Noise**

<b>Objective:</b> Project activities not to result in noise levels exceeding night-time noise levels of 42 dBA			
<b>Project Components:</b>	Construction activities and construction equipment generating disturbing and nuisance noises		
<b>Potential Impact:</b>	Night-time noise levels impacting on the quality of living of people living at NSR		
<b>Activity/Risk source</b>	Construction activities		
<b>Mitigation: Target</b>	Night-time noise levels less than 42 dBA at locations used for residential purposes		
<b>Mitigation: Action / Control</b>			<b>Responsibility</b>
ECO to ensure that equipment is well maintained and fitted with the correct and appropriate noise abatement measures;			ECO
ECO to include a component covering environmental noise in the Health and Safety Induction to sensitize all employees and contractors about the potential impact from noise;			ECO
ECO to notify NSR before night-time construction activities are to take place within 1,000 m from this NSR (if the structures are used for residential activities during the proposed construction period).			ECO
<b>Performance Indicator</b>	Night-time noise levels less than 42 dBA		
<b>Monitoring</b>	Noise level monitoring before the construction phase start at NSR03 and NSR04. Inspection of equipment by ECO.		

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
<b>Noise impacts during the day:</b> Construction activities relating to hardstand areas, digging of foundations for wind turbines, civil works as well as erection of wind turbines	1. Applicant to discuss the projected construction noise levels with NSR, highlighting that while noises will be clearly audible when activities are taking place within 2,000m from NSR, that measures will be implemented to minimise the potential impact on their quality of life; 2. The applicant must plan the completion of noisiest activities (such a pile driving, rock breaking and excavation) during the daytime period.	Holder of EA/Contractor	As per SANS 10103:2008	Reduction in Noise and thus reduction in chance of complaints arising.  Noise and lighting managed according to approved Method Statement  Ensure the EMP is adhered to.	Semi-continuous measurements conducted over a period of at least 48 hours, covering at least a full day (06:00 – 22:00) and two full night-time (22:00 – 06:00)
<b>Noise impacts at night:</b> Construction activities relating to civil works as well as erection of wind turbines	1. Applicant to discuss the projected construction noise levels with NSR, highlighting that while noises will be clearly audible when activities are taking place within 2,000m from NSR, that measures will be implemented to minimise the potential impact on their quality of life; 2. The Applicant to minimize night-time activities when working within 2,000m from any structure used for residential purposes where possible. Work should only take place at one WTG location to minimize potential night-time cumulative noises (when	Holder of EA/Contractor	As per SANS 10103:2008	Reduction in Noise and thus reduction in chance of complaints arising.  Noise and lighting managed according to approved Method Statement  Ensure the EMP is adhered to.	Semi-continuous measurements conducted over a period of at least 48 hours, covering at least a full day (06:00 – 22:00) and two full night-time (22:00 – 06:00)

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<p>working at night within 2,000m from NSR used for residential purposes);</p> <p>3. The applicant must notify the NSR when night-time activities will be taking place within 1,000m from the NSR; and</p> <p>4. 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).</p>				

### 9.2.11 Heritage

This section deals with the issues relative to Heritage during the construction phase.

**Table 26: Heritage**

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Paleontology – Fossil heritage resources – Disturbance, damage or destruction of fossils at or beneath the ground surface due to surface clearance and	<p>1. Assessment of footprint areas immediately before construction commence.</p> <p>2. Monitoring of substantial, deeper excavations (&gt; 1m)</p>	Paleontologist/ECO	<p>Assessment of footprint areas immediately before construction commences in sensitive sectors with recording and judicious collection of fossil material where discovered.</p> <p>Curation of fossils and site data within an approved repository (museum / university paleontological collection)</p>	Reporting and safeguarding of significant new fossil finds (e.g. vertebrate bones, teeth, petrified wood, shells) to Heritage Western Cape for potential mitigation.	Before and going throughout Construction Phase

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
bedrock excavations			Visual inspection of excavations  Application of Chance Fossil Finds Protocol  Safeguarding newly exposed fossils - in situ, if feasible – pending mitigation.		
	1. Submission of Work Plan to / application for Fossil Collection permit from responsible Heritage Resources Agency (PRHA) 2. Recording and sampling / collection of significant new fossil finds that have been reported by ECO / ESO	Paleontologist	Recording of fossil material as well as associated geological data.  Professional sampling / collection of fossils.  Curation of fossils and site data within an approved repository (museum / university palaeontological collection)	Conservation and recording of new fossil material of scientific / conservation value within project area	Triggered by alert from ECO / ESO / PHRA
	1. Palaeontological mitigation reporting to responsible Heritage Resources Agency (PRHA)	Paleontologist	Submission of Fossil Collection Report to responsible Heritage Resources Agency (PRHA)	Conservation and recording of new fossil material of scientific / conservation value within project area	Following specialist palaeontological mitigation
<b>Cultural landscape - Ecological</b>	1. Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), including wetlands and dams, should be	Holder of the EA/Contractor	Not Applicable	Ensure compliance with relevant legislation and	Throughout Construction

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<p>protected from development as far as possible of the wind turbines or any associated development during all phases.</p> <p>2. No wind turbines should be placed within the 1:100-year flood line of the watercourses, unless otherwise advised by the aquatic specialist. In the context of the sensitivity to soil erosion in the area, as well as potential archaeological resources, it would be a risk to include any structures close to these drainage lines. This recommendation can be waived if the archaeological or hydrological / aquatic specialist reports recommend different buffers.</p> <p>3. Remaining areas of endemic and endangered natural vegetation should be conserved in line with relevant specialist buffers.</p> <p>4. Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), should be protected as far as possible from development of the wind turbines or any associated development during all phases in line with relevant ecological and aquatic specialist recommended buffers.</p> <p>5. Areas of critical biodiversity should be protected from any damage during all phases, where indigenous and endemic vegetation should be preserved at all cost.</p> <p>6. Areas of habitat are found among the rocky outcrops and contribute to the character, as</p>			recommendations from SAHRA under Section 38 of NHRA	

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<p>well as biodiversity of the area. Care should be taken that habitats are not needlessly destroyed.</p> <p>7. Identified medicinal plants used for healing or ritual purposes should be conserved during all phases if threatened for use.</p> <p>8. Careful planning should incorporate areas for stormwater runoff where the base of the structure disturbed the natural soil. Local rocks found on the site could be used to slow stormwater (instead of concrete, or standard edge treatments), and prevent erosion that would be an unfortunate consequence that would alter the character of the site. By using rocks from site it helps to sensitively keep to the character.</p>				
<b>Cultural landscape - Aesthetic</b>	<p>1. Where additional infrastructure (i.e. roads) is needed, the upgrade of existing roads to accommodate the development should be the first consideration.</p> <p>2. Avoid development of infrastructure (such as buildings, wind turbines and power lines), on crests or ridgelines due to the impact on the visual sensitivity of skylines. The visual impact of turbines can be reduced by distancing them from viewpoints such as roads and farmsteads, and placing them in lower lying plains to reduce their impact on the surrounding sensitive cultural landscape.</p>	Holder of the EA/Contractor	Not Applicable.	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 38 of NHRA	Throughout Construction



IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<p>3. Significant and place-making viewsheds of surrounding ridgelines and distant mountain should be maintained by limiting the placement of turbines or associated infrastructure on opposing sides of any of the regional roads, so that at any time a turbine-free view can be found when travelling through the landscape or at the historic farmsteads.</p> <p>4. Retain view-lines and vistas focused on prominent natural features such as mountain peaks or hills, as these are important place making and orientating elements for experiencing the cultural landscape.</p> <p>5. Prevent the construction of new buildings/structures/ new roads on visually sensitive, steep, elevated or exposed slopes, ridgelines and hillcrests.</p> <p>6. Turbine and new road placement to avoid slopes steeper than 10% with existing farm roads to be used for access to turbines as far possible. The low gradient is relative to the context of the landscape, which is flat and expansive.</p> <p>7. Two relevant poorts on the N12 offer views of the vast flat Koup landscape and the Heuweltjies WEF site. 1) A smaller poort alongside the Amospoortjie farmstead as one travels south on the N12 (recommended grading IIIC) which runs through one of the</p>				

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<p>east west ridges of the Koup landscape. 2) On travelling north through the Meiringspoort Pass (Grade II), this portion of the N12 that travels through the Swartberg range, culminates in a poort through the last ridge of the mountain range, which opens up with dramatic views of the vast flat landscape of the Koup Karoo. This poort is located 11kms from the nearest proposed Heuweltjies turbine and is of medium sensitivity at this distance.</p> <p>8. To support the continued occupation of the homesteads on the landscape, the turbines should be placed at a suitable distance from any occupied homestead. Trakaskuilen and Lammerkraal both dated to pre-1965 can be graded IIIB and an 800m buffer would be minimum. Trakaskuilen and Lammerkraal are currently not negatively impacted by the proposed development. Any associated gravesites are graded IIIA.</p> <p>9. Due to the historic and local experience of the landscape from the regional farm road running across the north of Klipgat portion, which links the historically significant farmsteads across the region, a buffer of 300m (200m no-go buffer for all turbine infrastructure other than sensitive road upgrade, and 100m high sensitivity buffer where infrastructure placement is subject to specialist approval); from the regional road</p>				

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<p>still in use should be maintained and any road upgrades must not impact on the views from the road.</p> <p>10. The preferred substation in terms of cultural landscapes assessment is location 2 as it is located further away from the regional road.</p> <p>11. Substation Option 1 is acceptable if all permanent infrastructure, other than roads, underground cabling and guard house, can be kept out of the regional road 200m no-go buffer on final construction.</p> <p>12. The impact of WEF turbine night lighting on the wilderness landscape is intrusive and overwhelms the rural character of the landscape, giving it an industrial sense of place after dark. Reduce the impact of turbine night lighting by minimizing the number of turbines with lighting to only those necessary for aviation safety such as a few identified turbines on the outer periphery, or use aircraft triggered night lighting. Due to the reduced receptors on the roads at night, the impact of the lighting at night is reserved mainly for farmsteads and other places of overnight habitation such as the surrounding tourist facilities, which would be heavily impacted by the light pollution on a long term and ongoing basis.</p>				
<b>Cultural landscape -</b> Historic	1. Historic farmsteads must be protected from the impacts of heavy construction vehicles and increased numbers of people. No	Holder of the EA/Contractor	Not Applicable	Ensure compliance with relevant legislation and	Throughout Construction

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<p>construction traffic should pass through or closer than 50m to any outlying graded heritage structure, which includes the associated historically cultivated lands, cemeteries, unmarked burials. The most appropriate use of existing farm roads must be found to avoid farm werfs as far as possible and reduce construction impact on these heritage features. The AIA buffer recommendations should take preference for identified archaeological heritage resources.</p> <p>2. Duration and magnitude of construction/ decommissioning activity must be minimized as far possible to reduce the impact of heavy vehicles on the roads as well as the associated dust from the activity. Lightest vehicles possible should be used to reduce degradation to the farm roads and the need to upgrade roads to scale and extent that negatively impacts on the integrity of the historic farm roads. Construction decommissioning traffic must operate at speeds that reduce dust and noise as far possible.</p> <p>3. Accommodation of construction staff must not negatively impact on existing farm residents or degrade the integrity of the farmstead complexes and should, without negative impact to ecological or aesthetic resources, be located outside of the</p>			recommendations from SAHRA under Section 38 of NHRA	

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<p>farmstead complexes or site. Farm residents should be consulted on the preferable location for construction staff accommodation.</p> <p>4. Traditional planting patterns should be protected by ensuring that existing trees are not destroyed as these signify traces of cultural intervention in a harsh environment. These planting patterns include the trees planted around the werfs and along travel routes. Interpretation of these landscape features as historic remnants should occur. A buffer of 50m around such planting patterns, associated with cultural landscapes elements and farmsteads as identified in this report, should be maintained.</p> <p>5. Burial grounds and places of worship are automatically regarded as Grade IIIa or higher. Any development that threatens the inherent character of family burial grounds must be assessed and a buffer of 50m around all burial ground or unmarked graves should be in place. No turbines have been proposed for placement near known unmarked burials or family cemeteries. These recommendations should be considered together with the AIA report and the AIA recommendations should take preference for stand-alone burial grounds or graves where they are not associated with</p>				

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<p>other heritage features or cultural landscape elements.</p> <p>6. Mountain slopes have been used for traditional practices for many years, and care should be taken that any significant cultural sites, such as burials and veldkos/medicinal plant resources, are not disturbed.</p> <p>7. Farms in the area followed a system of stone markers to demarcate the farm boundaries in the area. Where these structures are found on the site, care should be taken that they are not needlessly destroyed, as they add to the layering of the area.</p> <p>8. Roads running through the area have historic stone way markers. Where these are found, care should be taken that they are left intact and in place. Road upgrades and or new roads must not move or threaten their position and they should be visible from the road they are related to by passing travellers. Final buffers for stone markers will be for identification and mitigation in collaboration with the ECO prior to construction and approval by heritage specialist.</p> <p>9. Where the historic function of a building/site is still intact, the function has heritage value and should be protected.</p> <p>10. Surviving examples (wagon routes, outspans, and commonage), where they are</p>				

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	owned in some public or communal way (or by a body responsible for acting in the public interest) and where they are found to be actively operating in a communal way, will have cultural and heritage value and should be enhanced and retained. The historic route running through Heuweltjies should be maintained and integrity as a communal road for farm residents must be retained.				
<b>Cultural landscape - Socio-economic</b>	<ol style="list-style-type: none"> <li>1. An updated cultural landscapes impact assessment report must be completed should the WEF continue to be used after the term granted in this application. This report should include a detailed assessment of the socio-economic impacts to the cultural landscape and its outcomes and recommendations need to be considered in the decision for recommissioning and be implemented if recommissioning is approved.</li> <li>2. The continued use of the landscape for human habitation and cultivation by historic residents of the area, should be retained and encouraged as far possible to sustain the continual use pattern and human-environment relationship which is the ultimate significance of this cultural landscape element. The WEF development must allow and support this, including</li> </ol>	Holder of the EA/Contractor	Not Applicable	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 38 of NHRA	Throughout Construction

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<p>financially, and not degrade this continued relationship.</p> <p>3. The local community on and around the development should benefit from job opportunities created by the proposed development and the development should not cause reduction in economic viability of surrounding properties in excess of those offered by the development. Short-term job opportunities at the expense of long-term economic benefit and local employment opportunities must be prevented.</p> <p>4. Local residents must be offered the opportunity for employment on the construction/ decommissioning and operational phases before 'importing' staff from elsewhere.</p> <p>5. Local residents must be offered employment training opportunities associated with WEF developments at all phases.</p> <p>6. Sheep, cattle or game farming should be allowed to continue below the wind turbines or be rehabilitated to increase biodiversity in the area.</p>				



### 9.2.12 Visual

This section deals with the issues relative to visual during the construction phase.

**Table 27: Visual**

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
<p>Potential alteration of the visual character and sense of place</p> <p>Potential visual impact on receptors in the study area</p>	<ol style="list-style-type: none"> <li>Carefully plan to minimise the construction period and avoid construction delays.</li> <li>Inform receptors within 1km of the WEF development area of the construction programme and schedules.</li> <li>Inform receptors within 500m of the proposed substation of the construction programme and schedules.</li> <li>Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.</li> <li>Vegetation clearing should take place in a phased manner.</li> <li>Maintain a neat construction site by removing rubble and waste materials regularly.</li> <li>Position storage / stockpile areas in unobtrusive positions in the landscape, where possible.</li> <li>Where possible, underground cabling should be utilised.</li> <li>Make use of existing gravel access roads where possible.</li> <li>Limit the number of vehicles and trucks travelling to and from the construction site, where possible.</li> <li>Ensure that dust suppression techniques are implemented:</li> </ol>	Holder of the EA/Contractor	As per specialist requirements.	Ensure the EMPr is adhered to.	Throughout Construction

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<ul style="list-style-type: none"> <li>– on all access roads;</li> <li>– in all areas where vegetation clearing has taken place;</li> <li>– on all soil stockpiles.</li> </ul>				

### 9.2.13 Social

This section deals with the issues relative to social during the construction phase.

**Table 28: Social**

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
<p>Increased spread of disease</p> <p>The spread of disease can be increased by additional individuals, e.g. contractors' staff, in the study area. As a result of a lack of previous exposure, newcomers to the area may carry respiratory disease strains to which the local population is unable to respond. There is also the possibility of increased</p>	<ol style="list-style-type: none"> <li>1. People with flu or COVID 19 should stay home.</li> <li>2. Before the project begins, all construction workers should take an HIV/AIDS awareness course.</li> <li>3. Information on general hygiene, HIV/AIDS, and STDs should be readily available.</li> </ol>	Holder of the EA/Contractor	As per specialist requirements.	Ensure the EMPr is adhered to.	Throughout Construction

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
spread of sexually transmitted diseases such as HIV/AIDS and others					
<p>Increased criminal activity.</p> <p>During construction, there will be contractors and job seekers in the area. Contractors and employees will have to cross private property to get to the site, which could attract criminals. Contractors are not the security risk, but it is unemployed job seekers who will have easier access to the site. This is, however, a low probability because there are very few landowners in the area.</p>	<ol style="list-style-type: none"> <li>1. All Mainstream employees and subcontractors should be easily identifiable.</li> <li>2. Mainstream and/or its contractors must work with farmers to establish access protocols for private land. Before entering affected land, landowners should be consulted.</li> <li>3. Construction sites should have security.</li> <li>4. Access to farms where construction is taking place should be controlled.</li> </ol>	Holder of the EA/Contractor	As per specialist requirements.	Ensure the EMPr is adhered to.	Throughout Construction
<p>Increased pressure on existing infrastructure and services.</p> <p>For either of the two projects, no construction camps will</p>	<ol style="list-style-type: none"> <li>1. Educate construction workers on the importance of conserving water resources. Ensure regular communication with the local municipalities to ensure pressure is not being exerted on local infrastructure.</li> </ol>	Holder of the EA/Contractor	As per specialist requirements.	Ensure the EMPr is adhered to.	Throughout Construction

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
be used. The contractors will be housed in a variety of town guesthouses. The populations in the study areas are small. Contractors who stay in town may put additional strain on existing infrastructure and services. The impact on water resources may be the most important, as drought is a major issue in the area. More frequent use may also have an impact on access roads, sanitation, and waste removal.					
<p>Tension/competition between newcomers and local residents/communities.</p> <p>Some of the contractor's (mostly semi- and highly skilled) employees may be from outside the DM. Locals'</p>	<ol style="list-style-type: none"> <li>1. When possible, the recruitment process should favour local job seekers.</li> <li>2. Clearly communicate the intention to hire locals first to discourage jobseekers from other areas.</li> <li>3. Involve local community structures (e.g. ward councillors and/or ward committees) to help communicate and identify local labour resources.</li> </ol>	Holder of the EA/Contractor	As per specialist requirements.	Ensure the EMPr is adhered to.	Throughout Construction

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
perception that outsiders take jobs from unemployed locals causes tension. High unemployment in the study area increases this impact's likelihood.					
<p>Increased fire hazard</p> <p>An increase in human presence during construction may increase the risk of veld fires. These dangers could be caused by open fires used for cooking and warmth, cigarettes, the burning of fire breaks, and the use of flammable liquids. Uncontrolled fires in project areas could cause neighbouring landowners to lose infrastructure, grazing land, crops, or livestock.</p>	<ol style="list-style-type: none"> <li>1. No open fires allowed.</li> <li>2. Construction sites and vehicles should have firefighting equipment.</li> </ol>	Holder of the EA/Contractor	As per specialist requirements.	Ensure the EMPr is adhered to.	Throughout Construction
Reduced safety in and around the project areas.	<ol style="list-style-type: none"> <li>1. The contractor should brief farmers' workers on project safety risks.</li> <li>2. If possible, fence off stockpiles.</li> <li>3. Enforce strict speed limits.</li> </ol>	Holder of the EA/Contractor	As per specialist requirements.	Ensure the EMPr is adhered to.	Throughout Construction

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Non-project workers, such as farm labourers, could wander onto the construction site and stockpiles without PPE and knowledge of the dangers. Due to increased traffic volumes and the presence of heavy motor vehicles (HMs), the transportation of construction materials and machinery on roads used by private motorists poses a safety risk. However, this is unlikely due to the sparse population.	<ol style="list-style-type: none"> <li>All on-site and material-transporting vehicles should be roadworthy.</li> <li>High-danger areas should have road and warning signs.</li> </ol>				
<p>Site specific social sensitivities</p> <p>Property owners and land users on neighbouring properties may experience direct or indirect impacts differently. Construction causes noise and visual changes, for example. These activities could</p>	<ol style="list-style-type: none"> <li>Establish communication protocols to manage Mainstream, landowners, and contractors during construction.</li> <li>Appropriate mitigation measures are implemented to mitigate biophysical, visual, and cultural heritage impacts, per the EIA for the proposed project.</li> <li>Ensure a clean site during construction and operation to reduce the project's impact on the area's character.</li> </ol>	Holder of the EA/Contractor	As per specialist requirements.	Ensure the EMPr is adhered to.	Throughout Construction

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
affect "Sense of place," the identity and character of a landscape felt by locals and visitors (e.g. farmer, tourists, and community members). This attribute is derived from the natural environment, a mix of natural and cultural landscape features, and the people who live there.					
Increased employment opportunities  During construction, the project will create direct and indirect jobs. When this report was written, it wasn't known how many jobs the proposed development would create. Although limited, new employment opportunities may be significant in study areas with small populations. These are temporary, unskilled jobs (which will	<ol style="list-style-type: none"> <li>1. Mainstream and its contractors should be required to hire locals during construction. When possible, promote labour-intensive construction.</li> <li>2. Mainstream should consult the local DOL and neighbouring businesses to see if they will share their skills registers/databases with the Project, especially if any employees have been laid off.</li> <li>3. Recruitment during the construction phase should be coordinated through the local DoL or institutions recommended by local authorities (if applicable).</li> <li>4. Recruitment procedures must be fair and transparent and follow Mainstream's labour and procurement policies.</li> </ol>	Holder of the EA/Contractor	As per specialist requirements.	Ensure the EMPr is adhered to.	Throughout Construction

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
be available for members of local communities). The proposed project may also create indirect informal sector jobs, such as food stalls for construction workers. Due to high unemployment, any formal employment, even for a short time, will likely be beneficial.	<ol style="list-style-type: none"> <li>5. A monitoring system should ensure contractors follow local employment policy.</li> <li>6. Local contract/temporary workers should be given reference letters after construction is complete.</li> <li>7. On-the-job training should be certified.</li> </ol>				
<p>Increased opportunities for local SMEs</p> <p>Local SMEs providing transport, security, accommodation, catering, etc. may have more opportunities. Such opportunities will lead to secondary multiplier effects like more employment and disposable income.</p>	<ol style="list-style-type: none"> <li>1. If subcontractors are appointed, the project should give preference to subcontractors/SMEs in the surrounding communities (Ward 1 &amp; 6), then in the DM, and then outside the province.</li> <li>2. Construction contractors should monitor their procurement practises and prefer local suppliers.</li> <li>3. When non-local service providers are awarded contracts, contractors must show they tried to find a local provider.</li> </ol>		As per specialist requirements.		Throughout Construction
<p>Potential loss of revenue to tourism and ecotourism operations</p> <p>The construction of the project will most likely</p>	<ol style="list-style-type: none"> <li>1. Visual and aesthetic impacts are subjective and considered most significant when the development is different from others or its surroundings.</li> <li>2. Large electrical infrastructure elements are visually intrusive. However, mitigating</li> </ol>	Holder of the EA/Contractor	As per specialist requirements.	Ensure the EMPr is adhered to.	Throughout Construction



IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
degrade the scenery that has made the area popular among hikers, birders, and other outdoor enthusiasts. Tourism revenue generated by these visitors in the form of lodging and food may be reduced as a result of changes to the local flora and fauna and/or the visual landscape.	measures should be used. A separate flora & fauna and visual Assessment studies will determine mitigation that should be considered.				
<b>Unintended damages to private property</b>  Due to vibrations and ground instability, construction equipment like heavy-duty vehicles can damage nearby properties. Abnormally heavy vehicles can damage farm roads, fences, and gates. Littering during construction could damage farmland and harm domestic and game animals.	<ol style="list-style-type: none"> <li>1. Close communication with farm managers.</li> <li>2. Establish protocols and/or communication channels to access farms and reduce damage.</li> <li>3. Photograph all affected private property areas.</li> <li>4. Repair any unintended damage to private property, including fences, immediately.</li> <li>5. When working between construction areas, leave farm gates as found.</li> <li>6. Once construction stops each day, the landowner should confirm this where practically possible.</li> <li>7. If security is compromised by unintended damage to control measures, appropriate security should be provided until repairs are made.</li> </ol>	Holder of the EA/Contractor	As per specialist requirements.	Ensure the EMPr is adhered to.	Throughout Construction

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	8. If project activities cause damages to private property, the landowner should be notified and compensated where applicable.				

## 9.2.14 Transportation

This section deals with the issues relative to transportation during the construction phase.

**Table 29: Transportation**

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Additional Traffic Generation: <b>Increase in Traffic</b>	<ol style="list-style-type: none"> <li>1. Ensure staff transport is done in the 'off peak' periods and by bus.</li> <li>2. Stagger material, component and abnormal loads</li> <li>3. Construction of an on-site concrete batching plant to reduce trips.</li> </ol>	Holder of the EA/Contractor	As per specialist requirements.	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Throughout Construction
Additional Traffic Generation: <b>Increase of Incidents with pedestrians and livestock</b>	<ol style="list-style-type: none"> <li>1. Upgrade of existing / new access points</li> <li>2. Reduction in speed of vehicles</li> <li>3. Adequate enforcement of the law</li> <li>4. Implementation of pedestrian safety initiatives</li> <li>5. Regular maintenance of farm fences &amp; access cattle grids</li> <li>6. Construction of an on-site concrete batching plant to reduce trips.</li> </ol>	Holder of the EA/Contractor	As per specialist requirements.	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Throughout Construction
Additional Traffic Generation: <b>Increase in</b>	<ol style="list-style-type: none"> <li>1. Upgrade of existing / new access point</li> <li>2. Reduction in speed of the vehicles</li> <li>3. Construction of gravel roads in terms of TRH20</li> </ol>	Holder of the EA/Contractor	As per specialist requirements.	All staff members are aware of the EMPr	Throughout Construction

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
<b>Dust from gravel roads</b>	3. Implement a road maintenance program under the auspices of the respective transport department. 4. Possible use of an approved dust suppressant techniques 5. Construction of an on-site batching plant and tower construction to reduce trips.			requirements relevant to them  Ensure the EMPr is adhered to.	
Additional Traffic Generation: <b>Increase in Road Maintenance</b>	1. Implement a road maintenance program under the auspices of the respective transport department. 2. Construction of an on-site batching plant to reduce trips.	Holder of the EA/Contractor	As per specialist requirements.	All staff members are aware of the EMPr requirements relevant to them  Ensure the EMPr is adhered to.	Throughout Construction
Additional Abnormal Loads	1. Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods or stagger delivery. 2. Adequate enforcement of the law	Holder of the EA/Contractor	As per specialist requirements.	All staff members are aware of the EMPr requirements relevant to them  Ensure the EMPr is adhered to.	Throughout Construction
Internal Access Roads: <b>Increase in Dust from gravel roads</b>	1. Enforce a maximum speed limit on the development 2. Appropriate, timely and high quality maintenance required in terms of TRH20 3. Possible use of an approved dust suppressant techniques	Holder of the EA/Contractor	As per specialist requirements.	All staff members are aware of the EMPr requirements relevant to them  Ensure the EMPr is adhered to.	Throughout Construction
Internal Access Roads:	1. Adequate road signage according to the SARTSM 2. Approval from the respective roads department	Holder of the EA/Contractor	As per specialist requirements.	All staff members are aware of the EMPr	Throughout Construction

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
New / Larger Access points				requirements relevant to them  Ensure the EMPr is adhered to.	

### 9.3 Operation Phase

#### 9.3.1 Construction Site Decommissioning

This section deals with the issues relative to construction site decommissioning during the operation phase.

**Table 30: Construction Site Decommissioning**

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
<b>Construction Site Decommissioning:</b> Removal of equipment	<ol style="list-style-type: none"> <li>1. All structures comprising the construction camp are to be removed from site.</li> <li>2. 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.</li> <li>3. All hardened surfaces within the construction camp area should be ripped, all imported materials removed, and the area shall be top soiled and regressed using the guidelines set out in the re-vegetation that forms part of this document.</li> </ol>	Holder of EA/Contractor	<p>Compliance to all legislative requirements.</p> <p>Ensure the EMPr is adhered to.</p>	Following construction

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
<b>Construction Site Decommissioning:</b> Temporary services	<ol style="list-style-type: none"> <li>1. The Contractor must arrange the cancellation of all temporary services.</li> <li>2. Temporary roads must be closed and access across these, blocked.</li> <li>3. All areas where temporary services were installed are to be rehabilitated to the satisfaction of the ECO.</li> </ol>	Holder of EA/Contractor	<p>Compliance to all legislative requirements.</p> <p>Ensure the EMPr is adhered to.</p>	Following construction
<b>Construction Site Decommissioning:</b> Associated infrastructure	<ol style="list-style-type: none"> <li>1. Surfaces are to be checked for waste products from activities such as concreting or asphaltting and cleared in a manner approved by the Engineer.</li> <li>2. All surfaces hardened due to construction activities are to be ripped and imported material thereon removed.</li> <li>3. All rubble is to be removed from the site to an approved disposal site as approved by the Engineer. Burying of rubble on site is prohibited.</li> <li>4. The site is to be cleared of all litter.</li> <li>5. The Contractor is to check that all watercourses are free from building rubble, spoil materials and waste materials.</li> <li>6. Fences, barriers and demarcations associated with the construction phase are to be removed from the site unless stipulated otherwise by the Engineer.</li> <li>7. All residual stockpiles must be removed to spoil or spread on site as directed by the Engineer.</li> <li>8. All leftover building materials must be returned to the depot or removed from the site.</li> <li>9. 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> </ol>	Holder of EA/Contractor	All waste managed according to approved Method Statement	Following construction
<b>Construction Site Decommissioning:</b> Rehabilitation plan	<ol style="list-style-type: none"> <li>1. Rehabilitate and re-vegetate cleared areas with indigenous plant species.</li> </ol>	Holder of EA/Contractor	Alien Plant Management Plan	Following construction

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
			Plant Rehabilitation implemented	

### 9.3.2 Operation and Maintenance

This section deals with the issues relative to operation and maintenance during the operation phase.

**Table 31: Operation and Maintenance**

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
<b>Operation and Maintenance:</b> Maintenance	<ol style="list-style-type: none"> <li>1. All applicable standards, legislation, policies and procedures must be adhered to during operation.</li> <li>2. Regular ground inspection of the plants must take place to monitor their status.</li> </ol>	Holder of the EA	Ensure the conditions of the EA are adhered to. Compliance to all legislative requirements	During operation
<b>Operation and Maintenance:</b> Public awareness	<ol style="list-style-type: none"> <li>1. The emergency preparedness plan must be ready for implementation at all times should an emergency situation arise.</li> </ol>	Holder of the EA	Adhere to Emergency Evacuation Plan	During operation

### 9.3.3 Waste Management

This section deals with the issues relative to waste management during the operation phase.

**Table 32: Waste Management**

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIME FRAME
<b>Waste Management:</b> Recycling and litter management	<ol style="list-style-type: none"> <li>1. The site should be kept clear of litter at all times.</li> <li>2. Solid waste separation and recycling should take place for the duration of the operational phase for the development at the administration block.</li> </ol>	Holder of EA	All waste managed according to approved Method Statement Compliance to all legislative requirements.	Throughout Operation

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIME FRAME
	3. All waste must be removed promptly to ensure that it does not attract vermin or produce odours. 4. Solid waste should be collected on a regular basis.			

### 9.3.4 Agriculture and Soils

This section deals with the issues relative to agriculture and soils during the operation phase.

**Table 33: Agriculture and Soils**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/ FREQUENCY
Aspect: Protection of soil resources <b>Erosion</b>	1. Maintain the storm water run-off control system. Monitor erosion and remedy the storm water control system in the event of any erosion occurring.	Facility Environmental Manager	Undertake a periodic site inspection to verify and inspect the effectiveness and integrity of the storm water run-off control system and to specifically record the occurrence of any erosion on site or downstream. Corrective action must be implemented to the run-off control system in the event of any erosion occurring.	That existence of hard surfaces causes no erosion on or downstream of the site.	Bi-annually
Aspect: Protection of soil resources <b>Erosion</b>	1. Facilitate re-vegetation of denuded areas throughout the site.	Facility Environmental Manager	Undertake a periodic site inspection to record the progress of all areas that require re-vegetation.	That denuded areas are re-vegetated to stabilise soil against erosion	Bi-annually

### 9.3.5 Avifauna

This section deals with the issues relative to avifauna during the operation phase.

**Table 34: Avifauna**

ASPECT/ IMPACT	IMPACT ACTIONS	MANAGEMENT	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
Avifauna: Mortality due to collisions with the wind turbines: Bird collisions with the wind turbines	<ol style="list-style-type: none"> <li>Formal live-bird monitoring and carcass searches should be implemented at the start of the operational phase, as per the most recent edition of the Best Practice Guidelines at the time (Jenkins <i>et al.</i> 2015) to assess collision rates. The exact time when operational monitoring should commence, will depend on the construction schedule, and should commence when the first turbines start operating. The Best Practice Guidelines require that, as an absolute minimum, operational monitoring should be undertaken for the first two (preferably three) years of operation, and then repeated again, in year 5, and again every five years thereafter for the operational lifetime of the facility.</li> <li>If estimated annual collision rates indicate unacceptable mortality levels of priority species, i.e if it</li> </ol>		<ol style="list-style-type: none"> <li>Operations Manager</li> <li>Operations Manager</li> <li>Operations Manager</li> <li>Operations Manager</li> </ol>	<ol style="list-style-type: none"> <li>Comply with attached operational monitoring plan (Appendix F), including live bird monitoring and carcass searches.</li> <li>Implement operational monitoring plan.</li> <li>Design and implement mitigation measures if mortality thresholds are exceeded.</li> <li>Compile quarterly and annual progress reports detailing the results of the operational monitoring and progress with any recommended mitigation measures.</li> </ol>	Prevention of collision mortality on the wind turbines.	<ol style="list-style-type: none"> <li>Once-off</li> <li>Years 1,2, 5 and every five years after that for the duration of the operational lifetime of the facility.</li> </ol>



ASPECT/ IMPACT	IMPACT ACTIONS	MANAGEMENT	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
	exceeds mortality thresholds as determined by the avifaunal specialist in consultation with BLSA and other avifaunal specialists, additional measures will have to be implemented which could include shut down on demand or other proven measures.					
Avifauna: Mortality due to collisions and electrocutions on the 33kV network: Bird electrocutions on the overhead sections of the internal 11-33kV cables	1. Where overhead 11-33kV lines are required, conduct regular inspections of the overhead sections of the internal reticulation network to look for carcasses.		Operations Manager	<ol style="list-style-type: none"> <li>1. Carcass searchers under the supervision of the Avifaunal Specialist.</li> <li>2. Design and implement mitigation measures if mortality thresholds are exceeded.</li> <li>3. Compile quarterly and annual progress reports detailing the results of the operational monitoring and progress with any recommended mitigation measures.</li> </ol>	Prevention of electrocution mortality on the overhead sections of the 11-33kV internal cable network.	At least once every two months.

### 9.3.6 Bats

This section deals with the issues relative to bats during the operation phase.

**Table 35: Bats**

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
Fatality through direct collision or barotrauma of resident bats occupying the airspace amongst the turbines. The turning blades of the turbines during operation are the most important aspect of the project that would impact negatively on bats. High flying (high risk) species have predominantly been confirmed at the proposed Heuweltjies WEF site.	Mitigate disturbance due to operation activities.	<ol style="list-style-type: none"> <li>1. All turbines and turbine components, including the rotor swept zone, should be kept out of all 'no-go' and high sensitivity zones.</li> <li>2. Mitigation, as proposed, should be applied as soon as the test period of turbines are completed, and turbines start turning.</li> <li>3. A bat specialist should be appointed before the turbines start to turn, and operational bat monitoring should start when all the turbines start to turn, for a minimum of two years, or described by the latest South African bat guidelines.</li> <li>4. At least two years of post-construction bat monitoring is to be conducted and must be performed according to the South Africa Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy facilities (Aronson, et.al., 2020), or later versions of the guidelines valid at the time of monitoring, as well as other relevant SABAA guidelines as applicable during the monitoring period.</li> <li>5. Prolonged post-construction mitigation, beyond the prescribed two years, might be necessary if advised by the operational bat specialist.</li> <li>6. Mitigation should be discussed between the bat specialist and developer during the operational phase</li> </ol>	<ul style="list-style-type: none"> <li>• Regular bat monitoring reports, informed by the relevant SABAA operational bat monitoring guidelines.</li> <li>• Adhere to the mitigation measures as indicated by the EA and Section 9 of the Bat Monitoring report.</li> <li>• Maintain a register of bat mortality/injury.</li> <li>• Regular communication between bat specialist and site manager.</li> </ul>	Throughout operation and during operational bat monitoring period.	Site manager, Project developer

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>and should be adapted and implemented without delay. Where high bat mortality occurs, turbine specific mitigation measures should be applied, using Section 9 as a starting point for discussions.</p> <p>7. Freewheeling, when turbines do not generate power, should be avoided, to a point where the turbines are not a threat to bats.</p> <p>8. Except for compulsory lighting required in terms of civil aviation, artificial lighting should be minimised, especially bright lights. Lights should rather be turned downwards. Turbine tower lights should be switched off when not in operation, as possible.</p> <p>9. It is understood that static bat monitoring equipment on turbines has a cost implication. Although it is not a requirement at this stage, as it depends on whether the Met mast will be deployed for the life span of the turbines. Having refined static data from sampling points at height, would aid in interpreting future bat fatality records of the proposed Heuweltjies WEF. Therefore, the installation of more than one monitoring system at height, is advised.</p>			
Bat fatality during migration. Limited activity by <i>Miniopterus natalensis</i> , a Near Threatened migration species, had been recorded. Not	<p>1. Mitigate potential impacts on bats during operation of wind farm.</p> <p>2. Reduce bat mortality during the operational</p>	<p>1. Care should be taken during post construction monitoring to verify the activity of <i>M. natalensis</i>, especially within the rotor swept area of the turbine blades. Carcasses should be identified to establish the fatality of this species.</p> <p>2. A bat specialist should be appointed before the turbines start to turn, and operational bat monitoring should start when all the turbines start to turn, for a</p>	<ul style="list-style-type: none"> <li>Regular bat monitoring reports, informed by the relevant SABAA operational bat monitoring guidelines.</li> </ul>	Throughout operation and during operational bat monitoring period.	Site manager, Project developer

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
much research has been conducted on migration of bats in South Africa, and some of the other species occurring on site could also migrate.	lifetime of the wind farm.  3. Supervise all bat monitoring activities.	<p>minimum of two years, or described by the latest South African bat guidelines.</p> <p>3. At least two years of post-construction bat monitoring is to be conducted and must be performed according to the South Africa Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy facilities (Aronson, et.al., 2020), or later versions of the guidelines valid at the time of monitoring, as well as other relevant SABAA guidelines as applicable during the monitoring period.</p> <p>4. Prolonged post-construction mitigation, beyond the prescribed two years, might be necessary if advised by the operational bat specialist.</p> <p>5. Mitigation should be discussed between the bat specialist and developer during the operational phase and should be adapted and implemented without delay. Where high bat mortality occurs, of turbine specific mitigation measures should be applied, using Section 9 as a starting point for discussions.</p> <p>6. Freewheeling, when turbines do not generate power, should be avoided, to a point where the turbines are not a threat to bats.</p> <p>7. Except for compulsory lighting required in terms of civil aviation, artificial lighting should be minimised, especially bright lights. Lights should rather be turned downwards. Turbine tower lights should be switched off when not in operation, if possible.</p> <p>8. It is understood that static bat monitoring equipment on turbines has a cost implication. Although it is not a requirement at this stage, as it depends on whether the Met mast will be deployed for the life span of the turbines. Having refined static data from sampling</p>	<ul style="list-style-type: none"> <li>Adhere to the mitigation measures as indicated by the EA and Section 9 of the Bat Monitoring report.</li> <li>Maintain a register of bat mortality/injury.</li> <li>Regular communication between bat specialist and site manager</li> </ul>		

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		points at height, would aid in interpreting future bat fatality records of the proposed Heuveltjies WEF. Therefore, the installation of more than one monitoring system at height, is important.			
Loss of bats of conservation value: Bat fatality of bat species of conservation value. Calls similar to the red data <i>Miniopterus natalensis</i> have been recorded, as well as the endemic <i>Eptesicus hottentotus</i> .	Mitigate potential impacts on bats during operation of wind farm.	<ol style="list-style-type: none"> <li>Care should be taken during post construction monitoring to verify the activity of bat species of conservation value, especially within the rotor sweep area of the turbine blades.</li> <li>Proven species-specific mitigation measures, such as curtailment or bat deterrents, should be timeously applied if high activity or high numbers of carcasses of bats of conservation value is recorded during post-construction.</li> <li>Bat carcasses should be identified to establish whether there are bats species' carcasses of conservation value.</li> <li>A bat specialist should be appointed before the turbines start to turn, and operational bat monitoring should start when all the turbines start to turn, for a minimum of two years, or described by the latest South African bat guidelines.</li> <li>At least two years of post-construction bat monitoring is to be conducted and must be performed according to the South Africa Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy facilities (Aronson, et.al., 2020), or later versions of the guidelines valid at the time of monitoring, as well as other relevant SABAA guidelines as applicable during the monitoring period.</li> <li>Prolonged post-construction mitigation, beyond the prescribed two years, might be necessary if high</li> </ol>	<ul style="list-style-type: none"> <li>Adhere to the mitigation measures as indicated by the EA and Section 9 of the Bat Monitoring report.</li> </ul>	Throughout operation and during operational bat monitoring period.	Site manager, Project developer

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>numbers of bats of conservation value are recorded, as advised by the operational bat specialist.</p> <p>7. Mitigation should be discussed between the bat specialist and developer during the operational phase and should be adapted and implemented without delay. Where high fatality of bats of conservation value occurs, turbine specific mitigation measures should be applied, using Section 9 as a starting point for discussions.</p> <p>8. Freewheeling, when turbines do not generate power, should be avoided, to a point where the turbines are not a threat to bats.</p> <p>9. Except for compulsory lighting required in terms of civil aviation, artificial lighting should be minimised, especially bright lights. Lights should rather be turned downwards. Turbine tower lights should be switched off when not in operation, if possible.</p> <p>10. It is understood that static bat monitoring equipment on turbines has a cost implication. Although it is not a requirement at this stage, as it depends on whether the Met mast will be deployed for the life span of the turbines. Having refined static data from sampling points at height, would aid in interpreting future bat fatality records of the proposed Heuweltjies WEF. Therefore, the installation of more than one monitoring system at height, is important.</p>			
Bat fatality due to the attraction of bats to turbine blades.	Avoid activities that will attract bats to turbines.	1. Except for compulsory lighting required in terms of civil aviation, artificial lighting should be minimised, especially bright lights. Lights should rather be turned downwards. Turbine tower lights should be switched off when not in operation, if possible.	Reduce lights as far as possible.	Ongoing	Site manager/Project Developer

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
Loss of habitat and foraging space during operation of the wind turbines.	<ul style="list-style-type: none"> <li>Mitigate the loss of habitat and foraging space to avoid bat mortality.</li> <li>Reduce bat mortality during the operational lifetime of the wind farm.</li> </ul>	<ol style="list-style-type: none"> <li>All turbines and turbine components, including the rotor swept zone, should be kept out of all high sensitivity zones.</li> <li>At least two years of post-construction bat monitoring is to be conducted and must be performed according to the South Africa Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy facilities (Aronson, et.al., 2020), or later versions of the guidelines valid at the time of monitoring, as well as other relevant SABAA guidelines as applicable during the monitoring period.</li> <li>Prolonged post-construction mitigation, beyond the prescribed two years, might be necessary if advised by the operational bat specialist.</li> <li>Mitigation should be discussed between the bat specialist and developer during the operational phase and should be adapted and implemented without delay. Where high bat mortality occurs, turbine specific mitigation measures should be applied, using Section 9 as a starting point for discussions.</li> <li>Freewheeling, when turbines do not generate power, should be avoided, to a point where the turbines are not a threat to bats.</li> <li>Except for compulsory lighting required in terms of civil aviation, artificial lighting should be minimised, especially bright lights. Lights should rather be</li> </ol>	Adaptive mitigation plan.	During operations.	Site manager/Project Developer and ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>turned downwards. Turbine tower lights should be switched off when not in operation, if possible.</p> <p>7. It is understood that static bat monitoring equipment on turbines has a cost implication. Although it is not a requirement at this stage, as it depends on whether the Met mast will be deployed for the life span of the turbines. Having refined static data from sampling points at height, would aid in interpreting future bat fatality records of the proposed Heuweltjies WEF. Therefore, the installation of more than one monitoring system at height, is important.</p>			
Reduction in size, genetic diversity, resilience, and persistence of bat populations.	Monitor potential impacts on bats during operation of wind farm. Prevent activities that will attract bats to high-risk areas on site.	<ol style="list-style-type: none"> <li>1. A bat specialist should be appointed before the turbines start to turn, and operational bat monitoring should start when all the turbines start to turn, for a minimum of two years, or described by the latest South African bat guidelines.</li> <li>2. At least two years of post-construction bat monitoring is to be conducted and must be performed according to the South Africa Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy facilities (Aronson, et.al., 2020), or later versions of the guidelines valid at the time of monitoring, as well as other relevant SABAA guidelines as applicable during the monitoring period.</li> <li>3. Prolonged post-construction mitigation, beyond the prescribed two years, might be necessary if advised by the operational bat specialist.</li> <li>4. Mitigation should be discussed between the bat specialist and developer during the operational phase and should be adapted and implemented without delay. Where high bat mortality occurs, turbine</li> </ol>	Adaptive mitigation plan.	During operations.	Project Developer/Site manager and ECO.



Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>specific mitigation measures should be applied, using Section 9 as a starting point for discussions.</p> <p>5. Freewheeling, when turbines do not generate power, should be avoided, to a point where the turbines are not a threat to bats.</p> <p>6. Except for compulsory lighting required in terms of civil aviation, artificial lighting should be minimised, especially bright lights. Lights should rather be turned downwards. Turbine tower lights should be switched off when not in operation, if possible.</p> <p>7. It is understood that static bat monitoring equipment on turbines has a cost implication. Although it is not a requirement at this stage, as it depends on whether the Met mast will be deployed for the life span of the turbines. Having refined static data from sampling points at height, would aid in interpreting future bat fatality records of the proposed Heuveltjies WEF. Therefore, the installation of more than one monitoring system at height, is important.</p>			

### 9.3.7 Biodiversity

This section deals with the issues relative to biodiversity during the operation phase.

**Table 36: Biodiversity**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/FREQUENCY
Loss of terrestrial species - fauna	1. Clear demarcation during the construction phase of all undisturbed sensitive areas that are not within the direct footprint of the WEF	Holder of the EA/Contractor	Construction Monitoring and audit reports	Impacts avoided or managed as per	Throughout Operation

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/FREQUENCY
Although most of the species observed are mobile, the increase in vehicle movement could result in an increase in road mortalities.	<p>to ensure that there is no uncontrolled access by construction vehicles and labourers;</p> <ol style="list-style-type: none"> <li>Educate contractors as to the importance of the undisturbed conservation areas and importance of avoiding them;</li> <li>All vehicles must stick to designated and prepared roads and adhere to the speed limit on site of 40km/hr;</li> <li>Mitigating the risk of poaching by fencing in the accommodation compounds of the construction crews, to prevent individuals from wandering in the veld after hours; banning the possession of dogs on site by construction</li> </ol>			<p>specialist recommendations.</p> <p>Ensure the conditions of the EA are adhered to.</p>	

### 9.3.8 Aquatic/ Surface Water

This section deals with the issues relative to aquatic/surface watery during the operation phase.

**Table 37: Aquatic/ Surface Water**

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
<p>Impact on aquatic systems through the possible increase in surface water runoff on form and function during the operational phase:</p> <p>Increase in hard surface areas, and roads that require stormwater</p>	<ol style="list-style-type: none"> <li>A detailed stormwater management plan must be developed in the preconstruction phase, detailing the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems.</li> <li>The stormwater control systems must be inspected on an annual basis to ensure these are functional.</li> </ol>	Holder of the EA/Contractor	Construction Monitoring and audit reports	Throughout Operation

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
management will increase through the concentration of surface water flows that could result in localised changes to flows (volume) that would result in form and function changes within aquatic systems, which are currently ephemeral. This then increases the rate of erosion and sedimentation of downstream areas.	3. Effective stormwater management must include effective stabilisation (gabions and Reno mattresses) of exposed soil and the re-vegetation of any disturbed riverbanks as and where necessary.			

### 9.3.9 Noise

This section deals with the issues relative to noise during the operation phase.

**Table 38: Noise**

<b>Objective:</b> Project activities not to result in noise levels exceeding 45 dBA			
<b>Project Components:</b>	Operation of WTG within 2,000 m from structures used for residential purposes		
<b>Potential Impact:</b>	Noise levels impacting on the quality of living of people living at NSR		
<b>Activity/Risk source</b>	Operation of WTG		
<b>Mitigation: Target</b>	Night-time noise levels less than 45 dBA at locations used for residential purposes		
<b>Mitigation: Action / Control</b>		<b>Responsibility</b>	<b>Timeframe</b>
ECO to conduct noise monitoring when a reasonable and valid noise complaint are received from an NSR living within 2,000m from a WTG of the project.		ECO	Within 2 months after a noise complaint is registered
Noise monitoring to confirm that noise levels associated with operating WTG are less than 45 dBA at all NSR		ECO	During the first year once the project is operational. Noise specialist to confirm need for future measurements.
<b>Performance Indicator</b>	Night-time noise levels less than 45 dBA		

### 9.3.10 Heritage

This section deals with the issues relative to Heritage during the operation phase.

**Table 39: Heritage**

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
<b>Cultural landscape</b> - Ecological	<ol style="list-style-type: none"> <li>1. Areas of endemic and endangered natural vegetation should be conserved.</li> <li>2. Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), including manmade wetlands and dams, should be protected as far possible.</li> <li>3. Areas of habitat are found among the rocky outcrops and contribute to the character, as well as biodiversity of the area. Care should be taken that habitats are not needlessly destroyed.</li> <li>4. Identified medicinal plants used for healing or ritual purposes should be conserved during all phases if threatened for use. Access to these resources should be made available to those who have had historic access to them.</li> </ol>	Holder of the EA/Contractor	Not Applicable	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 38 of NHRA	Throughout Operation
<b>Cultural landscape</b> - Aesthetic	<ol style="list-style-type: none"> <li>1. Infrastructure improvement or maintenance work, including new roads and upgrades to the road network, should be appropriate to the rural context (scale, material etc.) and avoid steep slopes over 10% as well as ridges.</li> <li>2. Prevent the construction of new buildings/structures on visually sensitive, steep (over 10%), elevated or exposed slopes, ridgelines and hillcrests or within farmstead and N12 buffers and 300m of the regional farm roads.</li> </ol>	Holder of the EA/Contractor	Not Applicable	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 38 of NHRA	Throughout Operation

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<p>3. Avoid visual clutter in the landscape by intrusive signage, and the intrusion of commercial, corporate development along roads.</p> <p>4. Duration and magnitude of operational activity must be minimized as far possible to reduce the impact of heavy vehicles on the roads as well as the associated dust from the activity. Lightest vehicles possible should be used to reduce degradation to the farm roads and the need to upgrade roads to scale and extent that negatively impacts on the integrity of the historic farm roads. Operational traffic must operate at speeds that reduce dust and noise as far possible.</p> <p>5. The impact of WEF turbine night lighting on the wilderness landscape is intrusive and overwhelms the rural character of the landscape, giving it an industrial sense of place after dark. Reduce the impact of turbine night lighting by minimizing the number of turbines with lighting to only those necessary for aviation safety, such as a few identified turbines on the outer periphery, or use aircraft triggered night lighting. Due to the reduced receptors on the roads at night, the impact of the lighting at night is reserved mainly for farmsteads and other places of overnight habitation such as the surrounding tourist facilities, which would be heavily impacted by the light pollution on a long term and ongoing basis.</p>				
<b>Cultural landscape</b> - Historic	<p>1. Historic farmsteads must be protected from the impacts of operational facility vehicles and increased numbers of people. No WEF operations traffic should pass within 50m from graded structures, which includes the associated historically cultivated lands,</p>	Holder of the EA/Contractor	Not Applicable	Ensure compliance with relevant legislation and recommendations	Throughout Operation

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<p>cemeteries, unmarked burials. The most appropriate use of existing farm roads must be found to avoid farm werfs as far as possible and reduce construction impact on these heritage features. The AIA buffer recommendations should take preference for identified archaeological heritage resources.</p> <ol style="list-style-type: none"> <li>Traditional planting patterns should be protected by ensuring that existing trees are not destroyed as these signify traces of cultural intervention in a harsh environment. These planting patterns include the trees planted around the werfs and along travel routes. Interpretation of these landscape features as historic remnants should occur. A buffer of 50m around such planting patterns, associated with cultural landscapes elements and farmsteads as identified in this report, should be maintained.</li> <li>Burial grounds and places of worship are automatically regarded as Grade IIIa or higher. Any development that threatens the inherent character of family burial grounds must be assessed and should be discouraged and a buffer of 50m around any burial ground or unmarked graves should be in place. No turbines have been proposed for placement near known unmarked burials or family cemeteries. These recommendations should be considered together with the AIA report and the AIA recommendations should take preference for stand-alone burial grounds or graves where they are not associated with other heritage features or cultural landscape elements.</li> <li>Mountain slopes have been used for traditional practices for many years, and care should be taken that any significant cultural sites, such as burials and veldkos/medicinal plant resources, are not disturbed.</li> <li>Farms in the area followed a system of stone markers to demarcate the farm boundaries in the area. Where</li> </ol>			from SAHRA under Section 38 of NHRA	

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<p>these structures are found on the site, care should be taken that they are not needlessly destroyed, as they add to the layering of the area.</p> <p>6. Roads running through the area may have historic stone way markers. Where these are found care should be taken that they are left intact and in place. Road upgrades must not move or threaten their position and they should be visible from the road they are related to by passing travellers.</p> <p>7. Where the historic function of a building/site is still intact, the function has heritage value and should be protected.</p> <p>8. Surviving examples (wagon routes, outspans, and commonage), where they are owned in some public or communal way (or by a body responsible for acting in the public interest) and where they are found to be actively operating in a communal way, will have cultural and heritage value and should be enhanced and retained. The historic route running through Heuveltjies should be maintained and integrity as a communal road for farm residents must be retained.</p> <p>9. Accommodation of WEF staff must not negatively impact on existing farm residents or degrade the integrity of the farmstead complexes and should, without negative impact to ecological or aesthetic resources, be located outside of the farmstead complexes or site. Farm residents should be consulted on the preferable location for construction staff accommodation.</p> <p>10. Lightest vehicles possible should be used to reduce degradation to the farm roads and the need to upgrade roads to scale and extent that negatively impacts on the integrity of the historic farm roads. Operational traffic must operate at speeds that reduce dust and noise as far possible.</p>				

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
<b>Cultural landscape</b> - Socio-economic	<ol style="list-style-type: none"> <li>1. The local community on and around the development should benefit from job opportunities created by the proposed development, and the development should not cause reduction in economic viability of surrounding properties in excess of those offered by the development. Short-term job opportunities at the expense of long term economic benefit and local employment opportunities must be prevented.</li> <li>2. The continued use of the landscape for human habitation and cultivation by historic residents of the area, should be retained and encouraged as far possible to sustain the continual use pattern and human-environment relationship which is the ultimate significance of this cultural landscape element. The WEF development must allow and support this, including financially, and not degrade this continued relationship.</li> <li>3. Local residents must be offered the opportunity for employment on the construction/ decommissioning and operational phases before 'importing' staff from elsewhere.</li> <li>4. Local residents must be offered employment training opportunities associated with WEF developments at all phases.</li> <li>5. Crop cultivation, sheep, cattle or game farming should be allowed to continue below the wind turbines, or be rehabilitated to increase biodiversity in the area.</li> </ol>	Holder of the EA/Contractor	Not Applicable	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 38 of NHRA	Throughout Operation



### 9.3.11 Visual

This section deals with the issues relative to visual during the operation phase.

**Table 40: Visual**

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
<p>Potential alteration of the visual character and sense of place.</p> <p>Potential visual impact on receptors in the study area.</p> <p>Potential visual impact on the night time visual environment.</p>	<ol style="list-style-type: none"> <li>1. Turbine colours should adhere to CAA requirements. Bright colours and logos on the turbines should be kept to a minimum.</li> <li>2. Inoperative turbines should be repaired promptly, as they are considered more visually appealing when the blades are rotating (or at work) (Vissering, 2011).</li> <li>3. If turbines need to be replaced for any reason, they should be replaced with the same model, or one of equal height and scale to lessen the visual impact.</li> <li>4. As far as possible, limit the number of maintenance vehicles which are allowed to access the site.</li> <li>5. Ensure that dust suppression techniques are implemented on all gravel internal access roads.</li> <li>6. As far as possible, limit the amount of security and operational lighting present on site.</li> <li>7. Light fittings for security at night should reflect the light toward the ground and prevent light spill.</li> <li>8. Lighting fixtures should make use of minimum lumen or wattage.</li> <li>9. Mounting heights of lighting fixtures should be limited, or alternatively foot-light or bollard level lights should be used.</li> <li>10. If possible, make use of motion detectors on security lighting.</li> </ol>	Holder of the EA/Contractor	As per specialist requirements.	Visual character and sense of place protected	Throughout Operation

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	11. Where an occupied building is located within 800m of a wind turbine, then the potential for shadow flicker should be assessed. 12. Where possible, the operation and maintenance buildings should be consolidated to reduce visual clutter. 13. The operations and maintenance (O&M) buildings should not be illuminated externally at night. 14. The O&M buildings should be painted in natural tones that fit with the surrounding environment. 15. Buildings on the substation site should be painted with natural tones that fit with the surrounding environment. 16. Non-reflective surfaces should be utilised where possible.				

### 9.3.12 Social

This section deals with the issues relative to social during the operation phase.

**Table 41: Social**

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Increased socio-economic development associated with more available electricity  The WEF when completed provides part of the solutions for the current electricity shortages and the increasing demand for energy, as well as the need to find more sustainable and	1. Engage government planning departments to prioritise households with electricity backlogs. Continuous communication with municipal and district spatial planning departments.	Holder of the EA/Contractor	As per specialist requirements.	Ensure the EMP is adhered to.	Throughout Operation

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
environmentally friendly energy resources. The additional clean energy can contribute to sustainable socio-economic development in South Africa.					
<p>Reduced property values</p> <p>The proposed WEF may lower farm property values directly and indirectly. This may be due to the WEF's appearance and infrastructure within the natural environment. It also hinders the owner's ability to market the land for hiking, bird watching, and other activities.</p>	1. In the event of property prices being significantly reduced, affected landowners should be consulted with regard to the value of compensation. Mainstream must ensure that the value of compensation is agreed by all parties.	Holder of the EA/Contractor	As per specialist requirements.	Ensure the EMPr is adhered to.	Throughout Operation
<p>Unintended damages to private property.</p> <p>Littering may occur during maintenance, which could damage farmland or harm domestic and game animals. Farm gates may be left open, allowing animals to escape. Stray animals are valuable assets and rounding them up is inconvenient and may stress the animals.</p>	1. Mitigation to be applied as described in the construction phase.	Holder of the EA/Contractor	As per specialist requirements.	Ensure the EMPr is adhered to.	Throughout Operation
<p>Site specific social sensitivities.</p> <p>Similarly, to the impact described earlier, property owners and land users on surrounding properties may experience direct or indirect impacts differently on their specific properties during the operational phase as well, Therefore, the following impacts on surrounding landowners need to be taken into account</p>	1. Mitigation to be applied as described in the construction phase.	Holder of the EA/Contractor	As per specialist requirements.	Ensure the EMPr is adhered to.	Throughout Operation

### 9.3.13 Transportation

This section deals with the issues relative to transportation during the operation phase.

**Table 42: Transportation**

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Additional Traffic Generation: Increase in Traffic	1. The increase in traffic for this phase of the development is negligible and will not have a significant impact	Holder of the EA/Contractor	As per specialist requirements.	All staff members are aware of the EMP requirements relevant to them  Ensure the EMP is adhered to.	Throughout Operation
Additional Traffic Generation: Increase of Incidents with pedestrians and livestock	1. The increase in traffic for this phase of the development is negligible and will not have a significant impact	Holder of the EA/Contractor	As per specialist requirements.	All staff members are aware of the EMP requirements relevant to them  Ensure the EMP is adhered to.	Throughout Operation
Additional Traffic Generation: Increase in Dust from gravel roads	1. The increase in traffic for this phase of the development is negligible and will not have a significant impact	Holder of the EA/Contractor	As per specialist requirements.	All staff members are aware of the EMP requirements relevant to them  Ensure the EMP is adhered to.	Throughout Operation
Additional Traffic Generation: Increase in Road Maintenance	1. The increase in traffic for this phase of the development is negligible and will not have a significant impact	Holder of the EA/Contractor	As per specialist requirements.	All staff members are aware of the EMP requirements relevant to them	Throughout Operation

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
				Ensure the EMPr is adhered to.	
Additional Abnormal Loads	1. The increase in traffic for this phase of the development is negligible and will not have a significant impact	Holder of the EA/Contractor	As per specialist requirements.	All staff members are aware of the EMPr requirements relevant to them  Ensure the EMPr is adhered to.	Throughout Operation
Internal Access Roads: New / Larger Access points	1. Adequate road signage according to the SARTSM.	Holder of the EA/Contractor	As per specialist requirements.	All staff members are aware of the EMPr requirements relevant to them  Ensure the EMPr is adhered to.	Throughout Operation

## 9.4 Decommissioning Phase

### 9.4.1 On-going Stakeholder involvement

This is the process that is recommended when the proposed wind farms are decommissioned.

**Table 43: On-going Stakeholder involvement**

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT ACTIONS	TIME FRAME
Ongoing Stakeholder Involvement	<ol style="list-style-type: none"><li>1. Community to be notified, as culturally appropriate, timeously of the planned decommissioning, e.g.:<ul style="list-style-type: none"><li>• Proposed decommissioning start date; and</li><li>• Process to be followed.</li></ul></li><li>2. Recommend that a meeting with community leader(s) be held before decommissioning commence to inform them:<ul style="list-style-type: none"><li>• What activities will take place during the decommissioning phase.</li><li>• How these activities will impact upon the communities and/or their properties.</li><li>• Regarding the timeframes of scheduled activities</li></ul></li><li>3. Regular interaction between the client and community leader(s) during the decommissioning phase</li><li>4. A reporting office/ channel to be established should community members experience problems with contractors/ sub-contractors during the decommissioning phase.</li><li>5. A register to be kept of problems reported by community members and the steps taken to address / resolve it.</li></ol>	Holder of the EA	Clear communication channels maintained	During decommissioning

### 9.4.2 Waste Management

This section deals with the issues relative to waste management during the decommissioning phase.

**Table 44: Waste Management**

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	IMPACT MANAGEMENT ACTIONS	TIME FRAME
<b>MITIGATION</b>	<ol style="list-style-type: none"> <li>1. All decommissioned equipment must be removed from site and disposed of at a registered land fill. Records of disposal must be kept.</li> <li>2. Wind turbines must be returned to the manufacturer or relevant recycling agent to be recycled.</li> </ol>	Holder of the EA	All waste managed according to approved Method Statement	During decommissioning

### 9.4.3 Agriculture and Soils

This section deals with the issues relative to agriculture and soils during the decommissioning phase.

**Table 45: Agriculture and Soils**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/ FREQUENCY
Aspect: Protection of soil resources <b>Erosion</b>	1. Implement an effective system of storm water run-off control, where it is required - that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all accumulation points and it must prevent any potential down slope erosion.	ECO	Undertake a periodic site inspection to verify and inspect the effectiveness and integrity of the storm water run-off control system and to specifically record the occurrence of any erosion on site or downstream. Corrective action must be implemented to the run-off control system in the event of any erosion occurring.	That disturbance and existence of hard surfaces causes no erosion on or downstream of the site.	Every 2 months during the decommissioning phase, and then every 6 months after completion of decommissioning, until final sign-off is achieved.
Aspect: Protection of soil resources <b>Erosion</b>	2. Maintain where possible all vegetation cover and facilitate re-vegetation of	ECO	Undertake a periodic site inspection to record the occurrence of and re-vegetation	That vegetation clearing does not	Every 4 months during the decommissioning

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/ FREQUENCY
	denuded areas throughout the site, to stabilize disturbed soil against erosion.		progress of all areas that require re-vegetation.	pose a high erosion risk.	phase, and then every 6 months after completion of decommissioning, until final sign-off is achieved.
Aspect: Protection of soil resources <b>Topsoil loss</b>	1. If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re-spreading during rehabilitation. During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.	ECO	Record GPS positions of all occurrences of below-surface soil disturbance (e.g. excavations). Record the date of topsoil stripping and replacement. Check that topsoil covers the entire disturbed area.	That topsoil loss is minimised	As required, whenever areas are disturbed.

#### 9.4.4 Avifauna

This section deals with the issues relative to avifauna during the decommissioning phase.

**Table 46: Avifauna**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/ FREQUENCY
Avifauna: Displacement due to disturbance: The noise and movement associated with the de-	A site-specific EMPr must be implemented, which gives appropriate and detailed description of how construction activities must be conducted. All contractors are to adhere to the EMPr and should apply good environmental practice	Contractor and ECO	1. Implementation of the EMPr. Oversee activities to ensure that the EMPr is implemented and enforced via site audits and	Prevent unnecessary displacement of avifauna by ensuring that contractors are	1. On a daily basis 2. Weekly 3. Weekly 4. Weekly 5. Weekly



ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES/ FREQUENCY
commissioning activities at the WEF footprint will be a source of disturbance which would lead to the displacement of avifauna from the area	<p>during construction. The EMPr must specifically include the following:</p> <ol style="list-style-type: none"> <li>1. No off-road driving;</li> <li>2. Maximum use of existing roads, where possible;</li> <li>3. Measures to control noise and dust according to latest best practice;</li> <li>4. Restricted access to the rest of the property;</li> <li>5. Strict application of all recommendations in the botanical specialist report pertaining to the limitation of the footprint.</li> </ol>		<p>inspections. Report and record any non-compliance.</p> <ol style="list-style-type: none"> <li>2. Ensure that construction personnel are made aware of the impacts relating to off-road driving.</li> <li>3. Access roads must be demarcated clearly. Undertake site inspections to verify.</li> <li>4. Monitor the implementation of noise control mechanisms via site inspections and record and report non-compliance.</li> <li>5. Ensure that the construction area is demarcated clearly and that construction personnel are made aware of these demarcations. Monitor via site inspections and report non-compliance.</li> </ol>	aware of the requirements of the EMPr)	

### 9.4.5 Bats

This section deals with the issues relative to bats during the decommissioning phase.

**Table 47: Bats**

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
DECOMMISSIONING PHASE					
Removal of turbines Bat disturbance due to decommissioning activities and associated noise, especially during night-time.	Mitigate disturbance due to decommissioning activities.	<div>1. Except for compulsory lighting required in terms of civil aviation, artificial lighting during construction should be minimised, especially bright lights or spotlights.</div> <div>2. Night-time decommissioning activities should be avoided as far as possible.</div> <div>3. Develop a decommissioning and remedial rehabilitation plan and adhere to compliance monitoring plan.</div>	Implement a decommissioning and rehabilitation plan to reduce the development footprint.	During decommissioning phase.	Site manager/ECO

## 9.4.6 Biodiversity

This section deals with the issues relative to biodiversity during the decommissioning phase.

**Table 48: Biodiversity**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
<p>Loss of species of special concern:</p> <p>The construction activities will result in the disturbance of terrestrial habitats that contain listed and or protected plant or animal species. However, none of the plant species were observed during this assessment within the buildable area</p>	<ol style="list-style-type: none"> <li>1. Develop and implement a Rehabilitation and Monitoring plan post Environmental Authorisation. This plan should include relocation of suitable plant species, but more importantly protect any topsoil stores and promote the collection of vegetative material and propagules / seed to assist with the revegetation of the site.</li> <li>2. Rapid regeneration of plant cover must be encouraged by setting aside topsoil during earthmoving and replacing onto areas where the re- establishment of plant cover is desirable to prevent erosion.</li> </ol>	Holder of the EA ECO/specialist	Construction Monitoring and audit reports	<p>Impacts avoided or managed as per specialist recommendations.</p> <p>Alien Plant Management Plan Implemented</p> <p>Plant Rehabilitation Implemented</p> <p>Ensure the conditions of the EA are adhered to.</p>	Throughout Decommissionin g
<p>Loss of terrestrial habitats – flora and vegetation:</p> <p>The construction of the proposed infrastructure will require the need to clear vegetation which could then have a secondary impact on ecological connectivity and especially Critical Biodiversity Areas, linked to the large riverine corridors.</p>	<ol style="list-style-type: none"> <li>1. The development of a Rehabilitation and Monitoring plan prior to construction. All alien plant re-growth, which is currently low within the greater region must be monitored and should it occur, these plants must be eradicated within the project footprints.</li> <li>2. Rapid regeneration of plant cover must be encouraged by setting aside topsoil during earthmoving and replacing onto areas where the re- establishment of plant cover is desirable to prevent erosion.</li> </ol>	Holder of the EA ECO/specialist	Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations.	Throughout Decommissionin g
<p>Loss of terrestrial species – fauna:</p>	<ol style="list-style-type: none"> <li>1. Clear demarcation during the construction phase of all undisturbed sensitive areas that are not within the direct footprint of the REF to ensure that</li> </ol>	Holder of the EA ECO/specialist	Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations.	Throughout Decommissionin g

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
Although most of the species observed are mobile, the increase in vehicle movement could result in an increase in road mortalities.	<p>there is no uncontrolled access by construction vehicles and labourers.</p> <ol style="list-style-type: none"> <li>ECO / EO (whichever is applicable) must be present on a daily basis to remove any reptiles such as the Karoo Padloper if present.</li> <li>Educate contractors as to the importance of the undisturbed conservation areas and importance of avoiding them;</li> <li>All vehicles must stick to designated and prepared roads and adhere to the speed limit on site of 40km/hr.</li> <li>Mitigating the risk of poaching by fencing in the accommodation compounds of the construction crews, to prevent individuals from wandering in the veld after hours; banning the possession of dogs on site by construction and maintenance staff</li> </ol>				

#### 9.4.7 Aquatic/ Surface Water

This section deals with the issues relative to aquatic/ surface water during the decommissioning phase.

**Table 49: Aquatic/ Surface Water**

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
<p>Loss of aquatic species of special concern</p> <p>The decommissioning activities will result in the disturbance of aquatic</p>	<ol style="list-style-type: none"> <li>Develop and implementation of a Rehabilitation and Monitoring plan post Environmental Authorisation. This must be developed following the finalisation of the turbine / road layout and a walk down has been completed. This plan should include relocation of suitable plant species, but more important protect any topsoil stores and promote</li> </ol>	Holder of the EA	Construction Monitoring and audit reports	Impacts avoided or managed as per specialist recommendations.	Throughout Decommissioning

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
habitats that may contain listed and or protected plant or animal species. However, none of these were observed during this assessment within the buildable areas proposed.	<p>the collection of vegetative material and propagules / seed to assist with the revegetation of the site, if and where possible.</p> <p>2. Rapid regeneration of plant cover must be encouraged by setting aside topsoil during earthmoving and replacing onto areas where the re- establishment of plant cover is desirable to prevent erosion.</p>			Ensure the conditions of the EA are adhered to.	
<p>Damage or loss of riparian and alluvial systems in the decommissioning phase:</p> <p>Decommissioning could result in the loss of drainage systems that are fully functional and provide ecosystem services within the site especially where new access roads are required, or road upgrades will widen any current bridges or drifts. Loss can also include a functional loss, through change in vegetation type via alien encroachment for example.</p>	<p>1. Development of a detailed stormwater management plan and Aquatic Rehabilitation and Monitoring plan, prior to construction.</p> <p>2. All alien plant re-growth, which is currently low within the greater region must be monitored and should it occur, these plants must be eradicated within the project footprints and especially in areas near the proposed crossings. Where roads and crossings are upgraded, the following applies:</p> <p>3. Existing pipe culverts must be removed and replaced with suitable sized box culverts, especially where road levels are raised to accommodate any large vehicles.</p> <p>4. River levels, regardless of the current state of the river / water course, must be reinstated thus preventing any impoundments from being formed. The related designs must be assessed by an aquatic specialist prior to construction.</p> <p>5. Where large cut and fill areas are required, these must be stabilised and rehabilitated during the construction process, to minimise erosion and sedimentation.</p> <p>6. Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use during the construction</p>	Holder of the EA	Construction Monitoring and audit reports	<p>Impacts avoided or managed as per specialist recommendations.</p> <p>Ensure the conditions of the EA are adhered to.</p>	Throughout Decommissioning

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
	<p>phase. Any erosion / sedimentation must be resolved through whatever additional interventions maybe necessary (i.e., extension, energy dissipaters, spreaders, etc).</p> <p>7. A detailed monitoring plan must be developed in the pre-construction phase by an aquatic specialist, where any delineated system occurs within 50 m of existing crossings.</p>				
<p>Potential impact on localised surface water quality (construction materials and fuel storage facilities) during the construction and decommissioning phases</p> <p>During construction earthworks will expose and mobilise earth materials, and a number of materials as well as chemicals will be imported and used on site and may end up in the surface water, including soaps, oils, grease and fuels, human wastes, cementitious wastes, paints and solvents, etc. Any spills during transport or while works area conducted in proximity to a watercourse has the potential to affect the surrounding biota. Leaks or</p>	<ol style="list-style-type: none"> <li>1. All liquid chemicals including fuels and oil, including the BESS must be stored in with secondary containment (bunds or containers or berms) that can contain a leak or spill. Such facilities must be inspected routinely and must have the suitable PPE and spill kits needed to contain likely worst-case scenario leak or spill in that facility, safely.</li> <li>2. Washing and cleaning of equipment must be done in designated wash bays, where rinse water is contained in evaporation/sedimentation ponds (to capture oils, grease cement and sediment).</li> <li>3. Mechanical plant and bowzers must not be refueled or serviced within 100m of a river channel.</li> <li>4. All construction camps, lay down areas, wash bays, batching plants or areas and any stores should be more than 50 m from any demarcated water courses.</li> <li>5. Littering and contamination associated with construction activity must be avoided through effective construction camp management; No stockpiling should take place within or near a water course. All stockpiles must be protected and located in flat areas where run-off will be minimised, and sediment is recoverable.</li> </ol>	Holder of the EA	Construction Monitoring and audit reports	<p>Impacts avoided or managed as per specialist recommendations.</p> <p>Ensure the conditions of the EA are adhered to.</p>	Throughout Decommissioning

ASPECT/ IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES /FREQUENCY
<p>spills from storage facilities also pose a risk and due consideration to the safe design and management of the storage facility must be given.</p> <p>Although unlikely, consideration must also be provided for the proposed BESS, with regard safe handling during the construction phase. This to avoid any spills or leaks from this system.</p>					

#### 9.4.8 Noise

This section deals with the issues relative to noise during the decommissioning phase.

**Table 50: Noise**

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
<p><b>Noise impacts during the day:</b></p> <p>Decommissioning activities</p>	<ol style="list-style-type: none"> <li>Decommissioning activities normally are limited to the daytime period, due to the lower urgency to complete this phase; and</li> <li>Decommissioning activities normally use smaller and less equipment, generating less noise than the typical construction or operational phases.</li> </ol>	Holder of EA/Contractor	As per SANS 10103:2008	<p>Reduction in Noise and thus reduction in chance of complaints arising.</p> <p>Noise and lighting managed according</p>	<p>Semi-continuous measurements conducted over a period of at least 48 hours, covering at least</p>

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
				to approved Method Statement  Ensure the EMPr is adhered to.	a full day (06:00 – 22:00) and two full night-time (22:00 – 06:00)
<b>Noise impacts at night:</b> Decommissioning activities	<ol style="list-style-type: none"> <li>Decommissioning activities normally are limited to the daytime period, due to the lower urgency to complete this phase; and</li> <li>Decommissioning activities normally use smaller and less equipment, generating less noise than the typical construction or operational phases</li> </ol>	Holder of EA/Contractor	As per SANS 10103:2008	Reduction in Noise and thus reduction in chance of complaints arising.  Noise and lighting managed according to approved Method Statement  Ensure the EMPr is adhered to.	Semi-continuous measurements conducted over a period of at least 48 hours, covering at least a full day (06:00 – 22:00) and two full night-time (22:00 – 06:00)

#### 9.4.9 Heritage

This section deals with the issues relative to Heritage during the decommissioning phase.

**Table 51: Heritage**



IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
<b>Cultural landscape</b> - Ecological	<ol style="list-style-type: none"> <li>1. Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), including wetlands and dams, should be protected from development as far as possible of the wind turbines or any associated development during all phases.</li> <li>2. No wind turbines should be placed within the 1:100-year flood line of the watercourses, unless otherwise advised by the aquatic specialist. In the context of the sensitivity to soil erosion in the area, as well as potential archaeological resources, it would be a risk to include any structures close to these drainage lines. This recommendation can be waived if the archaeological or hydrological / aquatic specialist reports recommend different buffers.</li> <li>3. Remaining areas of endemic and endangered natural vegetation should be conserved in line with relevant specialist buffers.</li> <li>4. Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), should be protected as far as possible from development of the wind turbines or any associated development during all phases in line with relevant ecological and aquatic specialist recommended buffers.</li> <li>5. Areas of critical biodiversity should be protected from any damage during all phases, where indigenous and endemic vegetation should be preserved at all cost.</li> <li>6. Areas of habitat are found among the rocky outcrops and contribute to the character, as well as biodiversity of the area. Care should be taken that habitats are not needlessly destroyed.</li> </ol>	Holder of the EA/Contractor	Not Applicable	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 38 of NHRA	Throughout Decommissioning

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<ol style="list-style-type: none"> <li>Identified medicinal plants used for healing or ritual purposes should be conserved during all phases if threatened for use.</li> <li>Careful planning should incorporate areas for stormwater runoff where the base of the structure disturbed the natural soil. Local rocks found on the site could be used to slow stormwater (instead of concrete, or standard edge treatments), and prevent erosion that would be an unfortunate consequence that would alter the character of the site. By using rocks from site it helps to sensitively keep to the character.</li> </ol>				
<b>Cultural landscape</b> - Aesthetic	<ol style="list-style-type: none"> <li>Encourage mitigation measures (for instance use of vegetation) to 'embed' or disguise the proposed structures within the surrounding tourism and agricultural landscape at ground level, road edges etc;</li> <li>The continuation of the traditional use of material could be enhanced with the use of the rocks on the site as building material. This would also help to embed structures into the landscape and should not consist of shipping containers or highly reflective untreated corrugated sheeting that clutters the landscape and is exacerbates the foreign intrusion on the natural matte landscape.</li> <li>Using material found on the site adds to the sense of place and reduces transportation costs of bringing materials to site.</li> <li>The local material such as the rocks found within the area could be applied to address storm water runoff from the road to prevent erosion.</li> <li>Duration and magnitude of construction/ decommissioning activity must be minimized as far possible to reduce the impact of heavy vehicles on the roads as well as the</li> </ol>	Holder of the EA/Contractor	Not Applicable	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 38 of NHRA	Throughout Decommissioning

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	associated dust from the activity. Lightest vehicles possible should be used to reduce degradation to the farm roads and the need to upgrade roads to scale and extent that negatively impacts on the integrity of the historic farm roads. Construction/ decommissioning traffic must operate at speeds that reduce dust and noise as far possible.				
<b>Cultural landscape</b> - Historic	<ol style="list-style-type: none"> <li>1. Historic farmsteads must be protected from the impacts of heavy construction vehicles and increased numbers of people. No construction traffic should pass through or closer than 50m to any outlying graded heritage structure, which includes the associated historically cultivated lands, cemeteries, unmarked burials. The most appropriate use of existing farm roads must be found to avoid farm werfs as far as possible and reduce construction impact on these heritage features. The AIA buffer recommendations should take preference for identified archaeological heritage resources.</li> <li>2. Duration and magnitude of construction/ decommissioning activity must be minimized as far possible to reduce the impact of heavy vehicles on the roads as well as the associated dust from the activity. Lightest vehicles possible should be used to reduce degradation to the farm roads and the need to upgrade roads to scale and extent that negatively impacts on the integrity of the historic farm roads. Construction decommissioning traffic must operate at speeds that reduce dust and noise as far possible.</li> <li>3. Accommodation of construction staff must not negatively impact on existing farm residents or degrade the integrity of the farmstead complexes and should, without negative impact to ecological or aesthetic resources, be located outside of the farmstead complexes or site. Farm residents should be consulted on the preferable location for construction staff accommodation.</li> <li>4. Traditional planting patterns should be protected by ensuring that existing trees are not destroyed as these</li> </ol>	Holder of the EA/Contractor	Not Applicable	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 38 of NHRA	Throughout Decommissioning

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<p>signify traces of cultural intervention in a harsh environment. These planting patterns include the trees planted around the werfs and along travel routes. Interpretation of these landscape features as historic remnants should occur. A buffer of 50m around such planting patterns, associated with cultural landscapes elements and farmsteads as identified in this report, should be maintained.</p> <p>5. Burial grounds and places of worship are automatically regarded as Grade IIIa or higher. Any development that threatens the inherent character of family burial grounds must be assessed and a buffer of 50m around all burial ground or unmarked graves should be in place. No turbines have been proposed for placement near known unmarked burials or family cemeteries. These recommendations should be considered together with the AIA report and the AIA recommendations should take preference for stand-alone burial grounds or graves where they are not associated with other heritage features or cultural landscape elements.</p> <p>6. Mountain slopes have been used for traditional practices for many years, and care should be taken that any significant cultural sites, such as burials and veldkos/medicinal plant resources, are not disturbed.</p> <p>7. Farms in the area followed a system of stone markers to demarcate the farm boundaries in the area. Where these structures are found on the site, care should be taken that they are not needlessly destroyed, as they add to the layering of the area.</p> <p>8. Roads running through the area have historic stone way markers. Where these are found, care should be taken that they are left intact and in place. Road upgrades and or new roads must not move or threaten their position and they should be visible from the road they are related to by passing travellers. Final buffers for stone markers will be for identification and mitigation in collaboration with the</p>				

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<p>ECO prior to construction and approval by heritage specialist.</p> <p>9. Where the historic function of a building/site is still intact, the function has heritage value and should be protected.</p> <p>10. Surviving examples (wagon routes, outspans, and commonage), where they are owned in some public or communal way (or by a body responsible for acting in the public interest) and where they are found to be actively operating in a communal way, will have cultural and heritage value and should be enhanced and retained. The historic route running through Heuweltjies should be maintained and integrity as a communal road for farm residents must be retained.</p>				
<b>Cultural landscape</b> - Socio-economic	<p>1. An updated cultural landscapes impact assessment report must be completed should the WEF continue to be used after the term granted in this application. This report should include a detailed assessment of the socio-economic impacts to the cultural landscape and its outcomes and recommendations need to be considered in the decision for recommissioning and be implemented if recommissioning is approved.</p> <p>2. The continued use of the landscape for human habitation and cultivation by historic residents of the area, should be retained and encouraged as far possible to sustain the continual use pattern and human-environment relationship which is the ultimate significance of this cultural landscape element. The WEF development must allow and support this, including financially, and not degrade this continued relationship.</p> <p>3. The local community on and around the development should benefit from job opportunities created by the proposed development and the development should not cause reduction in economic viability of surrounding</p>	Holder of the EA/Contractor	Not Applicable	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 38 of NHRA	Throughout Decommissioning

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
	<p>properties in excess of those offered by the development. Short-term job opportunities at the expense of long-term economic benefit and local employment opportunities must be prevented.</p> <p>4. Local residents must be offered the opportunity for employment on the construction/ decommissioning and operational phases before 'importing' staff from elsewhere.</p> <p>5. Local residents must be offered employment training opportunities associated with WEF developments at all phases.</p> <p>6. Sheep, cattle or game farming should be allowed to continue below the wind turbines or be rehabilitated to increase biodiversity in the area.</p>				

#### 9.4.10 Visual

This section deals with the issues relative to visual during the decommissioning phase.

**Table 52: Visual**

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Potential visual intrusion resulting from vehicles and equipment involved in the decommissioning process;	<ol style="list-style-type: none"> <li>1. All infrastructure that is not required for post-decommissioning use should be removed.</li> <li>2. Carefully plan to minimize the decommissioning period and avoid delays.</li> <li>3. Maintain a neat decommissioning site by removing rubble and waste materials regularly.</li> <li>4. Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase.</li> </ol>	Holder of the EA/Contractor	As per specialist requirements.	reduced visual intrusion	Throughout Decommissioning

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
<p>Potential visual impacts of increased dust emissions from decommissioning activities and related traffic; and</p> <p>Potential visual intrusion of any remaining infrastructure on the site.</p>	<p>5. All cleared areas should be rehabilitated as soon as possible.</p> <p>6. Rehabilitated areas should be monitored post-decommissioning and remedial actions implemented as required.</p>				

#### 9.4.11 Transportation

This section deals with the issues relative to transportation during the decommissioning phase.

**Table 53: Transportation**

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
<p>Additional Traffic Generation: Increase in Traffic</p>	<p>1. Ensure staff transport is done in the 'off peak' periods and by bus.</p> <p>2. Stagger material, component and abnormal loads.</p>	Holder of the EA/Contractor	As per specialist requirements.	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Throughout Decommissioning

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Additional Traffic Generation: Increase of Incidents with pedestrians and livestock	<ol style="list-style-type: none"> <li>1. Reduction in speed of vehicles</li> <li>2. Adequate enforcement of the law</li> <li>3. Implementation of pedestrian safety initiatives</li> <li>4. Regular maintenance of farm fences &amp; access cattle grids.</li> </ol>	Holder of the EA/Contractor	As per specialist requirements.	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Throughout Decommissioning
Additional Traffic Generation: Increase in Dust from gravel roads	<ol style="list-style-type: none"> <li>1. Reduction in speed of the vehicles</li> <li>2. Appropriate, timely and high quality maintenance required in terms of TRH20</li> <li>3. Possible use of an approved dust suppressant techniques</li> <li>4. Implement a road maintenance program under the auspices of the respective transport department.</li> <li>5. Construction of an on-site batching plant and tower construction to reduce trips.</li> </ol>	Holder of the EA/Contractor	As per specialist requirements.	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Throughout Decommissioning
Additional Traffic Generation: Increase in Road Maintenance	<ol style="list-style-type: none"> <li>1. Implement a road maintenance program under the auspices of the respective transport department.</li> </ol>	Holder of the EA/Contractor	As per specialist requirements.	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Throughout Decommissioning
Additional Abnormal Loads	<ol style="list-style-type: none"> <li>1. Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods or stagger delivery.</li> <li>2. Adequate enforcement of the law</li> </ol>	Holder of the EA/Contractor	As per specialist requirements.	<p>All staff members are aware of the EMPr requirements relevant to them</p>	Throughout Decommissioning



IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
				Ensure the EMPr is adhered to.	
Internal Access Roads: Increase in Dust from gravel roads	<ol style="list-style-type: none"> <li>1. Enforce a maximum speed limit on the development</li> <li>2. Appropriate, timely and high quality maintenance required in terms of TRH20</li> <li>3. Possible use of an approved dust suppressant techniques</li> </ol>	Holder of the EA/Contractor	As per specialist requirements.	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Throughout Decommissioning
Internal Access Roads: New / Larger Access points	<ol style="list-style-type: none"> <li>1. Adequate road signage according to the SARTSM</li> <li>2. Approval from the respective roads department</li> </ol>	Holder of the EA/Contractor	As per specialist requirements.	<p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Ensure the EMPr is adhered to.</p>	Throughout Decommissioning

#### 9.4.12 Social

This section deals with the issues relative to social during the decommissioning phase.

**Table 54: Social**

IMPACT	IMPACT MANAGEMENT ACTIONS	RESPONSIBILITY	METHOD	IMPACT MANAGEMENT OUTCOMES	TIMEFRAMES
Increased criminal activity Similarly, to the construction phase, numerous people will be moving through the project area during decommissioning activities. Contractors and related staff will need to cross private property to get to the site, which could provide an opportunity for criminals.	1. Mitigation to be applied as described in the construction phase.	Holder of the EA/Contractor	As per specialist requirements.	Ensure the EMPr is adhered to.	Throughout Decommissioning
Increased fire hazard An increased human presence during decommissioning potentially adds to the risk of accidental veld fires resulting from decommissioning activities which could result from exposed fires for cooking and warmth, cigarettes, burning of fire breaks, and the use of flammable liquids.	1. Mitigation to be applied as described in the construction phase	Holder of the EA/Contractor	As per specialist requirements.	Ensure the EMPr is adhered to.	Throughout Decommissioning
Improved visual landscape. Earlier, reference was made to the WEF negatively impacting the sense of place of that area because of its impact to the visual landscape. After decommissioning, it is expected that this visual impact will be substantially less or completely reversed if the landscape is returned to its original condition.	1. Mitigation to be applied as described in the construction phase.	Holder of the EA/Contractor	As per specialist requirements.	Ensure the EMPr is adhered to.	Throughout Decommissioning
Increased employment opportunities. It is anticipated that this impact will manifest similarly as is described for the construction phase.be taken into account	1. Mitigation to be applied as described in the construction phase.	Holder of the EA/Contractor	As per specialist requirements.	Ensure the EMPr is adhered to.	Throughout Decommissioning
Increased opportunities for local SMEs It is anticipated that this impact will manifest similarly as is described for the construction phase.	1. Mitigation to be applied as described in the construction phase.	Holder of the EA/Contractor	As per specialist requirements.	Ensure the EMPr is adhered to.	Throughout Decommissioning

## 10. ENVIRONMENTAL AWARENESS PLAN

Appendix 4 of GN R326 EIA Regulations 2014 (as amended) requires that an Environmental Awareness Plan describes the manner in which *“the applicant intends to inform his or her employees of any environmental risk which may result from their work; and risks must be dealt with in order to avoid pollution or the degradation of the environment”*. In recognition of the need to protect our environment, environmental management should not only be seen as a legal obligation but also as a moral obligation.

This Environmental Awareness Plan is intended to create the required awareness and culture with personnel and contractor's / service providers on environmental safety and health issues associated with the development activities.

### 10.1 Policy on Environmental Awareness

This Environmental Awareness Plan must serve as the basis for the induction of all new employees (as well as contractors depending on the nature of their work on site) on matters as described herein and read in conjunction with the EMPr. The Plan will also be used to hone awareness of all employees on a continuous basis.

Specific environmental awareness performance criteria will also form part of the job descriptions of employees, to ensure diligence and full responsibility at all levels of the organisational work force.

### 10.2 Implementation of Environmental Awareness

General environmental awareness will be fostered among the project's workforce to encourage the implementation of environmentally sound practices throughout the project's duration. This will ensure that environmental accidents are minimised and environmental compliance maximised.

Environmental awareness will be fostered in the following manner:

- Induction course for all workers on site, before commencing work on site;
- Refresher courses as and when required;
- Daily toolbox talks with all workers on the site at the start of each day, where workers can be alerted to particular environmental concerns associated with their tasks for that day or the area/habitat in which they are working; and
- Displaying of information posters and other environmental awareness material at the general assembly points.

### 10.3 Training and awareness

The main contractor is to take responsibility for the management of their staff and subcontractors on the project site during the construction phase and always supervise them closely. The onus is on the contractor to make sure that all their staff and subcontractors fully comprehend the contents of the EMPr. The contractor must organise environmental awareness training programmes, which should be targeted at the two levels of employee: management and labour.

## 10.4 Training of construction workers

All construction staff must receive basic training in environmental awareness, including the storage and handling of hazardous substances, minimisation of disturbance to sensitive areas, management of waste, and prevention of water pollution. They must be informed of how to recognise historical / archaeological artefacts that may be uncovered. They must also be apprised of the EMPr's requirements. Environmental awareness training programmes need to be formulated for these employee levels and must comprise:

- A record of all names, positions and duties of staff to be trained;
- A framework for the training programmes;
- A summarised version of the training course(s); and
- An agenda for the delivery of the training courses.

Such programmes will set out the training requirements, which need to be conducted prior to any construction works occurring and will include:

- Acceptable behaviour with regard to flora and fauna;
- Management and minimising of waste, including waste separation;
- Maintenance of equipment to prevent the accidental discharge or spill of fuel, oil, lubricants, cement, mortar and other chemicals;
- Responsible handling of chemicals and spills;
- Environmental emergency procedures and incident reporting; and
- General code of conduct towards I&APs.

## 11. AMENDMENTS TO THE EMPR

The ECO has the right to request (in writing) a method statement to be compiled by the contractor in cases where the Construction EMPr may not adequately address the issue or nature of the activity/site warrants the need thereof. The method statement must be approved in writing by the ECO prior to carrying out the activity.

Any major issues not covered in the EMPr as submitted as well as any layout changes, will be addressed as an addendum to the EMPr and must be submitted for approval prior to implementation.

Authorised officials of the Department reserve the right to review the approved EMPr during the construction and operational phases of the above-mentioned activity and amend/add any condition as it is deemed necessary. Authorised officials also reserve the right to inspect the project during both construction and operational phase of development.



**Annexure A:**

**Curriculum Vitae**

[illegible]



## Annexure C:

# Complaints Record Sheet

*Complaints Record Sheet*

COMPLAINTS RECORD SHEET	File Ref:	DATE:
	Page .... of ....	.....
COMPLAINT RAISED BY:		
CAPACITY OF COMPLAINANT:		
COMPLAINT RECORDED BY:		
COMPLAINT:		
PROPOSED REMEDIAL ACTION:		
EO: _____ Date: _____		
NOTES BY ECO:		
EO: _____ Date: _____ Site Manager: _____ Date: _____		



## Annexure D:

# Environmental Noise Monitoring Plan

Environmental Noise Monitoring can be divided into two distinct categories, namely:

- Passive monitoring – the registering of any complaints (reasonable and valid) regarding noise; and
- Active monitoring – the measurement of ambient sound (or noise) levels at identified locations.

Because the total projected noise levels would be higher than 42 dBA (higher than the projected residual noise level, as well as more than 7 dBA of the night-time rural rating level), active noise monitoring is recommended.

In addition, should a reasonable and valid noise complaint be registered, the WEF developer should investigate the noise complaint as per the guidelines below. These guidelines should be used as a rough guideline as site specific conditions may require that the monitoring locations, frequency or procedure be adapted.

### Measurement Localities and Frequency

Once-off noise measurements are recommended at the location of NSD06 before the construction phase start, to allow the defining of existing ambient sound levels. Once the WEF is operational, noise measurements should be repeated to assess the noise levels at NSD06. If the dwellings at NSD06 are not used for residential purposes, no noise monitoring would be required.

Should there be a noise complaint, once-off noise measurements must be conducted at the location of the person that registered a valid and reasonable noise complaint. The measurement location should consider the direct surroundings to ensure that other sound sources cannot influence the reading.

### Measurement Procedures

Ambient sound measurements should be collected as defined in SANS 10103:2008, though the protocols as defined by ETSU-R97 are recommended. Due to the variability that naturally occurs in sound levels at most locations, it is recommended that semi-continuous measurements are conducted over a period of at least 48 hours, covering at least a full day- (06:00 – 22:00) and night-time (22:00 – 06:00) period. Spectral frequencies should also be measured to define the potential origin of noise. When a noise complaint is being investigated, measurements should be collected during a period or in conditions similar to when the receptor experienced the disturbing noise event.





## **Annexure E:**

# **Summary of Specialist Findings and Recommendations**



## **Annexure F:**

# **Avifaunal Operational Monitoring Plan**

# OPERATIONAL MONITORING PLAN WEF

## 1 INTRODUCTION

The avifaunal post-construction monitoring at the proposed Heuweltjies WEF must be conducted in accordance with the latest version (2015) of the *Best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa* (Jenkins *et al.*, 2015)<sup>1</sup>.

## 2 AIM OF POST-CONSTRUCTION MONITORING

The avifaunal post construction monitoring aims to assess the impact of each proposed WEF by comparing pre- and post- construction monitoring data and to measure the extent of bird fatalities caused by each WEF. Post-construction monitoring is therefore necessary to:

- Confirm as far as possible what the actual impacts of each WEF are on avifauna; and
- Determine what mitigation is required if need be (adaptive management).

The proposed post-construction monitoring can be divided into three categories:

- Habitat classification;
- Quantifying bird numbers and movements (replicating baseline pre-construction monitoring); and
- Quantifying bird mortalities.

Post-construction monitoring will aim to answer the following questions:

- How has the habitat available to birds in and around each WEF changed?
- How has the number of birds and species composition changed?
- How have the movements of priority species changed?
- How has each WEF affected priority species' breeding success?
- How many birds collide with the turbines of each WEF? And are there any patterns to this?
- What mitigation is necessary to reduce the impacts on avifauna?

## 3 TIMING

Post-construction monitoring should commence as soon as possible after the first turbines become operational to ensure that the immediate effects of each facility on resident and passing birds are recorded, before they have time to adjust or habituate to the developments. However, it should be borne in mind that it is also important to obtain an understanding of the impacts of the facilities as they would be over the lifespan of the facilities. Over time the habitat within each WEF may change, birds may become habituated to, or learn to avoid the facilities. It is therefore necessary to monitor over a longer period than just an initial one year.

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<sup>1</sup> Jenkins, A.R., Van Rooyen, C.S., Smallie, J.J., Anderson, M.D., & A.H. Smit. 2015. Best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa. Produced by the Wildlife & Energy Programme of the Endangered Wildlife Trust & BirdLife South Africa.

## **4 DURATION**

Monitoring should take place in Year 1 and 2 of the operational phase of each proposed WEF, and then repeated in Year 5 and every five years after that. After the first year of monitoring, the programme should be reviewed in order to incorporate significant findings that may have emerged. This may entail the revision of the number of turbines to be searched, and the size of the search plots, depending on the outcome of the first year of monitoring. If significant impacts are observed, i.e., exceeding predetermined thresholds, and mitigation is required, the matter should be taken up with the operator to discuss potential mitigation. In such instances the scope of monitoring could be reduced to focus only on the impacts of concern.

## **5 HABITAT CLASSIFICATION**

Any observed changes in bird numbers and movements at each WEF may be linked to changes in the available habitat. The avian habitats available must be mapped once a year for the first two years, then in year 5 and thereafter in 5-yearly intervals.

## **6 BIRD NUMBERS AND MOVEMENTS**

In order to determine if there are any impacts relating to displacement and/or disturbance, all methods used to estimate bird numbers and movements during baseline monitoring must be applied as far as is practically possible in the same way to post-construction work in order to ensure maximum comparability of these two data sets. This includes sample counts of small terrestrial species, counts of large terrestrial species and raptors, focal site surveys and vantage point surveys according to the current best practice.

## **7 COLLISIONS**

The collision monitoring must have three components:

- Experimental assessment of search efficiency and scavenging rates of bird carcasses on the respective sites.
- Regular searches in the immediate vicinity of the WEF turbines for collision casualties (see Section 9).
- Estimation of collision rates.

## **8 SEARCHER EFFICIENCY AND SCAVENGER REMOVAL**

The value of surveying the area for collision victims is only valid if some measure of the accuracy of the survey method is developed. The probability of a carcass being detected and the rate of removal / decay of the carcass must be accounted for when estimating collision rates. This must be addressed in the form of searcher and scavenger trails which must be conducted by the avifaunal specialists at least twice a year during each year of post-construction monitoring in order to arrive at an estimated annual collision mortality rate.

## **9 COLLISION VICTIM SURVEYS**

### **9.1 Aligning carcass search protocols**

The carcass search protocol must be agreed upon between the bat and bird specialists to constitute an acceptable compromise between the current best practice guidelines for bird and bat monitoring.

Daily carcass searches must begin as early in the mornings as possible to reduce carcass removal by scavengers. A carcass searcher must walk in straight line transects, 6m apart, covering 3m on each side. A team of searchers and one supervisor must be trained to implement the carcass searches. The searchers must have a vehicle available for transport per site. The supervisor must assist with the collation of the data at each site and to provide the data to the specialist in electronic format on a weekly basis. The specialists must ensure that the supervisor is completely familiar with all the procedures concerning the management of the data. The following must be sent to the specialist on a weekly basis:

- Carcass fatality data (hardcopy and scans as well as data entered into Excel spreadsheets);
- Pictures of any carcasses, properly labelled;
- GPS tracks of the search plots walked; and
- Turbine search interval spreadsheets.

When a carcass is found, it must be bagged, labelled and kept refrigerated for species confirmation by the avifaunal specialist.

## **9.2 Estimation of collision rates**

Observed mortality rates need to be adjusted to account for searcher efficiency and scavenger removal. There have been many different formulas proposed to estimate mortality rates. The available methodologies must be investigated, and an appropriate method will be applied. The current method which is used widely is the GenEst method.

# **10 DELIVERABLES**

## **10.1 Annual report**

An operational monitoring report must be completed at the end of each year of operational monitoring. As a minimum, the report must attempt to answer the following questions:

- How has the habitat available to birds in and around each WEF changed?
- How has the number birds and species composition changed?
- How have the movements of priority species changed?
- How has each WEF affected priority species' breeding success?
- What are the likely drivers of any changes observed?
- How many, and which species of birds collided with the turbines and associated infrastructure?  
And are there any patterns to this?
- What is the significance of any impacts observed?
- What mitigation measures are required to reduce the impacts?

## **10.2 Quarterly reports**

Concise quarterly reports must be compiled by the avifaunal specialist for the WEF operator with basic statistics and recommendations for the management of impacts that need to be addressed.



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