NALA ENVIRONMENTAL CONSULTING FIRM

15 November 2022

Dear Stakeholder and Interested & Affected Party,

FINAL ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT AND FINAL LAYOUT FOR THE AUTHORISED 147MW UMSINDE EMOYENI WIND ENERGY FACILITY AND ASSOCIATED INFRASTRUCTURE, NEAR MURRAYSBURG, WESTERN CAPE PROVINCE (DFFE REF: 14/12/16/3/3/2/686)

NOTIFICATION OF PUBLIC PARTICIPATION PROCESS: (AVAILABILITY OF FINAL LAYOUT AND EMPR FOR REVIEW AND COMMENT)

Umsinde Emoyeni Wind Farm (Pty) Ltd received Environmental Authorisation (EA) (DFFE Ref: 14/12/16/3/3/2/686) dated 06 September 2018 and further amendments to the EA dated, 20 April 2021 and the latest 07 June 2022 for the development of a 147MW Umsinde Emoyeni Wind Energy Facility and associated infrastructure near Murraysburg, in the Western Cape Province.

The project will include:

- Up to 33 wind turbines (capped at 147MW total capacity); hub height up to of 160 m, rotor diameter up to 180m;
- Permanent turbine hardstanding area of up to 55m by 35m;
- Three temporary laydown areas of up to 150m by 60m;
- Temporary turbine laydown areas;
- Electrical cabling (Underground cables (where practical) between the turbines) and onsite substation;
- Existing farm access tracks and watercourse crossings will be upgraded;
- Onsite office compound, including site offices, parking and an operation and maintenance facility including a control room.
- In addition to the key components outlined above, the WEF will also require:
- Anemometer masts;
- Security fencing; and
- CCTV monitoring towers.
- Internal access roads to each turbine (12m wide during construction, 4 – 6m wide during operation).

The following properties have been identified for the 147MW Umsinde Emoyeni Wind Energy Facility and associated infrastructure

- Portion 3 (Portion of Portion 1) of the Farm Driefontein No.26
- Portion 7 (De Tafel) Portion of Portion 2) of the Farm Driefontein No.26
- Portion 10 (Portion of Portion 1 of the Farm Driefontein No.26
- Remainder of Portion 2 of Farm Driefontein No.26

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- Portion 1 of the Farm Klein Driefontein No.152
- Remainder of the Farm Klein Driefontein No.152
- Portion 2, portion of Portion 9 of Farm Witteklip 32
- Remainder of the Farm De Hoop No. 30
- Portion 4 of the Farm De Hoop No.30

The authorised Umsinde Emoyeni Wind Energy Facility has been selected as a preferred bidder project via a private off take (i.e. private power purchase) procurement process, and construction is expected to commence in early 2023. The authorised Umsinde Emoyeni Wind Energy facility has been registered as a Strategic Integrated Project (SIP) as per the embedded generation investment programme with the Department of Public Works and Infrastructure.

Therefore, in order to meet financial close requirements and comply with the requirements of the Environmental Authorisation (as amended) i.e Condition 16 of the EA stipulates that the Environmental Management Programme (EMPr) submitted as part of the application for environmental authorisation must be amended and submitted to the Department for written approval prior to commencement of the activity. The recommendations and mitigation measures recorded in the EIR dated September 2018, subsequent amendments and final specialist walkthrough's must be incorporated as part of the EMPr. Once approved, the EMPr must be implemented and adhered to. As per Condition 14 of the Environmental Authorisation the applicant must submit a final layout plan for the entire wind energy facility for comment to Registered Interested and Affected Parties prior to submission to the Department for approval. The Layout should indicate the following:

- Turbine wind turbines and its associated infrastructure;
- Internal roads indicating width and length;
- Wetlands, drainage lines, rivers, stream and water crossings of roads and cables;
- All sensitive features e.g. heritage sites, wetlands, pans and drainage channels that will be affected by the facility and associated infrastructure;
- Substation (s) and/or transformer(s) sites including their entire footprint;
- Cable routes and trench dimensions (where they are not along internal roads);
- All existing infrastructure on the site, especially roads;
- Buildings including accommodation; and
- All no-go and buffer areas

In this regard, Umsinde Emoyeni Wind Farm (Pty) Ltd has prepared the Final Environmental Management Programme report and Final Layout for review and comment. In accordance with Environmental Authorisation issued, the Umsinde Emoyeni Wind Energy Facility EMPr and Site Layout are available for a 30-day public comment and review period from **15 November 2022 to 09 January 2023 (both days inclusive).** The relevant report can be downloaded from : https://nalaenvironmental.co.za/projects/final-environmental-management-programme-for-the-authorised-umsinde-emoyeni-wind-energy-facility-western-cape-province/

The Public Participation Process takes into consideration Chapter 2 and Chapter 6 (41 (b), (e) ,42,43 and 44) of GN R.326 of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) Regulations 2014 (as amended), promulgated under Section

24 (5) of the National Environmental Management Act)Act 107 of 1998- NEMA), as amended. Comments received from the competent authority, public and organs of states will be incorporated, addressed and responded to in the EMPr and Site Layout.

Nala Environmental was appointed as the independent environmental consultant to undertake the finalisation of the original EMPr and Final Layout for the Umsinde Emoyeni Wind Energy Facility.

As per the requirements of the Environmental Authorisation and specialist recommendations made during subsequent amendment process the following specialist pre-construction walkthrough assessments were undertaken by suitably qualified and registered specialist to inform the final layout and EMPr:

- Terrestrial Pre-construction Walkthrough (The Biodiversity Company);
- Aquatic Pre-construction Walkthrough (The Biodiversity Company);
- Avifauna Pre-construction Walkthrough (The Biodiversity Company);
- Bat Pre-construction Walkthrough (Inkululeko Wildlife Services (Pty) Ltd);
- Heritage and Palaeontological Pre-construction Walkthrough (PGS Heritage (Pty) Ltd, Banzai Environmental)

You and/or the organisation, which you represent, has been identified as an Interested and Affected Party (I&AP) to review and comment of the Final EMPr and Layout.

Our team welcomes your participation and looks forward to your involvement throughout this process. We also welcome you to share this information with others that you feel will have an interest in this process.

Kind regards,

Arlene Singh
Environmental Consultant
E-mail: publicparticipation@nalaenvironmental.co.za

NALA

ENVIRONMENTAL

CONSULTING FIRM

FINAL ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE 147MW UMSINDE EMOYENI WIND ENERGY FACILITY AND ASSOCIATED INFRASTRUCTURE, NEAR MURRAYSBURG, WESTERN CAPE PROVINCE

NOVEMBER 2022

DOCUMENT DETAILS

Applicant	:	Umsinde Emoyeni Wind Farm (Pty) Ltd
Title	:	Final Environmental Management Programme for the for the 147MW Umsinde Emoyeni Wind Energy Facility and associated Infrastructure, near Murraysburg, Western Cape Province
Authors/EAP	:	Nala Environmental (Pty) Ltd Arlene Singh (SACNASP) Norman Chetsanga (SACNASP) Justin Jacobs
Purpose of Report	:	Environmental Management Programme to be submitted for public participation and to DFFE for approval.
Date	:	November 2022

DEFINITIONS AND TERMINOLOGY

The following definitions and terminology may be applicable to this project and may occur in the report below:

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

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

Ambient sound level: The reading on an integrating impulse sound level meter taken at a measuring point in the absence of any alleged disturbing noise at the end of a total period of at least 10 minutes after such meter was put into operation.

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

Biological diversity: The variables among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes they belong to.

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

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

Contractor: Persons/organisations contracted by the Developer to carry out parts of the work for the proposed project

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

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

Development area: the identified area (located within the study area) where the supporting infrastructure is planned to be located.

Development footprint: the defined area (located within the development area) where the various supporting infrastructure is planned to be constructed. This is the actual footprint of the infrastructure, and the area which would be disturbed.

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

Disturbing noise: A noise level that exceeds the ambient sound level measured continuously at the same measuring point by 7 dB or more.

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

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

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

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

Engineer / Project Director (PD): Person/organisation appointed by the Developer to oversee the work of all consultants, sub-developers, contractors, residents and visitors.

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

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

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

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

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

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

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

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

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

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

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

Hazardous waste: Any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment.

Independent Auditor: The person or entity who will conduct an environmental audit during the construction phase of the project according to the provisions of the Environmental Management Programme and Environmental Authorisation.

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

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

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

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

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

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

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

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

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

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

Study area:

- Portion 3 (Portion of Portion 1) of the Farm Driefontein No.26
- Portion 7 (De Tafel) Portion of Portion 2) of the Farm Driefontein No.26
- Portion 10 (Portion of Portion 1 of the Farm Driefontein No.26
- Remainder of Portion 2 of Farm Driefontein No.26
- Portion 1 of the Farm Klein Driefontein No.152

- Remainder of the Farm Klein Driefontein No.152
- Portion 2, portion of Portion 9 of Farm Witteklip 32
- Remainder of the Farm De Hoop No. 30
- Portion 4 of the Farm De Hoop No.30

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

Waste: as per the NEM: Waste Amendment Act, 2014 (Act No. 26 of 2014)

(a) any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3.

(b) any other substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister by notice in the *Gazette,*

but any waste or portion of waste, referred to in paragraph (a) and (b), ceases to be a waste –

(i) once an application for its re-use, recycling or recovery has been approved or, after such approval, once it is, or has been re-used, recycled or recovered;

(ii) where approval is not required, once a waste is, or has been re-used, recycled or recovered;

(iii) where the Minister has, in terms of section 74, exempted any waste or a portion of waste generated by a particular process from the definition of waste; or

(iv) where the Minister has, in the prescribed manner, excluded any waste stream or a portion of a waste stream from the definition of waste.

ABBREVIATIONS

The following abbreviations may be applicable to this project and may occur in the report below:

BGIS	Biodiversity Geographic Information System
CDSM	Chief Directorate Surveys and Mapping
CEMP	Construction Environmental Management Programme
DFFE	Department of Forestry, Fisheries and the Environment
WC DEADP	Western Cape Government Department of Environmental Affairs and Development Planning
DMRE	Department of Mineral Resources and Energy
EAP	Environmental Assessment Practitioner
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
GPS	Global Positioning System
HIA	Heritage Impact Assessment
HWC	Heritage Western Cape
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IFC	International Finance Corporation
IPP	Independent Power Producer
KOP	Key Observation Point
kV	Kilo Volt
LLRC	Low Level River Crossing
LUDS	Land Use Decision Support
LUPO	Land Use Planning Ordinance
MW	Mega Watt
NEMA	National Environmental Management Act
NEMAA	National Environmental Management Amendment Act
NEMBA	National Environmental Management: Biodiversity Act
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act
NSBA	National Spatial Biodiversity Assessment
NWA	National Water Act
PIA	Paleontological Impact Assessment
PM	Post Meridiem; "Afternoon"
SACAA	South African Civil Aviation Authority
SAHRA	South African National Heritage Resources Agency
SANBI	South Africa National Biodiversity Institute
SANS	South Africa National Standards
SDF	Spatial Development Framework
SMME	Small, Medium and Micro Enterprise
SAPD	South Africa Police Department

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SECTION 1: INTRODUCTION

1.1 Background

Umsinde Emoyeni Wind Farm (Pty) Ltd is proposing to establish the 147 MW Umsinde Emoyeni Wind Energy Facility and associated infrastructure. The Environmental Authorisation (DFFE Ref: 14/12/16/3/3/2/686) for the proposed wind energy facility was granted on 06 September 2018 and amended on 20 April 2021 and the latest amendment on the 07 June 2022. The Umsinde Emoyeni Wind Energy Facility and associated infrastructure is located near the town of Murraysburg in the Beaufort West Local Municipality in the Western Cape Province. The proposed wind energy facility is located within the Beaufort West Renewable Energy Development Zone (REDZ).

The Environmental Management Programme (EMPr) outlines measures to be implemented in orderto minimise adverse environmental degradation associated with construction of the proposed development. It serves as a guide for the contractor and the construction workforce on their roles and responsibilities concerning environmental management on site, and it provides a framework for environmental monitoring throughout the constructionperiod. This document must be seen as dynamic, and be updated when and if required, throughout the lifecycle of the project.

1.2 Details of the Applicant and the Environmental Assessment Practitioner

Project Applicant	Umsinde Emoyeni Wind Farm (Pty) Ltd
Company Registration	2013/166107/07
Contact Person	James Cumming
Postal Address	PO Box 23101, Claremont, 7735
Telephone	083 318 3982
Email	info@aced.co.za

Name	Organisation	Role/Specialist Study
Environmental Assessment Practitioners		
Arlene Singh	Nala Environmental (Pty) Ltd	Environmental Assessment Practitioner (SACNASP) (EAPASA)
Norman Chetsanga	Nala Environmental (Pty) Ltd	Environmental Assessment Practitioner (SACNASP)
Justin Jacobs	Nala Environmental (Pty) Ltd	Junior Environmental Assessment Practitioner
Specialists Details (Final Pre-construction walkthroughs undertaken in 2022)		
Andrew Husted / Leigh- Ann de Wet	The Biodiversity Company	Terrestrial Final Ecology Pre-construction Walkthrough
Andrew Husted / Michael Ryan	The Biodiversity Company	Aquatic Final Pre-construction Walkthrough
Andrew Husted / Leigh- Ann de Wet	The Biodiversity Company	Avifauna Pre-construction Walkthrough

Wouter Fourie	PGS Heritage (Pty) Ltd	Heritage Pre-construction Walkthrough
Elize Butler	Banzai Environmental (for PGS Heritage (Pty) Ltd)	Palaeontological Pre-construction Walkthrough
Dr Caroline Lötter	Inkululeko Wildlife Services	Bat Pre-construction Walkthrough
Deveshan Govender	BMK / Map Africa Consulting Engineers	Stormwater Management Plan

1.3 PURPOSE & OBJECTIVES OF THE EMPr

An Environmental Management Programme (EMPr) is defined as "*an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented or mitigated, and that the positive benefits of the projects are enhanced*". The purpose of an EMPr is to help ensure continuous improvement of environmental performance, reducing negative impacts and enhancing positive effects during the construction and operation of the facility. An effective EMPr is concerned with both the immediate outcome as well as the long-term impacts of the project.

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

This EMPr has been adopted in the format as per the Arcus original EMPr (2018) inclusive of the recommendation made by the relevant specialist and updated by Zutari (Pty) Ltd in the 2020 Amendment undertaken for the 147MW Umsinde Emoyeni Wind Energy Facility to maintain consistency and so that all mitigation measures as originally recommended by the relevant specialists and subsequent amendments have been included accordingly.

The objective of this EMPr is to provide consistent information and guidance for implementing the management and monitoring measures established in the permitting process and help achieve environmental policy goals. Umsinde Emoyeni Wind Farm (Pty) Ltd, obtained the Environmental Authorisation, from the (then) National Department of Environmental Affairs (DEA), (now Department of Forestry, Fisheries and the Environment, DFFE) for the 147MW Umsinde Emoyeni WEF (previously known as Umsinde Emoyeni Phase 1 Wind Energy Facility) on 06 September 2018 (DFFE Ref: 14/12/16/3/3/2/686). The WEF is authorised for a contracted capacity of up to 147MW. Several amendments to the EA have been undertaken for the Umsinde Emoyeni WEF dated 20 April 2021 and the latest amendment on the 07 June 2022.

It is noted that one Environmental Authorisation was applied for and issued for the 147MW Umsinde Emoyeni Wind Energy infrastructure and associated infrastructure. The project's grid connection infrastructure forms part of a separate environmental authorisation, subject to its own EMPr, and is thus not catered for in this EMPr.

The Umsinde Emoyeni Wind Energy Facility has been selected as a Preferred Bidder project via a private offtaker and construction is expected to commence in early 2023. It is noted that one Environmental Authorisation was applied for and issued for the 147MW Umsinde Emoyeni Wind Energy infrastructure and associated infrastructure. The project's grid connection infrastructure forms part of a separate environmental authorisation, subject to its own EMPr, and is thus not catered for in this EMPr.

This EMPr focuses on the 147MW Umsinde Emoyeni Wind Energy Facility and associated infrastructure and has been developed as a set of environmental specifications (i.e. principles of environmental management for the authorised Umsinde Emoyeni Wind Energy Facility), which

are appropriately contextualised to provide clear guidance in terms of the on-site implementation of these specifications (i.e. on-site contextualisation is provided through the inclusion of various monitoring and implementation tools for assisted use of the EMPr by the project implementer as well as compliance monitors). During its lifecycle, the project will journey through four distinctive phases, i.e. planning, construction, operation and decommissioning. This EMPr is accordingly separated into measures dealing with the various project phases.

The EMPr has the following objectives:

- To outline mitigation measures and environmental specifications which are required to be implemented for the planning, construction, rehabilitation and operation phases of the project in order to minimise the extent of environmental impacts, and to manage environmental impacts associated with the wind energy facility.
- To ensure that the construction and operation phases do not result in undue or reasonably avoidable adverse environmental impacts and ensure that any potential environmental benefits are enhanced.
- To identify entities who will be responsible for the implementation of the measures and outline functions and responsibilities.
- To propose mechanisms and frequency for monitoring compliance and preventing long-term or permanent environmental degradation.
- To facilitate appropriate and proactive responses to unforeseen events or changes in project implementation that were not considered in the EIA process.
- To outline additional recommendations and mitigation measures as outlined by the relevant specialist that have undertaken the final pre-construction walkthroughs in relation to the final layout.

The mitigation measures identified within the Environmental Impact Assessment process (2018), Part 2 Amendment (2020) and as per the final walkthroughs (Appendix A1- D1) are systematically addressed in this EMPr, ensuring the minimisation of adverse environmental impacts to an acceptable level.

Umsinde Emoyeni Wind Farm (Pty) Ltd must ensure that the implementation of the project complies with the requirements of any and all environmental authorisations and permits, and obligations emanating from other relevant environmental legislation. This obligation is partly met through the development and the implementation of this EMPr through its integration into the contract documentation. Since this EMPr was part of the EIA process (2018) and Part 2 Amendment process (2020) undertaken for the proposed Umsinde Emoyeni Wind Energy Facility, and the final specialist walkthrough's in relation to the final layout, it is important that this document be read in conjunction with the Environmental Authorisation issued on 06 September 2018 and amended on 20 April 2021 (and associated Amendment Report) and the latest EA amendment dated 07 June 2022 and relevant 2022 preconstruction walkthrough reports (Appendix A1 – E2). This will contextualise the EMPr and enable a thorough understanding of its role and purpose in the integrated environmental management process. This EMPr for construction and operation activities has been compiled in accordance with Section 34 of the EIA Regulations and will be further developed in terms of specific requirements listed in any authorisations issued for the proposed project.

To achieve effective environmental management, it is important that Contractors are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMPr. The Contractor is responsible for informing employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts. The Contractor's obligations in this regard include the following:

- Ensuring that employees have a basic understanding of the key environmental features of the construction site and the surrounding environment.

- Ensuring that a copy of the EMPr is readily available on-site, and that all site staff are aware of the location and have access to the document.
- Employees will be familiar with the requirements of the EMPr and the environmental specifications as they apply to the construction of the facility.
- Ensuring that, prior to commencing any site works, all employees and sub-contractors have received Environmental Awareness Training.. The training/induction must provide the site staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
- Providing basic training in the identification of archaeological sites/objects, and protected flora and fauna that may be encountered on the site.
- Ensuring awareness of any other environmental matters, which are deemed to be necessary by the ECO.

This EMPr is an update of the revision 1 EMPr 2020 submitted with the Part 2 Amendment Application and Motivation Report (2020) for the project, and includes additional mitigation recommended by the specialist consultants as identified through a Part 2 Amendment Process in which an amendment of the turbine specifications were requested (Arcus, 2020), as well as further recommendations made by the specialists following walkthroughs of the final layout (2022). The changes/updated made, following the completion of the final pre-construction walkthrough surveys have been underlined for ease of reference.

1.4 Compliance of this EMPr with the NEMA and EIA Regulations

This EMPr satisfies the requirements of Section 24N of the National Environmental Management Act (NEMA) (Act 107 of 1998) as well as Appendix 4 of the 2014 NEMA Environmental Impact Assessment (EIA) Regulations (GN R326), as amended in 2017. An overview of where these requirements are met in this EMPr is presented in Table 1.1 below:

Table 1.1: Requirements of an EMPr as defined in terms of NEMA (Act 107 of 1998) and Appendix 4 of the 2014 EIA Regulations (GN R326).

Appendix 4 of the EIA Regulations	Requirements for a EMPr in terms of Appendix 4 of the 2014 NEMA EIA Regulations (GN R326)	Location in this EMPr
(1) (a)	Details of – (i) the EAP who prepared the EMPr; and (ii) the expertise of the EAP to prepare an EMPr, including a curriculum vitae;	Section 1.2 Appendix A
(1) (b)	a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description	Section 1.3
(1) (c)	a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any	Section 1.4

	areas that should be avoided, including buffers;	
(I) (d)	A description of the impact management objectives, 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 6, 7, 8
(I) (e)	a description and identification of impact management outcomes required for the aspects contemplated in paragraph (d);	Section 6, 7, 8
(I) (f)	a description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (d) and (e) 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, were Applicable and (iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	Section 6, 7, 8
(I) (g)	the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 6, 7, 8

(I) (h)	the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 6, 7, 8
(I) (i)	an indication of the persons who will be responsible for the implementation of the impact management actions;	Section 6, 7, 8
(I) (j)	the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 6, 7, 8
(I) (k)	the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 6, 7, 8
(I) (l)	a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 6, 7, 8
(I) (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 6, 7, 8
(I) (n)	any specific information that may be required by the competent authority.	Section 6, 7, 8

1.5 Compliance to the requirements of the relevant Environmental Authorisations

The EA, dated on 06 September 2018 (DFFE Ref: 14/12/16/3/3/2/686), indicated in Condition 16 and 17 that the applicable management plans must be included within the proposed Umsinde Emoyeni WEF EMPr. The table below details the requirement as contained within the EA as well as a cross reference to where this is included within this EMPr.

Table 1.2: Content requirements of the EMPr as contained in the EA and subsequent amendments.

Condition	Requirements for a the EMPr as per the conditions of the EA, 2018	Location in this EMPr
16	The Environmental Management Programme (EMPr) submitted as part of the EIAr is not approved and must be amended to include measures as dictated by the final site lay-out map and micro-siting; and the provisions of this environmental authorisation. The EMPr must be made available for comments by registered Interested and Affected Parties and the holder of this environmental authorisation must consider such comments. Once amended, the final EMPr must be submitted to the	The final layout is attached to this EMPr as Figure 1.1. and Figure 1.2. Specific measures identified by the relevant specialists following a walkthrough of the final layout have been included in this EMPr.

	Department for written approval prior to commencement of the activity. Once approved the EMPr must be implemented and adhered to.	The Final EMPr will be subject to public participation and is to be submitted to the DFFE for approval.
17	The EMP must include the following:	
17.1	The requirements and conditions of this authorisation.	All requirements and conditions of the authorisation were considered and included in this EMPr.
17.2	All recommendations and mitigation measures recorded in the EIAr and specialist studies attached as part of the EIAr.	All recommendations and mitigation measures recorded in the EIAr and final walkthrough specialist studies have been considered and included in this EMPr
17.3	An alien invasive management plan to be implemented during construction and operation of the facility. The plan must include mitigation measures to reduce the invasion of alien species and ensure that the continuous monitoring and removal of alien species is undertaken.	Appendix E
17.4	A plant rescue and protection plan which allows for the maximum transplant of conservation important species from areas to be transformed. This plan must be compiled by a vegetation specialist familiar with the site in consultation with the ECO and be implemented prior to commencement of the construction phase.	Appendix F
17.5	A re-vegetation and habitat rehabilitation plan to be implemented during the construction and operation of the facility. Restoration must be undertaken as soon as possible after completion of construction activities to reduce the amount of habitat converted at any time and to speed up the recovery to natural habitats.	Appendix G
17.6	A traffic management plan for the site access roads to ensure that no hazards would results from the increased truck traffic and that traffic flow would not be adversely impacted. This plan must include measures to minimize impacts on local commuters e.g., limiting construction vehicles travelling on public roadways during the morning and late afternoon commute time and avoid using roads through densely populated built-up areas so as not to disturb existing retail and commercial operations.	Appendix N
17.7	A storm water and wash water management plan to be implemented during the construction and operation of the facility. The plan must ensure compliance with applicable regulations and prevent off-site migration of contaminated storm water or increased soil erosion. The plan must include the construction of design measures that allow surface and subsurface movement of water along drainage lines so as not to impede natural surface and subsurface flows. Drainage measures must promote the dissipation of storm water run-off.	Appendix I

17.8	An erosion management plan for monitoring and rehabilitating erosion events associated with the facility. Erosion mitigation must form part of this plan to prevent and reduce the risk of any potential erosion.	Appendix H
17.9	An effective monitoring system to detect any leakage or spillage of any hazardous substances during their transport, handling, use or storage. This must include precautionary measures to limit the possibility of oil and other toxic liquids from entering the soil or storm water systems	Appendix K
17.10	Measures to protect hydrological features such as streams, rivers, pans, wetlands, dams and their catchments, and other environmental sensitive areas from construction impacts including the direct or indirect spillage of pollutants.	Appendix I
17.11	A fire management plan to be implemented during the construction and operation of the facility.	Appendix K
17.12	An environmental sensitivity map indicating environmentally sensitive areas and features identified during the EIA process.	Section 1.4 Fig 1.2
17.13	The final site layout map	Section 1.4 Fig 1.1
17.14	The final site layout map superimposed (overlain) on the environmental sensitive map. This map must reflect the approval location of the wind turbines as stated in the EIAr and this environmental authorisation.	Section 1.4 Fig 1.1

1.6 The Proposed Project

The project will include the following infrastructure as authorised:

- Up to 33 wind turbines (capped at 147MW total capacity) with a hub height of up to 160m, blade length of 90m and rotor diameter of up to 180m;
- Permanent turbine Hard standing areas of up to 55m by 35m per turbine;;
- Three temporary Laydown areas[1] of up to 150m by 60m each;
- Temporary turbine laydown areas;
- Electrical cabling and on-site substation;
- Existing farm access tracks and watercourse crossings will be upgraded;
- Internal access roads;
- On-site office compound, including site offices, parking and an operation and maintenance facility including a control;
- Anemometer masts;

[1] Including site camp and batching plant

- Security fencing
- CCTV monitoring towers

The proposed project site covers an area of approximately 2652,68 ha, including internal roads, but excluding the grid connection.

The following properties have been identified for the Umsinde Emoyeni Wind Energy Facility and associated infrastructure[2]:

- Portion 3 (Portion of Portion 1) of the Farm Driefontein No.26
- Portion 7 (De Tafel) Portion of Portion 2) of the Farm Driefontein No.26
- Portion 10 (Portion of Portion 1 of the Farm Driefontein No.26
- Remainder of Portion 2 of Farm Driefontein No.26
- Portion 1 of the Farm Klein Driefontein No.152
- Remainder of the Farm Klein Driefontein No.152
- Portion 2, portion of Portion 9 of Farm Witteklip 32
- Remainder of the Farm De Hoop No. 30
- Portion 4 of the Farm De Hoop No.30

The authorised Umsinde Emoyeni WEF has been registered as a Strategic Integrated Project (SIP) as per the embedded generation investment programme with the Department of Public Works and Infrastructure.

[2] Note that the properties listed here are the properties assessed in the original EIA and included in the original EA

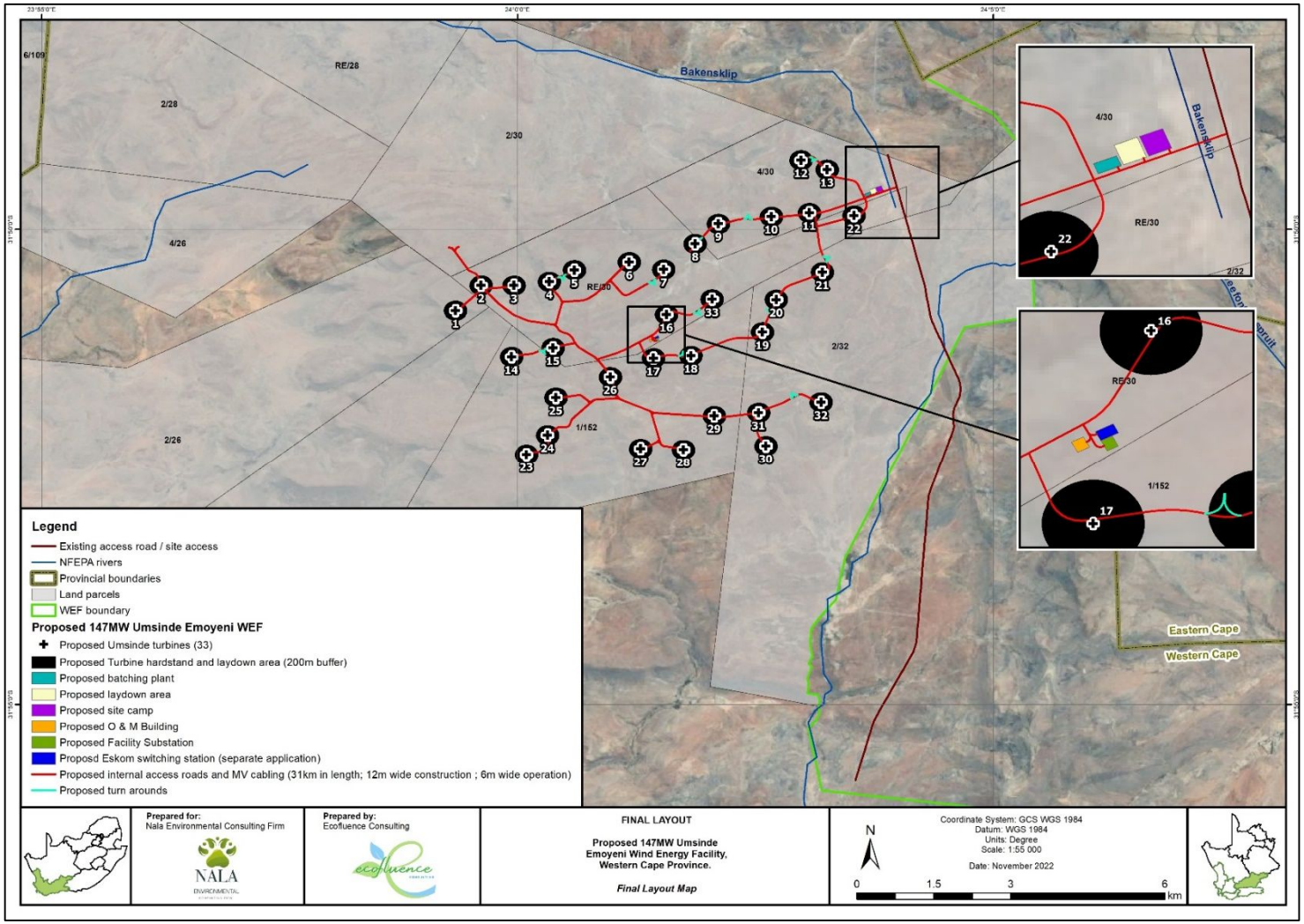

Figure 1.1: Umsinde Emoyeni Wind Energy Facility Final Layout Map

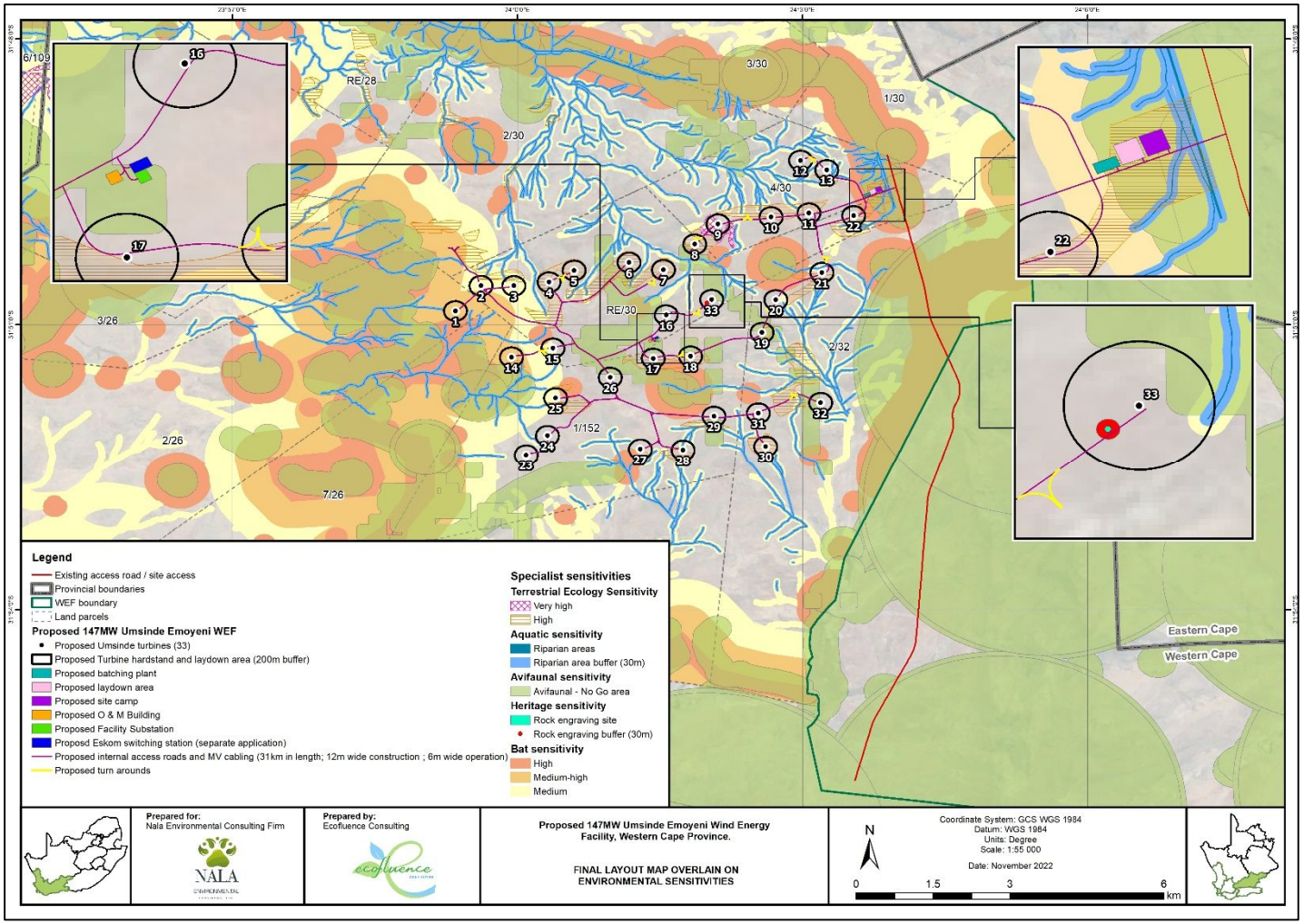

Figure 1.2: Umsinde Emoyeni Wind Energy Facility Overall Sensitivity Map

1.7 Proposed Project Infrastructure Components

The proposed project will comprise the following components as described below. It should be noted as the final detail design of the proposed project is not yet finalised, all dimensions are maximums as is required by the EIA process. The final design may include infrastructure which is of equal or less than dimensions to those stated below but not more than.

1.7.1 Turbines

The proposed project will consist of up to a maximum 33 turbines. At this stage it is envisaged that each turbine will have a maximum height to blade tip of 250 m. The turbines will be three-bladed horizontal-axis design with a hub height of up to 160 m and a rotor diameter of up to 180 m. A typical wind turbine is presented below (Plate 1). The exact turbine model has not been selected yet and will be subject to competitive tendering in advance of construction. The turbine model will depend upon the technical, commercial and site-specific requirements.

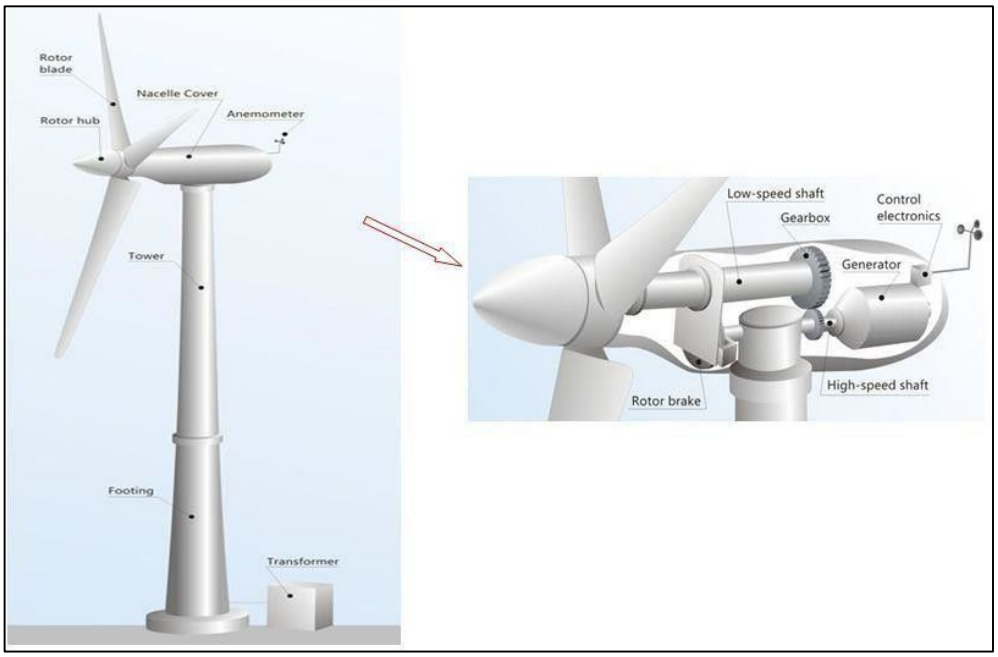

Plate 1 Typical Components of a Wind Turbine

The turbine rotor speed will vary according to the energy available in the wind, the wind speed. The turbines will generate power in wind speeds between approximately 3 metres per second (m/s) and 28 m/s (depending on the model of turbine) with maximum power output usually achieved at wind speeds of around 10 – 12 m/s. At average wind speeds greater than approximately 28 m/s the turbines will automatically turn the angle of the blade to reduce energy capture (this is known as 'pitching') and stop turning to prevent damage.

Each turbine will require a transformer and, depending on the selected model of turbine, this will be either located within the turbine tower or adjacent to the turbine on a concrete plinth.

The turbines will be placed on steel and concrete foundations which will each occupy an area of approximately 30 m by 30 m in total (which includes the maximum total area that may need to be disturbed during construction of the foundation), and be typically up to 3-

5 m deep and may include concrete and steel plinths depending upon local ground conditions. Once construction is complete, much of the foundation area can be rehabilitated.

1.7.2 Hardstanding Areas

A permanent hardstanding area of up to 55 m by 35 m will be established adjacent to each turbine location. This will be used to provide a platform for cranes to operate during construction (and unscheduled maintenance), as well as a clear area to lay out turbine components prior to erection. Temporary laydown areas will also be utilised at each turbine, and rehabilitated after construction is complete.

1.7.3 Laydown Areas

Up to three additional temporary laydown areas, each up to 150 m by 60 m (0.9 ha) in size will be required for equipment and component storage during construction. These areas will be levelled and compacted and used for component storage. Construction site camp and batching plant facilities may also be placed in these areas.

1.7.4 Electrical Cabling and Onsite Substation

The electricity from the turbines will be transferred via a 33 kV electrical network to a 33/ 132 kV onsite substation. Where feasible and possible this will be underground. The onsite substation will house electrical infrastructure such as transformers and switch gear to enable the energy to be transferred into the existing national grid.

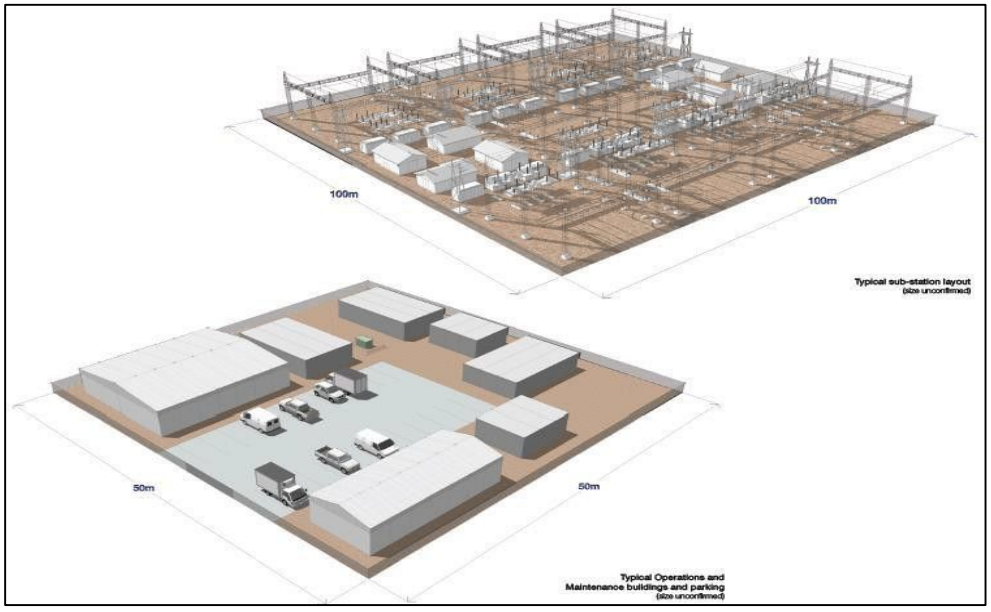

Plate 2 Typical Substation Layout

1.7.5 Access

The turbine locations will be accessed through a network of unsealed tracks which will be established across the project site. These access tracks will be up to 12 m wide during construction, depending on local topography, but will be reduced to between 4 m and 6 m during operation. Such roads are required to facilitate access for the cranes and abnormal load deliveries of turbine components. Existing farm access tracks will be upgraded and utilised where possible, as will existing watercourse crossings. Turning points will be created to enable large vehicles to turn around and/or pass each other on site. No borrow pits will be established on site. All material required for the construction of the proposed project will be imported to site.

1.7.6 Compound

There will also be an on-site office compound, including site offices, parking and an operation and maintenance facility including a control room.

1.7.7 Ancillary Equipment

In addition to the key components outlined above, the WEF may also require:

- Anemometer masts;
- Security fencing; and
- CCTV monitoring towers.

SECTION 2: LEGAL FRAMEWORK

2.1. LEGAL FRAMEWORK

An application for Environmental Authorisation, in term of the National Environmental Management Act, Act 107, 1998 (NEMA), Environmental Impact Assessment Regulations, 2010, was submitted to the Department of Environmental Affairs in April 2014 and authorised on 6 September 2018. This EMPr has been adopted in the format as per the ARCUS original EMPr (2018) inclusive of the recommendation made by the relevant specialist and updated by Zutari (Pty) Ltd in the 2020 Amendment for the 147MW Umsinde Emoyeni Wind Energy Facility to maintain consistency and so that all mitigation measures as originally recommended by the relevant specialists and subsequent amendments have been included accordingly. Further recommendations made by the relevant environmental specialists following walkthroughs of the final layout have also been included in this EMPr.

2.1.1. GENERAL

The construction phase activities included as part of the EMPr are in respect of any future construction, upgrades, or expansions at the site. Construction and operation shall be according to the best industry practices, as identified in the project documents. This EMPr, which forms an integral part of the contract documents, informs the contractor and operator as to their duties in the fulfilment of the project objectives, with particular reference to the prevention and mitigation of environmental impacts caused by construction activities associated with the project. The contractor should note that obligations imposed by the EMP are legally binding in terms of this contract.

2.1.2. STATUTORY AND OTHER APPLICABLE LEGISLATION

The contractor and operator are deemed to have made themselves conversant with all legislation pertaining to the environment, including provincial and local government ordinances, which may be applicable to the contract. Major environmental legislation, as amended from time to time, includes but is not limited to the following:

2.1.3. The Constitution (No. 6 of 1996)

The Constitution states that everyone has the right to an environment that is not harmful to their health or well-being, and to have the environment protected through reasonable legislative and other measures to prevent pollution and ecological degradation; promote conservation and ensure ecologically sustainable development and use of natural resources.

2.1.4. Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA)

This act provides for control over the utilisation of the natural agricultural resources of South Africa in order to promote the conservation of soil, water sources and vegetation, as well as combating weeds and invader plants.

2.1.5. Mineral and Petroleum Resources Development Act (No. 28 of 2002)

This act makes provision for equitable access to, and sustainable development of, minerals and petroleum resources.

2.1.6. National Environmental Management Act (NEMA), (No. 107 of 1998)

This act supports the Bill of Rights within the Constitution and highlights principles of sustainable development including preservation of ecosystems and biological diversity and avoidance, minimisation and remediation of pollution and environmental degradation. It also

sets the stage for the control of listed activities and the procedural requirements for authorisation thereof through the Environmental Impact Assessment Regulations, 2014. Environmental authorisation must be obtained prior to the commencement of any activities listed in the EIA Regulation Listing Notices, 2014.

2.1.7. National Environmental Management: Air Quality Act (No. 39 of 2004)

This act provides reasonable measures for the prevention of pollution and ecological degradation from activities with emissions to atmosphere; and provides for specific air quality measures; for national norms and standards regulating air quality monitoring, management, and control by all spheres of government.

2.1.8. National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEMBA)

This act makes provisions to accomplish the objectives of the United Nations' Convention on Biological Diversity. COM may be required to apply for permits to conduct certain listed activities which, together with the listed threatened or protected species, may be identified by the Minister. Section 73 (3) of this act empowers a competent authority to direct a person to take steps to remedy any harm to biodiversity resulting from the actions of that person or as a result of occurrence of listed invasive species occurring on land on which that person is the owner.

2.1.9. National Environmental Management: Protected Areas Act (No. 57 of 2003)

This act provides for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity, natural landscapes, and seascapes.

2.1.10. National Environmental Management: Waste Act (No. 59 of 2008)

This act aims to regulate waste management practices through provision of national norms and standards, specific waste measures, licensing and control of waste activities, remediation of contaminated land as well as providing for compliance and law enforcement. It sets the stage for the control of listed waste management activities and the procedural requirements for authorisation thereof through the Environmental Impact Assessment Regulations, 2014.

2.1.11. National Forests Act (No. 84 of 1998)

This act makes provision for promoting the sustainable management and development of forests, and for the protection of certain forests and trees for environmental, economic, educational, recreational, cultural, health and spiritual purposes.

2.1.12. National Heritage Resources Act No. 25 of 1999)

This act provides for an integrated and interactive system for identification, assessment, and management of South Africa's heritage resources, and empowers civil society to nurture and conserve their heritage resources. It provides for the control of specific activities that could impact heritage resources and for the procedural requirements for authorisation thereof from the heritage authority. Importantly, the Provincial Heritage Authority, Heritage Western Cape (HWC) or South African Heritage Resources Agency (SAHRA), must be notified immediately if any items of cultural heritage importance are noted during construction activities.

2.1.13. National Water Act (Act No. 36 of 1998)

This act makes provision for the protection of surface water and groundwater and their sustainable management for the prevention and remediation of the effects of pollution, as well as for the management of emergency situations. Authorisation is required for any activity which may compromise the water resource quality objectives.

SECTION 3: ENVIRONMENTAL IMPACT ASSESSMENT

This EMPr has been adopted in the format as per the Arcus original EMPr (2018) inclusive of the recommendation made by the relevant specialist and updated by Zutari (Pty) Ltd in the 2020 Amendment for the 147MW Umsinde Emoyeni Wind Energy Facility to maintain consistency and so that all mitigation measures as originally recommended by the relevant specialists and subsequent amendments have been included accordingly. Further recommendations made by the relevant environmental specialists following walkthroughs of the final layout have also been included in this EMPr

3.1 Summary of Findings

During the EIA process (2018), impacts on both the biophysical and socio-economic environments were assessed. The following specialist's studies were commissioned based on the sensitivities of the site and the potential impacts of the proposed development:

- Visual.
- Terrestrial Ecology (Flora and Fauna).
- Bats.
- Wetlands and Freshwater.
- Birds.
- Soils, Land Use and Agricultural Potential.
- Heritage and Palaeontology.
- Noise; and
- Socio-Economic.

From the assessment, it was evident that the construction and the operation of the WEF and grid connections will have both positive and negative impacts both social and environmental impacts, but appropriate mitigation measures have been applied to reduce negative impacts are outweighed by and enhance the positive impacts. Overall, the project has a positive economic impact regionally and for South Africa as a whole as power generated from the WEF will feed into the National Eskom grid, create job opportunities, and contribute to the local and regional economy.

3.2 Assessment of Alternatives

Different alternatives ranging from site location, transportation, design, turbine technologies, and the No Development alternative have all been considered for the proposed WEF. When considering the alternatives, the proponent needs to consider environmental, social and economic factors and technical factors. Considering the above- mentioned factors, the proponent intends to use the best available technology to satisfy these factors. The preferred site was chosen based on the following: because the site is located within an area that has a good wind resource, the proposed development has been located in the sections of the site that are of low-medium areas of ecological sensitivity. The No Development alternative was identified as a high negative social cost to South Africa in terms of the country meeting its energy needs with clean, renewable energy, and a medium negative social cost in terms lost employment and business opportunities, and the benefits associated with local socio-economic development initiatives.

The No Development scenario is that the Umsinde Emoyeni WEF: cannot be constructed. This result will include the following:

- The land-use remains agricultural with no further benefits derived from the implementation of a complementary land use.
- There is no change in the current landscape or environmental baseline.

- Whilst no WEF development will occur on site, other wind energy projects go ahead as planned for other areas locally.
- No additional electricity will be generated onsite or supplied through means of renewable energy resources. This would have implications for the South African Government in achieving its proposed renewable energy target;
- There is no opportunity for additional employment (albeit temporary) in the local area where job creation is identified as a key priority; and
- The local Economic Development benefits associated with the WEF development's will not be realised.

3.3 Summary of the Impact Assessment (ARCUS FEIR, 2018)

Potential environmental impacts were evaluated according to their extent, duration, intensity and magnitude. Negative impacts of the proposed project on the biophysical environment include clearing of vegetation that leads to habitat fragmentation, potential loss of species of concern, soil erosion, surface water pollution; while social-economic impacts being minimal loss of agricultural land, disruption of social relations within the proposed area by the introduction of contractor workers from different areas, spread of diseases, loss of potential heritage resources and impact on sense of place.

All impacts have been identified and assessed at different stages (design/planning, construction, operation and decommission) and possible mitigation measures assigned to ensure low significance (for negative impacts) or high significance (for positive impacts).

3.4 Summary of the Impacts (Zutari, Part 2 Amendment (Motivation Report) 2020)

Terrestrial (Fauna and Flora)- The impacts of the amended layout on Flora and Fauna were determined to be similar to the authorised layout and there are ere fatal flaw or critical issues associated with the proposed changes. The cumulative impacts associated with the amended layout are similar to the authorised layout and considered acceptable.

Wetlands & Freshwater Ecology- The significance of the impact on the aquatic environment would remain low after mitigation during the construction, operation and decommissioning phases. Based on the findings of this study the specialist has no objection to the approval of the proposed amendments.

Avifauna- As the project has already received environmental authorisation and the proposed amendment would likely significantly reduce the potential risk of the Verreaux's Eagles and other avifauna compared to the original authorisation post-mitigation (i.e. through a vastly improved layout and a potential reduction in the number of turbines), it is the specialist opinion that the project should proceed through the proposed amendment process without additional monitoring being required specifically for the amendment authorisation.

Bats- It was concluded that without mitigation, the proposed infrastructure and layout under the amendment is expected to have a Medium significant impact on bats roost, and bat foraging and a High significant impact on bat fatalities. With diligent, effective mitigation as recommended in the report the project's impact on bat roosts can be reduced to insignificant, and the impacts on bat foraging and also fatalities can be reduced to low significance. Recommended mitigation measures include but are not limited to: curtailment where and when necessary, operational bat monitoring, and adaptive management of bat fatalities.

Heritage and Palaeontology- Both ACO Associates (2020) and Almond (2020) found the proposed amendments acceptable as long as the recommended mitigation are implemented. The impacts on the cultural landscape are the most significant, however, the siting of

the WEF on the more remote and desolate high dolerite hills also goes some way to addressing the issue of landscape and setting. The cumulative impact in terms of the landscape and setting will remain, albeit reduced in significance by the mitigation measures recommended in the Visual Impact Assessment (VIA).

Visual- Based on the comparative study, the visual impact significance of the currently proposed WEF would be similar to that of the authorised 2018 WEF and therefore no fatal flaws are anticipated. The amendment to the authorised WEF could therefore be approved from a visual perspective, provided the visual mitigations are implemented. The visual effect on the proposed WEF has been significantly reduced through the elimination and relocation of many turbines in previous iterations. It was determined that the visual impacts significance of the currently proposed WEF would be similar to the previous authorised layout of 2018, given the slightly reduced number of wind turbines (up to 33 turbines). There would be about 5 km less internal roads, which would reduce visibility but would not change overall visual significance ratings.

Noise- The amendment was found to have no significant impacts regarding noise therefore a full noise impact the original assessment in 2015, as reconsidered in 2018, were still valid. In terms of noise, the amendments were determined to be acceptable.

SECTION 4: ENVIRONMENTAL MANAGEMENT PROGRAMME

This section forms the core of the EMPr and outlines the specific mitigation measures for those key impacts identified in the section above.

4.1 Environmental Awareness and Compliance

The philosophy that has been used for the compilation of this management program is derived from the principles of the National Environmental Management Act (No. 107 of 1998) which states that development must be socially, economically and environmentally sustainable. Sustainable development requires that:

- The disturbance of ecosystems and loss of biodiversity are avoided (minimised or remedied).
- Pollution and degradation of the environment are avoided or minimised and remedied; Waste is avoided or minimised and re-used or re-cycled where possible and otherwise disposed of in a responsible manner.
- A risk averse and cautious approach is applied.
- Negative impacts on the environment and on people's environmental rights be anticipated; and, prevented and where they cannot altogether be prevented, are minimised and remedied.

The Act makes provision that anyone who causes pollution or degradation of the environment is responsible for preventing impacts occurring, continuing or recurring and for the costs of repair of the environment.

4.2 Roles and Responsibilities for Good Environmental Management

The developer, together with the appointed contractor will be responsible for environmental management on site during the construction and operational phases of the proposed development. Specific roles and responsibilities are highlighted below.

Developer/Wind Farm Representative – Environmental Officer (EO)/ Site Manager

During Pre-Construction and Construction:

- Review and approve EMPr prior to authorisation by DFFE.
- Review and approve any EMPr updates or amendments.
- Ensure environmental requirements are integrated into the project plans, method statements and tender processes.
- Together with the ECO, support the Contractor's site environmental officer during the construction phase, to ensure implementation of the EMPr.
- Follow up and close out all environmental incidents and non-conformances.
- Appointment a suitably qualified independent environmental control officer during the construction and decommissioning phase.

During Operations:

- Overseeing the implementation of the EMPr for the operation phase;
- Ensure that the necessary environmental monitoring takes place as specified in the EMPr;

- Update the EMPr and ensure that records are kept of all monitoring activities and results; and
- Maintain an Incidents Register and Complaints Register on site.

Independent Environmental Control Officer (ECO)

The holder of the EA must appoint an independent environmental control officer (ECO) who monitor EMPr implementation, and compliance with the EMPr and EA throughout the construction phase. After each inspection, the ECO will produce a monitoring report that will be submitted to the Developer, DFFE Relevant sections of the minutes of customary (monthly) site meetings will be attached to the monitoring report, as required/appropriate

The Environmental Control Officer (ECO) will be responsible for overseeing the implementation of the EMP during the construction and operations phases, and for monitoring, reviewing and verifying compliance of the contractor with the EMP, record- keeping and updating of the EMP as and when necessary.

The ECO will:

- Be fully knowledgeable with the contents of the EMP.
- Be fully knowledgeable with the contents of all relevant environmental legislation and ensure compliance with them.
- Ensure that the contents of the EMP are communicated to the contractor, all site staff, and the contractor and /or site manager are made aware of the contents of the EMP, through presentations and discussions.
- Ensure that compliance to the EMP is monitored by regular and comprehensive inspection of the site and surrounding areas.
- Report on any incidents of non-compliance and ensure mitigation measure are implemented as soon as practical.

During *construction*, the Environmental Control Officer will be responsible for the following:

- Meeting on site with the Construction Manager prior to the commencement of construction activities to confirm the construction procedure and designated activity zones.
- Monthly- monitoring of site activities during construction to ensure adherence to the specifications contained in the EMPr, using a monitoring checklist that is to be prepared by the ECO at the start of the construction phase.
- Preparation of the monitoring report based on the site visit.
- Conducting an environmental inspection on completion of the construction period and signing off the construction process with the Construction Manager; and
- Maintain an Incidents Register and Complaints Register on site.

During decommissioning, the Environmental Control Officer will be responsible for:

- Overseeing the implementation of the EMPr for the decommissioning phase
- Conducting an environmental inspection on completion of decommissioning and "signing off" the site rehabilitation process

Contractor

The Contractor appoints the cEO and has overall responsibility for ensuring that all work, activities, and actions linked to the delivery of the contract are in line with the EMPr and that Method Statements are implemented as described. External contractors must ensure compliance with this EMPr while performing the onsite activities as per their contract with the Project Developer. The contractors are required, where specified, to provide Method Statements setting out in detail how the impact management actions contained in the EMPr will be implemented during the development or expansion for overhead electricity transmission and distribution infrastructure activities.

Responsibilities

- project delivery and quality control for the development services as per appointment;
- employ a suitably qualified person to monitor and report to the Project Developer's appointed person on the daily activities on-site during the construction period;
- ensure that safe, environmentally acceptable working methods and practices are implemented, and that equipment is properly operated and maintained, to facilitate proper access and enable any operation to be carried out safely;
- attend on site meeting(s) prior to the commencement of activities to confirm the procedure and designated activity zones;
- ensure that contractors' staff repair, at their own cost, any environmental damage as a result of a contravention of the specifications contained in EMPr, to the satisfaction of the ECO.

Contractor Environmental Officer(cEO)

Each Contractor affected by the EMPr should appoint a cEO, who is responsible for the on-site implementation of the EMPr (or relevant sections of the EMPr). The Contractor's representative can be the site agent; site engineer; a dedicated environmental officer; or an independent consultant. The Contractor must ensure that the Contractor's Representative is suitably qualified to perform the necessary tasks and is appointed at a level such that she/he can interact effectively with other site Contractors, labourers, the Environmental Control Officer and the public. As a minimum the cEO shall meet the following criteria:

Responsibilities

- Be on site throughout the duration of the project and be dedicated to the project;
- Ensure all their staff are aware of the environmental requirements, conditions and constraints with respect to all of their activities on site;
- Implementing the environmental conditions, guidelines and requirements as stipulated within the EA, EMPr and Method Statements;
- Attend the Environmental Site Meeting;
- Undertaking corrective actions where non-compliances are registered within the stipulated timeframes;
- Report back formally on the completion of corrective actions;
- Assist the ECO in maintaining all the site documentation;
- Prepare the site inspection reports and corrective action reports for submission to the ECO;
- Assist the ECO with the preparing of the monthly report; and
- Where more than one Contractor is undertaking work on site, each company appointed as a Contractor will appoint a cEO representing that company

4.3 Training and Induction of Employees

The contractor has a responsibility to ensure that all personnel involved in the project areaware of and are familiar with the environmental requirements for the project. The EMPr shall be part of the terms of reference (ToR) for all contractors, sub-

contractors and suppliers. All Contractors have to give some assurance that they understand the EMPr andthat they will undertake to comply with the conditions therein. All senior and supervisory staff members shall familiarise themselves with the full contents of the EMPr. They shall know and understand the specifications of the EMPr and be able to assist other staff members in matters relating to the EMPr.

The Contractor must ensure that all staff working on site has an environmental induction.The presentation can include the following topics;

- What is meant by "Environment"?
- Why the environment needs to be protected and conserved.
- How construction activities can impact on the environment.
- What can be done to militate against such impacts?
- Awareness of emergency and spills response provisions.
- Social responsibility during construction e.g. being considerate to local residents.

A detailed environmental management and training program must be developed. The purpose of this is to ensure that all staff and workers understand what is required of them.The main components of the program can incorporate the following:

- Concept of sustainability and the reasons for good environmental management and practice
- Potential environmental impacts
- Mitigation measures
- Establishing a chain of responsibility and decision making
- Specific training requirements of certain staff, and the potential hazardous associatedwith the job.
- Methodologies to be used for field sampling
- Training in the use of field equipment
- Training in identification of non-compliance situations and procedures to be followedin such instances
- Reporting requirements
- Fire management
- HIV/AIDS

4.4 Complaints Register and Environmental Incidents Book

The Contractor must record any complaints received from the community. The complaint must be brought to the attention of the site manager and Environmental Control Officer, who will respond accordingly.

The following information will be recorded:

- Time, date and nature of the complaint.
- Response and investigation undertaken; and,
- Actions taken and by whom.

All complaints received will be investigated and a response (even if pending further investigation) will be given to the complainant within 7 days.

All environmental incidents occurring on the site will be recorded. The following information will be provided:

- Time, date, location and nature of the incident,
- Actions taken and by whom.

4.5 Construction Environmental Monitoring

Environmental audits must be undertaken by the Environmental Control Officer on a monthly basis, or as deemed necessary by the ECO during times of heavy earth works and vegetation clearing, in order to ensure compliance of all aspects of the EMPr.

In order to facilitate communication between the ECO and the Resident Engineer and Contractor, it is vital that a suitable chain of command is structured that will ensure that the ECO's recommendations have the full backing of the project team before being conveyed to the Contractor. In this way, penalties as a result of non-compliances with the EMPr may be justified as failure to comply with instruction from the highest authority.

4.6 Dealing with Non-Compliance with the EMPr

There may be difficulties encountered with carrying out the mitigation measures within the EMPr, this may result in non-compliance with the EMP. It may be possible that the contractor and/or the developer put in place procedures to motivate staff members to comply with the EMPr and to deal with non-compliance. The developer must make this known to the contractor at the earliest stage possible, even during the tender phase.

4.7 EMPr Amendments and Instructions

Any amendments to the EMPr must comply with the requirements of the EIA Regulations Amendments may be possible, following discussions with the relevant ECO or environmental consultant, who may propose EMPr amendments on behalf of the developer or issue EMPr instructions, corrective actions, remediation or rehabilitation. These correction actions must be completed within the specified timeframes.

SECTION 5: DESIGN PHASE/PRE-CONSTRUCTION PHASE MITIGATION MEASURES

The objectives of the pre-construction phase are:

- To promote environmental awareness.
- To define roles and responsibilities for environmental management.
- To ensure suitable environmental training and induction to all contractors, sub- contractors and labourers; and
- To ensure that all legal obligations and contractual conditions have been met prior to commencing of construction.

Mitigation measures for Legal Compliance.

- Appoint an independent environmental control officer
- Contractor to appoint an internal environmental co-ordinator or environmental officer, to oversee day to day environmental activities.
- 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.
- Before construction begins, all areas to be developed must be clearly demarcated
- The contractor must ensure compliance with conditions described in the environmental authorisation.
- No workers are allowed to stay overnight in the construction area, aside from security personell to the extent required.
- Confirm with ECO, suitable sites for the construction camps (equipment and batching etc.) and storage areas for materials. All construction equipment must be stored within the construction camps and all associated oil changes etc. (no servicing) must take place within this camp.
- Unskilled labourers should be drawn from the local market as far as possible
- Environmental awareness training for construction staff, concerning 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.
- Project Manager shall ensure that the training and capabilities of the Contractor's sitestaff are adequate to carry out the designated tasks.
- Staff operating equipment (such as excavators, loaders, etc.) shall be adequately trained and sensitised to any potential hazards associated with their tasks.
- No operator shall be permitted to operate critical items of mechanical equipment without having been suitably trained.

The developer must ensure that the following mitigation measures are applied to the proposed project prior to the construction phase. These measures must be included in an updated EMPr to be submitted to the DFFE for approval.

Prior to the submission of the final layout plan to the DFFE for approval, the following specialists must visit the site to assist with the micro-siting the layout and do a walkthrough of all power lines[3]:

- Flora and fauna specialists
- Avifaunal specialist
- Palaeontologist

[3] Note that the requisite walkthrough assessments were undertaken in 2022, and the resultant walkthrough reports are attached hereto as Annexures A1 – E2

Following the selection of turbine to be used for the project, the developer must update the layout plan for the WEF , this together with the following management plans, to be developed, must be submitted to the DFFE for approval:

- Traffic Management Plan – this plan will include the necessary arrangements to transport all equipment and infrastructure to site, including the necessary road transport permits.
- Construction Site Traffic Management Plan – this will be in the form of a site layout, showing the flow of traffic during the construction phase taking into consideration existing land users.
- Storm water Management Plan – once the final layout plan has been produced the appointed responsible engineers must produce a storm water management plan for the site, during the construction and operational phases of the project.
- A health and safety plan must be drawn up to ensure worker safety.

The construction of the WEF will result in water crossings for the expansion of existing and / the construction of new bridges/crossings over water courses. The developer must ensure that the relevant approvals are obtained, prior to the start of construction.

Develop a Project Layout = Plan to show the intended use of the area as per the Environmental Authorisation. The plan shall clearly indicate and/or describe the location and details of:

- Turbine wind turbines and its associated infrastructure;
- Internal roads indicating width and length;
- Wetlands, drainage lines, rivers, stream and water crossings of roads and cables;
- All sensitive features e.g. heritage sites, wetlands, pans and drainage channels that will be affected by the facility and associated infrastructure;
- Substation (s) and/or transformer(s) sites including their entire footprint;
- Cable routes and trench dimensions (where they are not along internal roads);
- All existing infrastructure on the site, especially roads;
- Buildings including accommodation; and
- All no-go and buffer areas

5.1 Method Statements

Prior to construction the developer must ensure that the contractor supply the following method statements:

- Vegetation clearing.
- Cement mixing.
- Hazardous waste management.
- Emergency preparedness and response.
- Hazardous spills clean up.
- Topsoil stockpiling management.
- Laydown area management.
- Hazardous materials management.

5.2 Site Establishment

The object of site establishment is to ensure that an appropriate site is selected for the construction camp/site office and that the site office is managed in an environmentally responsible manner with minimal impact on the environment.

Mitigation Measures

Before establishing the construction office areas, carefully plan the layout and develop a Construction Site Office Plan. The Construction Site Office Plan shall provide a description of the site and shall show, on a reasonably scaled map, the intended use of the site. Indicate and/or describe the location, size / quantity / capacity and design of:

- Access routes;
- Ablution facilities (including details on the handling of sewage and wastewater);
- On-site waste management facilities (waste containers, etc.);
- Design of bunds and other structures for containment of hazardous substances;
- Fencing;
- Water storage and supply;
- Power supply (for cooking, space heating, lighting, etc.);
- Fire extinguishers, first aid kit and any other relevant safety equipment;
- Other structures and buildings (offices, storerooms, workshops, etc.);
- Other storage areas and stockpiles (i.e., topsoil, construction materials, equipment, etc.).

Location of areas to be reinstated upon completion of the construction period, providing measures to be used for reinstatement:

- An area within the site must be demarcated for a construction site office, which will include storage area. This area must be fenced off.
- Site establishment shall take place in an orderly manner and all required amenities shall be installed at the lay down area before the main workforce move onto site.
- The construction camp shall have the necessary ablution facilities with chemical toilets at commencement of construction.
- The Contractor shall inform all site staff to make use of supplied ablution facilities and under no circumstances shall indiscriminate sanitary activities be allowed other than in supplied facilities.
- The Contractor shall supply waste collection bins and all solid waste collected shall be disposed of at a registered landfill.
- Potable water for use by on site workers must be made available on a daily basis at the site office and the working areas on site.
- A certificate of waste disposal shall be obtained by the Contractor and kept on file. Where a registered waste site is not available close to the construction site, the Contractor shall provide a method statement with regard to waste management.
- The disposal of waste shall be in accordance with all relevant legislation. Under no circumstances may solid waste be burnt or buried on site.

Siting, Establishing and Management of Storage Material and Facilities

- 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.
- Storage areas must be designated, demarcated and fenced.

- Storage areas should be secure so as to minimize the risk of crime. They should also be safe from access by children / animals etc.
- Fire prevention facilities must be present at all storage facilities.
- 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 should include a bund wall high enough to contain at least 110% of any stored volume, and this should be sited away from drainage lines in a site with the approval of the Engineer.
- Any water that collects in the bund must not be allowed to stand and must be removed immediately and the hydrocarbon digestion agent within must be replenished.
- All legal compliance requirements with respect to Fuel storage and dispensing must be met.
- All fuel storage tanks (temporary or permanent), and associated facilities must be designed and installed in accordance with the relevant oil industry standards, SANS codes and other relevant requirements.
- Areas for storage of fuels and other flammable materials must comply with standard fire safety regulations
- Flammable fuel and gas must be well separated from all welding workshops, assembly plants and loading bays where ignition of gas by an accidental spark may cause an explosion or fire.
- The tank must be erected at a safe distance from buildings, boundaries, welding sites and workshops and any other combustible or flammable materials.
- Symbolic safety signs depicting "No Smoking", "No Naked Flames" and "Danger" are to be prominently displayed in and around the fuel storage area.
- The capacity of the tank must be clearly displayed, and the product contained within the tank clearly identified.
- There must be adequate fire-fighting equipment at the fuel storage and dispensing area or areas.
- The storage tank must be removed on completion of the construction phase of the project.
- All such tanks to be designed and constructed in accordance with a recognised code (international standard).
- The rated capacity of tanks must provide sufficient capacity to permit expansion of the product contained therein by the rise in temperature during storage.
- Only empty and externally clean tanks may be stored on the bare ground. All empty and externally dirty tanks must be sealed and stored in an area where the ground has been protected.
- Any electrical or petrol-driven pump must be equipped and positioned so as not to cause any danger of ignition of the product.
- If fuel is dispensed from 200-liter drums, the proper dispensing equipment must be used.
- The drum must not be tipped in order to dispense fuel. The dispensing mechanism of the fuel storage tank must be stored in a waterproof container when not in use.
- All waste fuel and chemical impregnated rags must be stored in leak-proof containers and disposed of at an approved hazardous waste site.
- The amounts of fuel and chemicals stored on site must be minimised.
- Storage sites must be provided with bunds to contain any spilled liquids and materials.
- These storage facilities (including any tanks containing hazardous substances like fuel or oil/waste-oil) must be on an impermeable surface that is protected from the ingress of storm water from surrounding areas in order to ensure that accidental spillage does not pollute local soil or water resources.
- Clear signage must be placed at all storage areas containing hazardous substances / materials.
- Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site. Where possible the available, MSDSs should additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes.
- Storage areas containing hazardous substances / materials must be clearly signed.

- Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures.
- A suitable Waste Disposal Contractor must be employed to remove waste oil. These wastes should only be disposed of at licensed landfill sites designed to handle hazardous wastes.
- Hazardous waste generated during the construction phase may not, under any circumstances, be mixed with general waste. Should this occur, the entire volume of waste will be classified as hazardous waste and must be managed accordingly.
- 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
- All excess cement and concrete mixes are to be contained on the construction site prior to disposal off site.
- Any spillage, which may occur, shall be investigated and immediate action must be taken.

SPECIFIC FINAL PRE-CONSTRUCTION WALKTHROUGH MITIGATION MEASURES (2022): DESIGN PHASE

5.3 AQUATIC ECOLOGYMITGATON MEASURES
DESIGN/PRECONSTRUCTION PHASE (INCLUDING THE FINAL PRE-CONSTRUCTION WALKTHROUGH; 2022)

Impact management outcome: Minimise disturbance to Aquatic systems						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
Avoid the delineated watercourse and buffers areas except for limited watercourse crossings as per final layout.	Developer, Environmental Officer	A no-go buffer of 30 m must be applied around them[4]	Pre-Construction phase	Developer, Site Manager	Ongoing	Buffers respected around drainage lines including evidence of demarcation
A competent Environmental Control Officer (ECO) must oversee the construction phase of the project	Environmental Officer, Contractor	Appoint a competent Environmental Officer before construction phase commences	Pre-Construction phase	Site Manager	Ongoing	Evidence of competent Environmental Officer appointment.
Impact management outcome: Minimise direct loss, disturbance, and degradation of watercourses						
Minimise direct loss, disturbance, and degradation of watercourses	cEO, Contractor	Educate staff and relevant contractors on the location and importance of the identified watercourses. Conduct toolbox talks and by including them in site inductions as well as the overall site final layout plan.	Pre-Construction phase	Site Manager	Continuous and as and when required	Evidence of staff toolbox talks Photographic evidence.

[4] Note that the final site layout plan in Figure 1.1. and 1.2 complies with this requirement

		Restrict all non-essential activities (e.g., cement mixing and equipment watercourse machinery storage) to outside of watercourses and their prescribed buffers. Request the watercourse spatial data, load it onto a GPS and use it to mark out the positions to plan for the required activities to reduce the disturbance footprint and the unnecessary clearing of vegetation. Demarcate the construction area as well as the prescribed 30 m buffer on the ground (e.g. painted wooden poles).				
Impact management outcome: Minimise Degradation of watercourse vegetation and the introduction and spread of alien and invasive vegetation						
Minimise Degradation of watercourse vegetation and spread of alien invasive species	Contractor, contractor Environmental Officer(cEO)	Promptly remove all alien and invasive plant species that may emerge during construction (i.e., weedy annuals and other alien forbs) must be removed. The use of herbicides is not recommended in or near watercourses (opt for mechanical removal).	Pre-Construction phase	Site Manager,	Continuous and as and when required	Proof of no or minimal degradation of watercourse vegetation and the introduction and spread of alien and invasive vegetation

		Clearly demarcate construction footprint and limit all activities to within this area. Landscape and re-vegetate all denuded areas as soon as possible.				
Impact management outcome: Minimise Contamination of watercourse with concrete						
Minimise contamination of watercourses and drainage lines associated with concrete and batching plant.	Contractor	It is preferable that pre-fabricated materials be used, with no pouring of concrete within the watercourse areas. All materials and structures must be stored beyond the buffer, and only brought into the watercourse for installation. Short-term storage (, 1 day) in a cleared area is permissible. Ensure that topsoil is appropriately stored and re-applied during backfilling and landscaping of the area. Make sure that the soil is backfilled and compacted to accepted geotechnical standards to avoid conduit formation around the structures i.e. gabion baskets	Pre-Construction phase	Site Manager	Continuous and as and when required	No proof of contamination of watercourse with concrete

5.4 TERRESTRIAL ECOLOGY MITIGATION MEASURES
DESIGN/PRECONSTRUCTION PHASE (INCLUDING THE FINAL PRE-CONSTRUCTION WALKTHROUGH; 2022)

Impact management outcome: Minimise disturbance to Vegetation and Habitats						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
Minimise disturbance to vegetation and habitats	Project manager, Environmental Officer	A no-go buffer of 30 m must be applied and demarcated around them[5] Drainage lines must be avoided for turbine placement. Limited access road crossings are acceptable subject to mitigation prescribed by the aquatic specialist The aquatic ecology walkdown report must be consulted. Rocky outcrops must be avoided as much as possible. Avoid fragmenting rocky habitats.	Design Phase	Site Manager	Ongoing	Evidence buffer demarcations respected around drainage lines Proof of aquatic specialist mitigation adhered to on access road crossings Proof of rocky outcrops left undisturbed.

[5] Note that the final site layout plan in Figure 1.1. and 1.2 complies with this requirement

		No turbines should encroach into an area assigned a Very High Site Ecological Importance (SEI).				Final revised layout showing all turbines out of very high SEI
Prevent removal of protected plant species prior to search and rescue operations (prior to site clearing)	Environmental Officer & Contractor	To the extent possible within construction timelines, the floral search and rescue operation must be undertaken before the end of February for the summer flowering species, and during August for the winter flowering species.	Design phase	Site Manager	Ongoing	Evidence of correct timeframes adhered to for floral search and rescue operation
Prevent fragmentation and disturbance to areas of indigenous vegetation and secondary communities outside of the direct turbine footprint. Clearing of vegetation should be minimized and avoided where possible. Rehabilitation of the disturbed areas existing in the project area must be made a priority.	Project manager, Environmental Officer	It is recommended that areas to be developed be specifically demarcated so that during the construction phase, only the demarcated areas be impacted upon. All temporary disturbance footprints disturbed areas to be rehabilitated and landscaped after installation is complete Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type , in accordance with the revegetation plan	Life of operation	Site Manager	Ongoing	Evidence of areas of indigenous vegetation left undisturbed.
Prevent potential spillage, contamination of the soil of the surrounding environment. Construction activities and vehicles could cause spillages of lubricants, fuels and waste material potentially negatively affecting the functioning of the ecosystem	Environmental Officer & Contractor	A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. Construction activities and vehicles could cause	Life of operation	Site Manager	Ongoing	Monitoring of hydrocarbon spill management plan and evidence of compliance to the plan.

		spillages of lubricants, fuels and waste material potentially negatively affecting the functioning of the ecosystem. All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers. Appropriately contain any generator diesel storage tanks, machinery spills (e.g., accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them leaking and entering the environment. Avail a spill kit for use when required Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment on site unless necessary All vehicles and equipment must be maintained, and all re-fuelling and servicing of equipment is to take place off-site where possible, or within in specifically demarcated areas on-site				No hydrocarbon contamination

Prevent illegal removal and clearing of plant and animal species from site	Project manager, Environmental Officer	No plant species whether indigenous or exotic should be brought into/taken from the project area (except in accordance with the rehabilitation plan), to prevent the spread of exotic or invasive species or the illegal collection of plants Any individual of the protected plants that are present needs a relocation or destruction permit in order for any individual that may be removed or destroyed due to the development. If left undisturbed the sensitivity and importance of these species needs to be part of the environmental awareness program. Acquire relocation or destruction permit when required All protected and red-data plants should be relocated, and as many other geophytic species as possible. Turbine infrastructure, development areas and routes where protected plants cannot be avoided, these plants many being geophytes or small succulents should be removed from the soil and	Life of operation	Site Manager	Ongoing	Photographic evidence. Proof of no plant species taken in or out of the project area Evidence of removal and relocation permits on site. Evidence of permits in place for any relocation or destruction of protected plants Evidence of floral search and rescue operation

		relocated/ re-planted in similar habitats where they should be able to resprout and flourish again. For the threatened species that may not be destroyed, it is recommended that professional service providers that deal with plant search and rescue be used to remove such plants and use them either for later rehabilitation work other conservation projects. Contract professional service providers for search and rescue to remove threatened species for later rehabilitation work or other conservation projects.				Proof of professional service contracted
A fire management plan needs to be complied and implemented to restrict the impact fire might have on the surrounding areas	Contractor	Develop and implement a fire management plan	Life of operation	Site Manager	During Phase	Monitoring of fire management plan and no fire recorded
Impact management outcome: Minimise disturbance to Fauna						
Prevent trapping, killing, or poisoning of any wildlife	Environmental Officer/ Health and Safety Officer	Signs must be put up to enforce this;	Life of operation	Site Manager	Ongoing	No killings or trapping occurring.

Prevent faunal mortality as a result of construction vehicles.	, Environmental Officer/	All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings, dust and erosion is limited, this is especially true due to the presence of the Verrox's Tent Tortoise's. The speed limits should be restricted to maximum 30 km/h Driving on access roads at night should be restricted in order to reduce or prevent wildlife road mortalities which occur more frequently during this period;	Life of operation	Site Manager / Health and Safety Officer	Ongoing	Evidence of speed limits erected in place No/ limited faunal fatalities on roads
Prevent entrapment and mortality of fauna associated with excavation activities	Environmental Officer & Contractor, Engineer	Any holes/deep excavations must be dug and planted in a progressive manner and should ideally not be left open overnight; Should the holes need to remain overnight they must be fenced / covered temporarily to ensure no small fauna species fall in, and/or the holes must be inspected each morning and any trapped fauna released by a suitably experienced individual	Planning and Construction	Site Manager	Ongoing	Proof of progressive excavations being implemented
Reduce the risk of electrocution of fauna	Environmental Officer &	Ensure that cables and connections are insulated successfully to reduce electrocution risk.	Life of project	Site Manager	Ongoing	Evidence of proper insulation and no

	Contractor, Engineer					electrocutions recorded.
Impact management outcome: Minimise disturbance due to Alien species						
Minimise disturbance to due to Alien species	Project manager, Environmental Officer & Contractor	The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. Footprint of the roads must be kept to prescribed widths.	Life of operation	Site Manager	Life of operation	no additional footprint visible to the project area
Impact management outcome: Minimise disturbance to dust						
Minimise dust emissions	Contractor	Dust-reducing mitigation measures must be put in place and must be strictly adhered to. Wetting of exposed soft soil surfaces. No non environmentally friendly suppressants may be used as this could result in pollution of water sources	Life of operation	Site Manager	Dust monitoring program	No complaints of dust
Impact management outcome: Waste Management						
Waste management must be a priority and all waste must be collected and stored adequately.	Environmental Officer, Contractor & Health and Safety Officer	It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site Develop waste management plan and implement	Life of operation	Site Manager	Life of operation	Proof of waste collection
Sufficient toilets must be provided for on-site workers	Environmental Officer, Contractor &	Install or place one toilet for every 10 persons or as per the requirements of the Occupational Health and Safety Act.	Life of operation	Site Manager	Daily	Proof of sufficient toilets provided, and toilets kept in good order.

	Health and Safety Officer	Portable toilets must be pumped dry to ensure the system does not degrade over time and spill into the surrounding area				
The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility	Environmental Officer, Contractor & Health and Safety Officer	Install specified bins for temporary waste storage	Life of operation	Site Manager	Ongoing	Proof of sealed and marked bins
Where a registered disposal facility is not available close to the project area, the Contractor shall provide a method statement with regard to waste management.	Environmental Officer, Contractor & Health and Safety Officer	Develop method statement for waste disposal. Under no circumstances may domestic waste be burned on site	Life of operation	Site Manager	Ongoing	No waste lying around
Refuse bins will be emptied and secured Temporary storage of domestic waste shall be in covered waste skips or other suitable containers.	Environmental Officer, Contractor & Health and Safety Officer	Restrict Maximum domestic waste storage period to 10 days.	Life of operation	Site Manager	Ongoing, every 10 days	Proof of regularly disposed waste within stipulated period.
Impact management outcome: Environmental Awareness Training						
All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area to inform contractors and site staff of the presence of Red / Orange List species, their	Environmental Officer, Health and Safety Officer	Conduct environmental awareness training	Life of operation	Site Manager	Ongoing	Proof of training conducted

identification, conservation status and importance, biology, habitat requirements and management requirements the Environmental Authorisation and within the EMPr. The avoidance and protection of the very high sensitivity areas must be included into a site induction. Contractors and employees must all undergo the induction and made aware of the "no-go" to be avoided.						
Impact management outcome: Minimise Erosion						
Minimise erosion due to vehicles travelling at high speeds.	Project manager, Environmental Officer	Speed limits of 30 km/h must be put in place to reduce erosion. Reducing the dust generated by the listed activities above, especially the earth moving machinery, through wetting the soil surface and putting up signs to enforce speed limit as well as speed bumps built to force slow speeds; Signs must be put up to enforce this.	Life of operation	Site Manager	Ongoing	Proof of no dust generated
Reduce erosion caused by continuous use of paths	Project manager, Environmental Officer	Where possible, existing access routes and walking paths must be made use of	Life of operation	Site Manager	Ongoing	Evidence of access routes made use of.
Prevent erosion during flooding and strong wind events	Project manager, Environmental Officer	Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood and wind events	Life of operation	Site Manager	Progressively	Photographic evidence.

		Assess the state of rehabilitation and encroachment of alien vegetation Livestock should be kept out of areas that have been recently re-planted until these areas are well established				Proof of revegetation
A stormwater management plan must be compiled and implemented	Project manager, Environmental Officer	Develop and implement the stormwater management plan	Life of operation	Site Manager	Before construction phase: Ongoing	Monitoring of stormwater management and evidence of compliance to the plan

5.5 AVIFAUNA MITIGATION MEASURES

DESIGN/PRECONSTRUCTION PHASE (INCLUDING THE FINAL PRE-CONSTRUCTION WALKTHROUGH; 2022)

Impact management outcome: Minimise disturbance to Avifauna						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
Minimise disturbance to Avifauna	Contractor and ECO	Implement proven best proactive mitigation measures must be implemented prior to commencement of construction as per Arcus (2015 and 2020) recommendations. Where cables are required to be aboveground, pole designs and spanning mitigation measures should be informed following consultation with the Endangered Wildlife Trust; and Birdlife South Africa.	Pre-construction	Contractor and Site Manager	Ongoing	Compliance on all best practice mitigation measures Evidence of communication and agreement with the Endangered Wildlife Trust

5.6 BAT MITIGATION MEASURES

DESIGN/PRECONSTRUCTION PHASE (INCLUDING THE FINAL PRE-CONSTRUCTION WALKTHROUGH:2022)

Impact management outcome: Minimise disturbance to Bats						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
Minimise disturbance to bats	Contractor and ECO	Map and construct the turbines to avoid the medium and high bat sensitivity areas. Implement recommendations to reposition, relocate and implement curtailment as specified by the Bat walkthrough specialist report. No turbine tower or blades will encroach into any High bat sensitive area. Two turbines (Turbines 1 and 14), which are proposed in Medium-High sensitive bat areas, will require curtailment. Where turbines encroach into Medium-High sensitive areas, implement curtailment of all these turbines as soon as each starts operating. Curtailment will require implementation of an initial cut-in speed of 4.5m/s between 1 September and 31 May, when temperatures are 12°C or higher, during the following seasonal time periods:	Construction	Contractor Site Manager	Once off prior to commencement of construction and on-going during operation.	Evidence of the turbine relocated to less Bat sensitive areas Evidence of implementation of curtailment for turbines located within Medium- High Sensitivity areas as per the final sensitivity map.

		a) Autumn: 18h30 to 04h00; b) Spring: 19h00 to 04h00; and c) Summer: 20h00 to 04h00. Spring = 1 Sept – 15 Nov Summer = 16 Nov – 15-Mar Autumn = 16 Mar – 31 May Winter = 1 Jun – 31 Aug				
Reduce and monitor bat fatalities	Contractor and ECO	If bat fatalities exceed the calculated bat fatality threshold for the Umsinde WEF, adaptive mitigation should take place (such as curtailment of additional turbines, and/or installation of bat deterrents), and bat fatality monitoring must continue to monitor the efficacy of the adaptive mitigation. Plan and Implement bat fatality monitoring in accordance with best practise guidelines	Construction	Contractor and ECO	Ongoing	Evidence of periodical bat fatality monitoring

5.7 HERITAGE & PALEONTIGICAL MITIGATION MEASURES

MITIGATION MEASURES DESIGN/PRECONSTRUCTION PHASE: (INCLUDING THE FINAL PRE-CONSTRUCTION WALKTHROUGH:2022)

Impact management outcome: Minimise disturbance to heritage resources						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
Minimise disturbance to heritage resources related to the turbine positions and access roads.	Site Manage	A Walk-Down of the final positions of the turbines and access road routes must be completed prior to commencement of construction. The locations of construction camps and laydown yards must also be assessed as part of the walk-down report. The report must CLEARLY state which heritage resources are located within the Western Cape Provinces to allow the relevant Heritage Resource Authority (HRA) to provide comments. The report must also clearly state the distance between each proposed project activity and identified resources via detailed descriptions, photographs and a map.	Pre-construction	Site Manager / Heritage Specialist / Palaeontologist	Once- off prior to commencement of construction	Completion of pre-construction walkthrough report and submission to HWC & SAHRA
Reduce damage and irreparable damage to resources caused by construction.	Site Manager / Heritage Specialist / Palaeontologist	Place infrastructure outside of sensitive areas identified in the Heritage walkthrough. Implement buffers around identified site	Pre-construction, Construction,	Site Manager / Heritage Specialist / Palaeontologist	Once, prior to construction Monthly reports during	Adherence to a layout and sensitivity map indicating avoidance of heritage sensitive areas and/or suitable

		Implement a 30-meter buffer around rock engravings sites (**U0003**) with a rating of IIIB/IIIC. If the engravings cannot be avoided, then they should be photographed and traced as necessary to produce a clear record. If the engravings cannot be avoided, then they should be photographed and traced (catalogued) as necessary to produce a clear record, prior to removal/ destruction/destruction. If excavations into the Lower Beaufort Group cannot be avoided a "Watching Brief" during the construction phase had to should be conducted A management plan for the heritage resources has been compiled and needs to be submitted for approval by HWC , NCHRA and SAHRA for implementation during construction and operations. The management plan must be submitted and approved by HWC			construction/ as or when required	mitigation where avoidance is not possible.
Prevent disturbance / destruction of heritage resources due to inadequate training of contractor or site staff	Developer ECO Heritage Specialist	If development occurs within the vicinity of the identified sites, the construction team should be informed. ECO should implement cultural awareness talks before construction activities commence to induct personnel in:	During the design phase	Site Manager/ Heritage Specialist	Monthly reports during construction/ as or when required)	Monthly reports during Construction / as or when required)

		• The types of cultural heritage sites that exist within the disturbance areas and that trigger the implementation of the Chance Finds Procedure, which includes measures for dealing with archaeological finds, palaeontological resources and burial ground and graves. Locations of known cultural heritage sites and requirement to avoid all site, as they are No-Go-Zones Cultural awareness talks A Chance find and Chance find Procedure has to be developed and implemented for the project. If any evidence of fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted. A professional palaeontologist must be contracted as soon as possible to inspect the findings. If the newly discovered heritage				Yearly Report to be submitted to HWC during construction

		resources prove to be of palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA.				
Prevent potential damage to *in situ* deposits	Developer Contractor, Environmental Officer	Implement chance finds procedure and heritage management plan	During construction	ECO	On receipt	HWC to review report
Prevent damage to resources due to inexperienced contractors.	Developer, ECO	Appoint experienced project and contractors in agreement with the TOR and management plans to be implemented for the project.	To comply with project time frames	Site Manager	As required	Proof of experienced contractors appointed.
Prevent damage to sites or unnecessary removal of deposits due to inexperience	Developer ECO	Appoint Archaeologist/Heritage specialist to develop Heritage Management Plan	Planning phase.	Site Manager	As required	Proof of development of heritage management plan by suitably qualified specialist.
Prevent inefficient and un-coordinated rehabilitation and conservation work	Developer, ECO Archaeologist/heritage specialist	Planning and co-ordination must be done in conjunction with a development company, Officer (ECO) and Archaeologist/heritage specialist	During the planning, construction and operational phases	Site Manager Archaeologist/heritage specialist	Monthly	Proof of appointment of specialist for rehabilitation and conservation initiatives.
Reduce risk to heritage resources related to poor quality materials and workmanship during rehabilitation	Client Archaeologist/heritage specialist, ECO	During excavation, monitoring of the turbine foundations as well as access roads and underground cables by a palaeontologist is recommended	Necessary	Site Manager / Archaeologist/heritage specialist, ECO	Monthly (during construction)	Regular inspections by ECO

and conservation initiatives		Implement Chance Find Fossil Procedure.				A monitoring report has to be submitted to SAHRA.
Prevent loss of information through inadequate recording	Developer ECO / Archaeologist/heritage specialist, HWC /SAHRA	Any archaeological or historical material found accidentally must be reported to responsible Archaeologist/heritage specialist or HWC/ SAHRA	During construction	Site Manager / Developer Archaeologist/heritage specialist, HWC/SAHRA	As required	Check sites are recorded and photographs are taken. Measures recommended by specialist or heritage authority are implemented.
Prevent impact beyond areas requiring mitigation	Developer/ Site Manager/ ECO	Developer and ECO must indicate to contractors the area of work for the duration of the contract, including the access road to be used, construction lay-down areas, materials storage and delivery requirements, work stations, pedestrian routes and operational demarcation, etc.	During the planning, construction and operational phases	Site Manager/ Developer	Before start of construction	Maps to be signed off at the start of each contract Check contractor works within demarcated areas
Avoid unnecessary disturbances to adjacent areas Avoid accidental destruction of sensitive areas.	Developer, ECO	Boundaries of the sites and conservation areas shall be demarcated by the Contractor, as instructed by the Developer and the Archaeologist/heritage specialist, prior to any work commencing on the site. The workforce must be made aware of these areas, and why they are sensitive.	During the planning, construction and operational phases	Site Manager	Ongoing	No encroachment beyond the demarcated boundaries is to be permitted. The contractor must ensure all labour and materials remain

		Any changes must be recorded in writing.				within the boundaries of the site.
Prevent damage to heritage resources sites	Developer ECO	Sensitive areas identified by Developer and/or Archaeologist / Heritage Specialist to be demarcated if/as applicable.	During the planning, construction and operational phases	Site Manager	Weekly	Sites are demarcated to the extent required
Prevent damage to sites and deposits due to unapproved access roads being used/developed (non-compliance with final approved layout)	Contractor, ECO, Developer	Only those roads agreed to between Developer, Archaeologist/ Heritage Specialist and Contractor, as described in the current layout, may be used during maintenance activities and day to day activities The access roads should be specifically demarcated so that during the construction phase, only the demarcated areas may be impacted upon. Access roads must be planned to deviate around trees or other natural features marked out in an approved manner by Developer. A walk down of access roads and the final turbine positions prior to construction	During the planning, construction and operational phases	Contractor, Site Manager	Weekly	ECO and site manager to check access roads regularly
Reduce impacts to the integrity of the cultural landscape and damage to sites related to the development of	Contractor and Developer	No off-road driving allowed; temporary access roads must be rehabilitated after usage	During the planning, construction and operational phases	Contractor Site Manager	As required	Check rehabilitation of temporary access roads against those agreed to satisfaction of Developer

temporary roads and off-road access						
Un-coordinated movement can lead to damage of sites and landscape	Contractor and ECO	The contractor must ensure that all construction personnel, labourers and equipment remain within demarcated restoration sites at all times. Movement outside boundaries may be done only with permission from the ECO	Necessary	Contractor Site Manger	Weekly	Check that all work is done within demarcated areas.
Reduce erosion caused by continuous use of paths.	Contractor	Confine pedestrian routes to paths.	Necessary	Contractor	Continuous and as and when required	Photographic evidence of no erosion

SECTION 6: CONSTRUCTION PHASE MITIGATION MEASURES

The following sections form the core of the EMPr during the construction phase of the proposed development. The developer is to ensure that the contractor complies with all mitigation measures during the construction period. The major sources of potential impactsinclude, the turbine footprint construction, the construction of buildings and infrastructure,the construction of roads and bridges, and vehicle operation, and spillages.

The following is not allowed on site:

- No poaching of any animals or harvesting of any flora;
- No workforce accommodation is allowed on site; contractorsare to ensure suitable housing for staff outside of the proposed development footprint.
- No cooking or open fires allowed on site;
- No alcohol or drugs are allowed on site;

6.1 Potential Construction Phase Impacts

The following impacts are likely to occur during the construction of the proposed WEF. Specific mitigation measures for each impact are presented below.

- The accidental, negligent, or deliberate spillage or inappropriate disposal of hazardous substances could result in air, soil and water pollution and may affect the health and well-being of people, plants and animals.
- Excessive noise could be made by the construction activity which would affect neighbouring communities.
- Potential damage to the soil structure, soil compaction and loss of soil fertility.
- Loss of the vegetation cover and increased erosion risks.
- Dust related problems.
- Safety hazards to the public, workers and animals in the area.
- Disturbance to local hydrology from construction activities.
- Pollution of surface water bodies
- Dust can be a nuisance to the construction workforce and to the public and can negatively affect the growth and recovery rate of plants. Potential sources of fugitive dust include, but are not limited to:
  - Demolition of concrete foundations and existing buildings;
  - Grading / movement of soil;
  - Transportation and unloading of construction materials;
  - Vehicular movement over unsurfaced roads and tracks; and,
  - Wind erosion of stockpiles.
- Construction activities will result in the exposure of the soil to erosive factors, i.e., wind and water, and the compaction of the soil in other areas;
- Illegal poaching and collection of animals and plant material.
- Loss of established indigenous and exotic habitat
- Unnecessary trampling of vegetation and harm to animals.
- Degradation of the scenic quality due to the major earthworks and any unsightly structures.
- Damage or loss of important cultural, historical or pre-historical sites and artefacts.
- Damage to existing roads and tracks, power lines, pipelines, etc.
- Dangerous conditions near road.
- Trespassing and illegal access onto land

Table 6:1 Construction Phase Mitigation Measures (as per ACUS EMPr 2018, Amended, 2022)

Mitigation Measure	Responsibility	Frequency
Route Clearing		
Off-road driving and the creation of new tracks, other than those described during Project Layout and Access Plan, are prohibited and will be regarded as unwanted tracks or unwarranted disturbed areas. All unwanted tracks or unwarranted disturbed areas shall be properly rehabilitated	Contractor's engineer will be responsible for the creation ofnew roads. The ECO will be responsible for monitoring this activity	During site establishment Monthly thereafter.
When a new path is created: Carefully plan the route and have it clearly marked out so thatdrivers exactly know where to drive.	Site engineer/site manager ECO to monitor	Monthly
Establish the track by simply driving over the ground if there areno obvious obstacles (i.e., large rocks, high plants or rough terrain).	ECO to monitor Site engineer/site manager	
Keep tracks as narrow as possible and only drive on marked outroutes (as per the Layout and Access Plan).		
No bulldozers will be used in bush clearing outside of the construction footprint. Only inflatable tire earthmoving equipment must be used to reduce damage to vegetation.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
If obstacles are far enough apart, divert the track around obstacles. Only obstacles that could interfere with the safeconstruction and operation of the development need to beremoved.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.

Where possible, remove obstacles by hand. Shrubs are to be cutor crushed rather than being completely uprooted in areas where landscaping or rehabilitation will be undertaken on completion of the construction. Leave vegetation in place wherever possible, especially around the perimeter of the site to provide screening and habitat. Indigenous plants can be planted to replace alien vegetation.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Only undertake earthworks in an area if it is unavoidable andkeep the size of platforms as small as possible.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Sensitive sites within the construction area must be demarcated to avoid accidental destruction of sensitive areas. The workforcemust be made aware of these areas, and why they are sensitive.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Mitigation Measure	**Responsibility**	**Frequency**
Impacts on vegetation and listed or protected plant species resulting from construction activities		
Preconstruction walk-through of the facility in order to locatespecies of conservation concern that can be avoided or translocated as well as comply with the provincial permit conditions.	Developer / Site EngineerECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Vegetation clearing to commence only after walk through has been conducted and necessary permits obtained.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Preconstruction environmental induction for all construction staffon site to ensure that basic environmental principles are adheredto. This includes awareness as to no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
ECO to provide supervision and oversight of vegetation clearingactivities within sensitive areas such as near drainage areas.	ECO to monitor	During site establishment Monthly thereafter.

	Site engineer/site manager	
Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared. Any vegetation that is removed during construction activities may not be illegally dumped under any circumstances. Such vegetation may be chipped for re-use or betaken to a waste management facility that will process the wasteprior to further re-use or disposal.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
All construction vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed outside ofthe construction area.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Temporary lay-down areas should be located within previously transformed areas or areas that have been identified as being oflow sensitivity. These areas should be rehabilitated after use.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.

Mitigation Measure	**Responsibility**	**Frequency**
Alien Plant Invasion Risk		
Wherever excavation is necessary, topsoil should be set asideand replaced after construction to encourage natural regeneration of the local indigenous species.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
The recovery of the indigenous grass layer should be encouraged through leaving some areas intact through the construction phase to create a seed source for adjacent clearedareas.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Due to the disturbance at the site as well as the increased runoffgenerated by the hard infrastructure, alien plant species are likely to be a long-term problem at the site and a long-term control plan will need to be	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.

implemented.		
Regular monitoring for alien plants within the development footprint as well as adjacent areas which receive runoff from thefacility as there are also likely to be prone to invasion problems.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Regular alien clearing should be conducted using the best-practice methods for the species concerned in accordance with the alien & invasive plant management plan attached to this EMPr. The use of herbicides should be avoided as far as possible.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Mitigation Measure	**Responsibility**	**Frequency**
Increased Erosion Risk		
Dust suppression and erosion management should be an integrated component of the construction approach.	ECO to monitor Site engineer/site manager	Weekly
Regular monitoring for erosion problems along the access roadsand other cleared areas.re	ECO to monitor Site engineer/site manager	Weekly
Erosion problems should be rectified on a regular basis.	ECO to monitor Site engineer/site manager	weekly
Sediment traps may be necessary to prevent erosion and soilmovement if there are topsoil or other waste heaps present during the wet season	ECO to monitor Site engineer/site manager	monthly
A low cover of vegetation should be left wherever possible within the construction footprint to bind the soil, prevent erosion and promote post-disturbance recovery of an indigenous groundcover.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.

Disturbance near to drainage lines or the pan should be avoidedand sensitive drainage areas near to the construction activities should demarcated as no-go areas.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Direct Faunal Impacts		
All personnel should undergo environmental induction with regards to fauna and in particular awareness about not harmingor collecting species such as snakes, tortoises and owls which are often persecuted out of superstition.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Any fauna threatened by the construction activities should beremoved to safety by the ECO or appropriately qualified environmental officer.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
All construction vehicles should adhere to a low-speed limit toavoid collisions with susceptible species such as snakes and tortoises	ECO to monitor Site engineer/site manager / safety officer	During site establishment Monthly thereafter.
All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature ofthe spill.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
If trenches need to be dug for water pipelines or electrical cabling, these should not be left open for extended periods oftime as fauna may fall in and become trapped in them. Trenches which are standing open should have places wherethere are soil ramps allowing fauna to escape the trench.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Avifaunal Habitat Destruction		
Prior to construction, the avifaunal specialist must conduct a site walkthrough, covering the final road and power line routes as well as the final turbine positions, to identify any nests/breedingactivity of sensitive	ECO to monitor Site engineer/site manager	Prior to construction

species, as well as any additional sensitive habitats. The results of which may inform the final construction schedule, including abbreviating construction time, scheduling activities around avian breeding and/or movement of schedules,and lowering levels of associated noise.		
During construction laydown areas and temporary access roadsshould be kept to a minimum in order to limit direct vegetation loss and habitat fragmentation, while designated no-go areas must be enforced i.e., no off-road driving.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Any clearing of stands of alien trees on site should be approvedfirst by an avifaunal specialist.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Following construction, rehabilitation of all areas disturbed (e.g.,temporary access tracks and laydown areas) must be undertaken and to this end a habitat restoration plan is to be developed by and included within the EMPr.	ECO to monitor Site engineer/site manager	Post construction
All contractors are to adhere to the EMPr and should apply good environmental practice during construction.	ECO to monitor Site engineer/site manager	Throughout construction
A sensitivity map is attached to this EMPr , areas identified on the map as 'no-go' areas for the placement of turbines must be strictly adhered when micro-siting.	ECO to monitor Site engineer/site manager	Design phase
Avifaunal Disturbance and Displacement		
The maximum generation capacity of the development should be met through the deployment of fewer, larger turbines as far as practically possible; Should fewer turbines be required to meet the maximum generation capacity of the development than the number authorised, the turbines closets to 'no-go' areas and those in areas identified as being of Medium collision risk by the VERA model must be the first up for	ECO to monitor Site engineer/site manager	Design phase

consideration toforgo where practically possible.		
Consultation with the South African Civil Aviation Authority (SACAA) can be undertaken to determine the potential mitigation measure of painting one WTG blade per turbine blackor other similar proven mitigation measures to further reduce the risk of bird collisions, this mitigation measure is recommended at the facility should SACAA agree to its implementation.	ECO to monitor Site engineer/site manager	Design phase
It is recommended that tracking of sub-adult and non-territorial adult Verreaux's Eagles be considered in close consultation with BLSA and an academic institution to gain a better understandingof the movement of these birds across the landscape, should thetiming and utility of such a study be considered to be of value bythose institutions. *Note: This research is not a requirement however the data collected would be valuable tothe scientific community and also be used to inform any post-construction mitigation that may be required.*	Developer to consider	Design phase
The appointed Environmental Control Officer (ECO) must be trained by the avifaunal specialist to identify the potential priority species and red data species as well as the signs that indicate possible breeding by these species. The ECO must then,during audits/site visits, make a concerted effort to look out for such breeding activities of red data species, and such efforts may include the training of construction staff (e.g. in Toolbox talks) to identify red data species, followed by regular questioning of staff as to the regular whereabouts on site of these species. If any of the red data species are confirmed to be breeding (e.g., if a nest site is found), construction activities within 1 km of the breeding site must cease, and the avifaunal specialist is to be contacted immediately for further assessment of the situation and instruction on how to proceed.	ECO to monitor Site engineer/site manager	Monthly and when required.

An avifaunal specialist must conduct nest searches of all suitable cliffs and/or tree nesting sites within 1 km of the WEFs footprints that were not surveyed as part of the pre-construction cliff surveys. This additional survey must preferably be prior to construction commencement or as soon as possible thereafter. The aim will be to locate nest sites, so that these may continue to be monitored during the construction andoperation phase, along with the monitoring of already identified nest sites.	ECO to monitor Site engineer/site manager	Pre-construction, post final design
Nests of Verreaux' s Eagle must be monitored for breedingactivity as per the Verreaux' s Eagle guidelines, including during construction	ECO to monitor Site engineer/site manager	As per specialist requirements
Appoint a specialist to design and conduct monitoring of the breeding of Verreaux's Eagle and Martial Eagle at all identified nest sites that are within 5 km of a turbine position. This should be done at least three times during a calendar year during construction, optimally spaced before, during and after the breeding season of large eagles. Where possible, this monitoring can be combined with the additional nest surveys described above.	ECO to monitor Site engineer/site manager	As per specialist requirements.
Construction phase monitoring must be undertaken as recommended by the Verreaux' s Eagle guidelines and mustinclude vantage point surveys.	ECO to monitor Site engineer/site manager	As per specialist requirements
Additional vehicle based transects of the project site and controlsite must be conducted once per season over four seasons prior to the commencement of construction activities with the aim of recording the status of Blue Crane to allow for more reliable BACI analyses to be conducted.	ECO to monitor Site engineer/site manager	Prior to construction
No construction activities are allowed within in 1 km of nests during the breeding season (May, June, July and August) as perthe Verreaux's Eagle guidelines[3].	ECO to monitor Site engineer/site manager	Throughout construction

Excavated rock piles must be removed after the construction phase to avoid increasing the prey population on the facility toreduce the chances of attracting Verreaux's Eagles into the project site during operation phase.	ECO to monitor Site engineer/site manager	Post construction
Bat Roost disturbance and/or destruction and bat fatalities		
Prioritise dropping turbines in closest proximity to High, Medium-High ad Medium sensitive areas (in descending priority) and/or on the periphery of the WEF (to reduce its overall footprint), if fewer than 33 turbines are developed. Refer to sensitivity map.	ECO to monitor Developer to implement Site engineer/site manager	Design phase
Minimise road impacts. Do not construct roads within 500 m of aconfirmed roost. Minimise clearing and degradation of all natural (especially wetland and riparian) and agricultural areas andobtain a water use license for each watercourse crossing. Effectively rehabilitate all 12 m wide roads to 6 m after construction.	ECO to monitor Site engineer/site manager	Pre-construction and design phase
Avoid blasting within 2 km of a confirmed roost.	ECO to monitor Site engineer/site manager	During blasting activities
Minimise artificial lighting. Apart from compulsory civil aviation lighting, minimize artificial lighting especially high-intensity, steady burning, sodium vapour, quartz, halogen and other brighter lights at substations, offices and turbines. All non-aviation lights should be hooded downward and directed to horizontal and skyward illumination.	ECO to monitor Site engineer/site manager	Design phase
Minimise degradation of terrestrial habitat and water resources(especially near bat roots). Implement and maintain effective invasive alien plants, storm water erosion, sediment and dustcontrol measures.	ECO to monitor Site engineer/site manager	Monthly during construction

Turbines must be fitted with bat detectors and deterrent devices. Turbine engineers must consult with bat specialist toincorporate the necessary turbine adaptations for this during design phase so that there are no unexpected surprises or concerns after the turbines are built. Whilst acoustic deterrents are showing positive results for lowering bat fatalities at WEFs in some parts of the world, in South Africa, data are very limited, and deterrent devices are not readily available for installation. Therefore, curtailment is still the most effective and available bat fatality minimization strategy in this country	Site engineer/ site manager Developer to implement ECO	Design phase
Perform acoustic bat monitoring during construction. A detector(s) should be installed on at least one meteorologicalmast just before construction commences, and monitoring should occur through construction (and into operation).	ECO to monitor Site engineer/site manager	As per specialist requirements.
Report any new discovered roosts and incorporate their protection into the WEFs adaptive management plan.	ECO to monitor Site engineer/site manager	As and when roosts discovered.
Best practice (not essential): Continue performing roost searches during construction.	ECO to monitor/ Site Engineer	As per specialist requirements.
No construction of turbines within 200m of any building orsubstation.	Site Engineer	Design phase.
Loss of riparian systems and water courses		
Where water course crossings are required, the engineering team must provide an effective means to utilise the potential upstream and downstream effects of sedimentation and erosion(erosion protection) as well the loss of riparian vegetation (small footprint).	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
No vehicles to refuel within drainage lines/ riparian vegetation.	ECO to monitor Site engineer/site manager	Weekly

During the operational phase, monitor culverts to see if erosionissues arise and if any erosion control if required.	ECO to monitor Site engineer/site manager	monthly
Where possible culvert bases must be placed as close as possible with natural levels in mind so that these don't form additional steps / barriers.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Impact on riparian systems through the possible increase in surface water runoff from hard surfaces and or roads on riparian form and function		
Any stormwater within the site must be handled in a suitablemanner, i.e., trap sediments, and reduce flow velocities.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Increase in sedimentation and erosion within the development footprint		
Any stormwater within the site must be handled in a suitable manner, i.e., trap sediments, and reduce flow velocities.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Impact on localized surface water quality		
Strict use and management of all hazardous materials used onsite.	ECO to monitor Site engineer/site manager	Weekly
Strict management of potential sources of pollution (e.g., litter, hydrocarbons from vehicles & machinery, cement during construction, etc.).	ECO to monitor Site engineer/site manager	Weekly
Containment of all contaminated water by means of careful run-off management on the development site.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Strict control over the behaviour of construction workers.	ECO and safety to monitorSite engineer/site manager	Weekly
Working protocols incorporating pollution control measures (including approved method statements by the contractor) should be clearly set out in the EMPr for the project and strictlyenforced.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.

<table>
<tr><td>Appropriate ablution facilities should be provided for construction workers during construction and on-site staff duringthe operation of the facility.</td><td>ECO to monitor
Site engineer/site manager</td><td>Weekly</td></tr>
<tr><td colspan="3">Wind turbines Visual Impacts</td></tr>
<tr><td>Visually sensitive peaks, major ridgelines and scarp edges, including 500m buffers, to be avoided, should the layout be further amended, because of silhouetteeffect on the skyline over large distances.</td><td>Site engineer/site manager</td><td>Design phase</td></tr>
<tr><td>Mitigation Measure</td><td>Responsibility</td><td>Frequency</td></tr>
<tr><td>Recommended Buffers
<table>
<tr><th>Landscape features/criteria</th><th>PGWC Guide-lines (2006)</th><th>Recommended visual buffer guidelines (2014)</th></tr>
<tr><td>Project area boundary</td><td>-</td><td>270m (subject to turbine specification).</td></tr>
<tr><td>Ephemeral streams/ tributaries (or as per aquatic recommendations)</td><td>-</td><td>250m</td></tr>
<tr><td>Perennial rivers, wetland features</td><td>500m</td><td>500m</td></tr>
<tr><td>Major ridgelines, peaksand scarps</td><td>500m</td><td>As per visual informants map, subject to micro-siting. (500m recommended for peaks).</td></tr>
</table></td><td>ECO to monitor
Site engineer/site manager</td><td>Design phase</td></tr>
</table>

	Local roads	500m	500m	
	Local district gravel roads	review if scenic	1 to 3km (can be less if outside the viewshed).	
	R63 arterial route	review if scenic	1 to 3km (can be less if outside the viewshed).	
	Farmsteads (inside the project site)	400m (noise)	800m	
	Farmsteads (outside the project site)	400m (noise)	2 to 4km (can be less if outside the viewshed).	
	Private nature reserves/ game farms/ guest farms/ resorts	500m	2 to 5km (can be less if outside the viewshed).	
Slopes steeper than 1:5 gradient to be avoided.			ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Cultural landscapes or valuable cultivated land, particularly alongalluvial river terraces to be avoided.			ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Visual mitigation during construction				
Access and haul roads to use existing farm tracks as far aspossible.			ECO to monitor Site engineer/site manager	During site establishment Weekly
Construction camp, stockpiles and lay-down area to be locatedout of sight of district roads to the extent possible,, possibly in the vicinity of the proposed substation and O&M buildings.			ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.

Disturbed areas rather than pristine or intact land to preferablybe used for the construction camp. Construction camp and laydown areas to be limited in area to only that which is essential	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Measures to control wastes and litter to be included in the contract specification documents.	ECO to monitor Site engineer/site manager	During site establishment Weekly thereafter.
Provision to be made for rehabilitation/ re-vegetation of areasdamaged by construction activities.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Disturbance, damage or destruction of well-preserved fossils at or beneath the ground surface during the construction phase (especially due tobedrock excavations, ground clearance)		
Once the final layout of the WEF and associated transmission line is determined, a pre-construction palaeontological study must be undertaken over areas underlain by the Lower BeaufortGroup bedrocks. The study must be conducted by a qualified palaeontologist. The study would involve (a) recording of near- surface fossil material, including relevant geological data (e.g., stratigraphy, sedimentology, taphonomy), (b) judicious sampling of scientifically-valuable fossils as well as (c) making recommendations regarding further mitigation or conservation ofspecific fossil sites for the construction phase of the WEF and transmission line.	ECO to monitor Site engineer/site manager	Pre-construction
Best practice (not essential): The employment of a palaeontologist during the construction phase, establishment ofon-site curation facilities and identification of a repository for specimens.	ECO to monitor Site engineer/site manager	Throughout construction

A walk-down of the final positions of the turbines and access road routes must be completed prior to construction by a qualified palaeontologist. The locations of construction camps and laydown yards must also be assessed as part of the walk- down report. The report must CLEARLY state which heritage resources are located within the Northern Cape and Western Cape Provinces to allow the relevant Heritage Resource Authority to provide comments (HWC in this case). The report must also clearly state the distance between each proposed project activity and identified resources via detailed descriptions,photographs and a map.	ECO to monitor Site engineer/site manager	Pre- construction phase
A buffer zone of 30 m must be maintained from all identifiedheritage resources. *Note: It is the specialist's view, that only fossil sites of high scientific / educational / cultural or other conservation significance that cannot be effectively mitigated through professional palaeontological recording and collection require buffer zones (Most recorded fossil finds are of low scientific / conservation value and can be effectively mitigated in the pre-construction or construction phase).* **This caveat would need to be approved by the responsibleHeritage Resource Authority (HRA), in this case HWC.*	ECO to monitor Site engineer/site manager	Design phase Throughout construction
A Heritage Management Plan (HMP) must be developed forall heritage resources that are to be retained *in-situ*. The HMP must include and is not limited to details regarding on-going monitoring and access controls for affected interested and affected parties. This HMP must be submitted to the relevant Heritage Resources Authority for comment (in this case, HWC).	ECO to monitor Site engineer/site manager	Pre-construction Throughout construction

Turbine placements must avoid areas underlain by the Lower Beaufort Group rocks. Should this not be possible, a Watching Brief must be conducted during the construction phase of the project. This must include the on-site presence of a qualified palaeontologist who will monitor excavations for turbine foundations, access roads and underground cables within the Lower Beaufort Group rocks. A Watching Brief Report detailing the results of the monitoring must be submitted to the relevantHeritage Resource Authority (HRA) for comment.	ECO to monitor Site engineer/site manager	Pre-construction Throughout construction
A Chance Finds Procedure must be developed and implemented for the project, should fossil remains such as vertebrate bones, teeth or trackways, plant-rich fossil lenses or dense fossil burrowassemblages be exposed by excavation or discovered within the development footprint. This procedure must include standard protocol, steps and reporting structures to be followed should any fossil heritage beuncovered during any phase of development.	ECO to monitor Site engineer/site manager	Pre-construction Throughout construction
If any evidence of fossils or other categories of heritage resources are found during the proposed development, therelevant Heritage Resource Authority must be altered. A professional palaeontologist must be contracted as soon as possible to inspect the findings. If the newly discovered heritageresources prove to be of palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by the relevant Heritage Resource Authority (HWC in this case).	ECO to monitor Site engineer/site manager	Throughout construction
Mitigation Measure	**Responsibility**	**Frequency**
Archaeological material and rock engravings		

Conduct a final walk down of roads and check turbines positions for archaeological material.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
A Chance Finds Procedure must be developed and implementedfor the project. These procedures must include standard protocol, steps and reporting structures to be followed should any heritage be uncovered during any phase of development.	ECO to monitor Site engineer/site manager	Pre-construction Throughout construction
If any evidence of archaeological sites or remains (e.g., remnantsof stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations) or other categories of heritage resources are found during the proposed development, the relevant Heritage Resources Authority must be alerted (HWC in this case). A professional archaeologist must be contracted as soon as possible to inspect the findings. If the newly discovered heritageresources prove to be of archaeological significance, a Phase 2 rescue operation may be required subject to permits issued by the relevant Heritage Resource Authority (HWC in this case).	ECO to monitor Site engineer/site manager	Throughout construction
A buffer zone of 30 m must be maintained from all identifiedheritage resources as per the final walkthrough.	ECO to monitor Site engineer/site manager	Design phase Throughout construction
Check dolerite clusters and flat dolerite rafts for rock engravings.Rock engravings must be assigned co-ordinates, photographed (so as to record detail) and moved out of harm's way, or the road adjusted to avoid them.	ECO to monitor Site engineer/site manager	Throughout construction
Colonial period heritage		
If possible within the context of the project, re-use and sensitive repair of abandoned farmhouses would make a positive contribution to heritage conservation.	ECO to monitor Site engineer/site manager	Design phase

Refurbishment is recommended to be done under the advice of a heritage architect/consultant.		
Mitigation Measure	**Responsibility**	**Frequency**
Graves		
In the event of human bones being found on site, an archaeologist must be informed immediately, and the remains removed under an emergency permit. This process will incur some expense as removal of human remains is at the cost of thedeveloper. Time delays may result while application is made to the authorities and an archaeologist is appointed to do the work.	ECO to monitor Site engineer/site manager	Throughout construction
All identified graveyards must be mapped, and co-ordinates given to the developer and the contractor. These areas must be avoided, as far a practical. The contractor is to ensure that the work force is aware of these areas, and buffers applied aroundthem.	ECO to monitor Site engineer/site manager	Throughout construction
Employment and Business Creation Opportunities		
An accredited training and skills development programme aimed at maximizing the opportunity for local workers to be employed for the low and semi-skilled positions should be initiated prior to the initiation of the construction phase, to the extent possible. The aim of the programme should be to maximize employment opportunities formembers of the local community. In this regard the programme should be aimed at community members from Murraysburg, Beaufort West, Graaff-Reinet and Richmond. The programme should be developed in consultation with the Department of Labour and the BWLM and/or other appropriate stakeholders. The recommended targets are 50% and 30% of low and semi-skilled positions respectively should be taken up by local community members or as required in terms of the socio-economic investment requirements of the	Developer/Contractor/ site manager	Pre-construction and throughout construction

project's power purchase agreement. Due to the low skills levels in the area, the majority of semi-skilled and skilled posts are likely to be filled by people from outside the area;		
The recruitment selection process for the training and skills development programme should seek to promote gender equality and the employment of women wherever possible;	Contractor/ site manager	Pre-construction and throughout construction
Before the construction phase commences the proponent should meet with representatives from the BWLM to establish the existence of a skills database for the area. If such as database exists it should be made available to the contractors appointedfor the construction phase;	Developer / Contractor/ site manager	Pre-construction and throughout construction
The local authorities and relevant community representatives should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following forthe construction phase of the project.	Contractor/ site manager	Pre-construction and throughout construction
Where reasonable and practical the proponent should appoint local contractors and implement a 'locals first' policy, especiallyfor semi and low-skilled job categories. Where feasible, effortsshould be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria;	Contractor/ site manager	Pre-construction and throughout construction
The proponent should liaise with the BWLM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g., construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction contractors. These companies should be notified of the tenderprocess and invited to bid for project-related	Contractor/ site manager	Pre-construction and throughout construction

work;		
Where possible, the proponent should assist local BBBEE companies to complete and submit the required tender forms and associated information.	Developer/Contractor/ site manager	Pre-construction and throughout construction
The BWLM, in conjunction with the local business sector and representatives from the local hospitality industry, should identify strategies aimed at the potential benefits associated with the project.	Developer/ site manager	Pre-construction and throughout construction
The proponent in consultation with the contractor should investigate the option of establishing a cell phone booster mast onthe site.	Developer/ site manager	Pre-construction and throughout construction
Mitigation Measure	**Responsibility**	**Frequency**
Impacts on family structures and social networks associated with the presence of construction workers		
An accredited training and skills development programme aimed at maximizing the opportunity for local workers to be employed for the low and semi-skilled positions should be initiated prior to the initiation of the construction phase, to the extent possible. The aim of the programme should be to maximise employment opportunities formembers of the local community. In this regard the programme should be aimed at community members from Murraysburg, Beaufort West, Graaff-Reinet and Richmond. The programme should be developed in consultation with the Department of Labour and the BWLM and/or other appropriate stakeholders. The recommended targets are 50% and 30% of low and semi-skilled positions respectively should be taken up by local community members or as required in terms of the socio-economic investment requirements of the project's power purchase agreement.. Due to the low skills levels in the area, the majority of semi-skilled and skilled posts are likely to be filled by	Contractor/ Developer/ site manager	Pre-construction and throughout construction

people from outside the area. The selection process for the training and skills development programme should seek to promote gender equality and the employment of women wherever possible;		
To the extent possible, the proponent should establish a Monitoring Forum (MF) in order to monitor the construction phase and the implementationof the recommended mitigation measures. The MF should be established before the construction phase commences, and should include key stakeholders, including representatives from the BWLM, farmers and the contractor(s). The MF should also bebriefed on the potential risks to the local community and farm workers associated with construction workers;	Contractor/ site manager	Pre-construction and throughout construction
The proponent and the contractor(s) should, in consultation with representatives from the MF, develop a code of conduct for the construction phase. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be dismissed. All dismissals must comply with the South African labour legislation;	Contractor/ site manager	Pre-construction and throughout construction
The proponent and contractor (s) should implement an HIV/AIDS awareness programme for all construction workers atthe outset of the construction phase;	Contractor/ site manager	Pre-construction and throughout construction
The contractor should provide transport to and from the site on a daily basis for low and semi-skilled construction workers. This will enable the contractor to effectively manage and monitor the movement of construction workers on and off the site;	Contractor/ site manager	Pre-construction and throughout construction

The contractors should make the necessary arrangements to transport workers from Beaufort West, Graaff-Reinet and Richmond home over weekends. This will reduce the risk posedto local family structures and social networks in Murraysburg;	Contractor/ site manager	Pre-construction and throughout construction
No construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.	Contractor/ site manager	Pre-construction and throughout construction
Impacts on family structures, social networks and community services associated with the influx of job seekers		
The proponent should implement a "locals first" policy to the extent possible specifically with regard to unskilled and low skilled opportunities;	Contractor/ site manager	Pre-construction and throughout construction
The proponent should implement a policy that no employmentwill be available at the gate and or in Murraysburg (except forlocal residents).	Contractor/ site manager	Pre-construction and throughout construction
Risk to safety of farmers and farm workers, livestock and damage to farm infrastructure associated with the movement of construction workers onand to the site		
The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase proven to be associated with theconstruction activities for the WEF will be compensated for. Theagreement should be signed before the construction phase commences;	Contractor/ site manager	Pre-construction and throughout construction
The proponent should establish a MF (see above) that includes local farmers and develop a Code of Conduct for construction workers. This committee should be established prior to commencement of the construction phase. The Code of Conductshould be signed by the proponent and the contractors before the contractors move onto site.	Developer/ site manager	Pre-construction and throughout construction
The proponent should hold contractors liable for compensatingfarmers in full for any stock losses and/or damage to farm	Developer/ site manager	Pre-construction and throughout construction

infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors and neighbouring landowners. The agreement should also cover loses and costsassociated with fires caused by construction workers or construction related activities.		
The contractors appointed by the proponent must ensure that allworkers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.	Developer/ site manager Safety/ Environmental officer	Pre-construction and throughout construction
The contractors appointed by the proponent must ensure that construction workers who are found guilty of trespassing, stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation;	Developer/ site manager Safety/ Environmental officer	Pre-construction and throughout construction
The housing of construction workers on the site should bestrictly limited to security personnel.	Developer/ site manager Safety officer/ Environmental	Pre-construction and throughout construction
The contractors appointed by the proponent should provide dailytransport for low and semi-skilled workers to and from the site. This would reduce the potential risk of trespassing on the remainder of the farm and adjacent properties;	Contractor/ site manager Safety officer/ Environmental	Pre-construction and throughout construction
Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of grassfires		

The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase proven to be associated with theconstruction activities for the WEF will be compensated for. Theagreement should be signed before the construction phase commences;	Developer/ site manager	Pre-construction and throughout construction

The contractor should provide adequate firefighting equipmenton-site;	Contractor/ site manager Safety officer	Pre-construction and throughout construction
Contractor should ensure that open fires on the site for cookingor heating are not allowed except in designated areas;	Contractor	Throughout Construction
The contractor should ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires isgreater. In this regard special care should be taken during the high-risk dry, windy winter months;	Contractor/ site manager Safety officer	Pre-construction and throughout construction
The contractor should provide fire-fighting training to selected construction staff;	Contractor/ site manager Safety officer	Pre-construction and throughout construction
No construction staff, with the exception of security staff, to be accommodated on site over night;	Contractor/ site manager Safety officer	Pre-construction and throughout construction
As per the conditions of the Code of Conduct, in the event of a fire proven to be caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. Thecontractor should also compensate the reasonable firefighting costs borne by farmers and local authorities.	Contractor/ site manager Safety officer	Pre-construction and throughout construction

Potential dust and safety impacts and damage to road surfaces associated with movement of construction related traffic to and from the site		
The contractor must ensure that damage caused by constructionrelated traffic to the gravel road between Murraysburg and Richmond, the Swavel Kranse Road and the Witteklip Road and local farm roads is repaired on a regular basis throughout the construction phase. The costs associated with the repair must be borne by the contractor. Experience for other renewable energy projects is that the maintenance for roads is the responsibility of the local district roads authority laks.. In many instances the local district roads authority lacks the resources to maintain the local road network. In addition, due to legal restrictions, it is not possible for the contractor to repair damageto public roads. This can result in damage to roads not being repaired before the construction phase is completed. This is anissue that should be addressed with the local district roads authority prior to the commencement of the construction phase. As far as possible, the transport of components to the site alongthe N10 should be planned to avoid weekends and holiday periods. Sections of the roads that are located adjacent to irrigated lands or farmsteads should be watered on a regular basis (or other dust suppression measures applied) to reduce impactof dust;	Contractor/ site manager Safety officer and ECO	Pre-construction and throughout construction
The contractor must ensure that all construction vehicles adhereto speed limits and vehicles used to transport sand and buildingmaterials must be fitted with tarpaulins or covers;	Contractor/ site manager Safety officer and ECO	Pre-construction and throughout construction
All workers should receive training/ briefing on the reasons for and importance of closing farm gates and driving slowly. Speed limits must be applied. Construction vehicles limit of 40km/hr on site.	Contractor/ site manager Safety officer and ECO	Pre-construction and throughout construction. Monthly

All vehicles must be road-worthy, and drivers must be qualified and made aware of the potential road safety issues and need forstrict speed limits.	Contractor/ site manager Safety officer and ECO	Pre-construction and throughout construction. Monthly
The Contractor should ensure that workers are informed that nowaste can be thrown out of the windows while being transported to and from the site. Workers who throw waste outwindows should be fined.	Contractor/ site manager Safety officer and ECO	Daily. Pre-construction and throughout construction
The Contractor should be required to collect waste along theroad reserve on a regular basis.	Contractor/ site managerECO	Daily or as needed. Pre-construction and throughout construction
Waste generated during the construction phase should be transported to the registered landfill. A waste management hierarchy must be implemented as far as possible, and the disposal of waste must be considered only as a last resort. Anyresulting waste that cannot be re-used or recycled, must be disposed of at a duly authorised waste disposal facility.	Contractor/ site managerECO	Weekly throughput construction
EMP measures (and penalties) should be implemented to ensurefarm gates are closed at all times.	Developer, Contractor / site manager Developer to implement ECO	Daily. Pre-construction and throughout construction
EMP measures (and penalties) should be implemented to ensure speed limits are adhered to at all times.	Developer, Contractor / site manager, ECO	Daily. Pre-construction and throughout construction
Impact on farmland due to construction related activities		
The location of wind turbines, access roads, laydown areas etc.should be informed by the findings of key specialist studies, including the soil and botanical study. In this regard areas of high potential agricultural soils should be avoided;	Site engineer/ site manager Developer to implement ECO	Weekly. Pre-construction and throughout construction

The location of wind turbines, access roads, laydown areas etc.should be discussed with the locally affected landowners in the finalisation process and inputs provided should be implemented in the layout as best as possible;	Site engineer/ site manager Developer to implement ECO	Weekly. Pre-construction and throughout construction
All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop areaetc., should be rehabilitated at the end of the construction phase. The rehabilitation plan should be informed by input froma botanist with experience in arid regions;	Contractor/ site manager, ECO	Weekly post construction
The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed. The specifications for the rehabilitation programme should be drawn up the Environmental Consultants appointed toundertake the EIA;	Developer/ Contractor	Tender phase
The implementation of the Rehabilitation Programme should bemonitored by the ECO;	Contractor/ site manager ECO	Monthly
All workers should receive training/ briefing on the reasons for and importance of not driving in undesignated areas;	Contractor/ site manager, ECO	Pre-construction and throughout construction. Monthly
EMP measures (and penalties) should be implemented to strictlylimit all vehicle traffic to designated roads and construction areas. Under no circumstances should vehicles be allowed todrive into the veld;	Contractor/ site manager, ECO	Pre-construction and throughout construction. Daily
Disturbance footprints should be reduced to the minimum.	Contractor/ site manager, ECO	Pre-construction and throughout construction. Ongoing

The footprint areas for the establishment of individual wind turbines should be clearly demarcated prior to commencementof construction activities. All construction related activities should be confined to the demarcated area and minimised where possible;	Contractor/ site manager, ECO	Pre-construction and throughout construction. Monthly
General Construction Mitigation Measures		
Sufficient Portable toilets must be supplied to the workforce in areas of activity. Femalesmust have separate toilets. A licensed contractor must be appointed by the contractor to provide this facility and ensure that wastes are correctly disposed of. Servicing must take place on a weekly basis, proof of which must be retained on site by thecontractor.	Contractor/ site manager	Pre-construction and throughout construction. Weekly
Waste skips must be provided in areas of construction activity aswell as within the lay down areas, along with waste bins. Wastesmust be separated into the following categories: • General waste, compactable and non-compactable • Wastepaper recycling • Scrap metal • Globes and fluorescent tubes • Rubber waste • Medical waste • Chemical waste • Hazardous waste	Contractor/ site manager	Pre-construction and throughout construction. Weekly
Mitigation Measure	**Responsibility**	**Frequency**
Health and Safety		

Implementation of safety measures, work procedures and firstaid must be implemented on site.	Contractor/ site manager, Safety Officer	Pre-construction and throughout construction. Weekly
Workers should be thoroughly trained in using potentially dangerous equipment	Contractor/ site manager, Safety Officer	Pre-construction and throughout construction. Weekly
Contractors must ensure that all equipment is maintained in a safe operating condition.	Contractor/ site manager, Safety Officer	Pre-construction and throughout construction. Weekly
A safety officer must be appointed.	Contractor/ site manager, Safety Officer	Pre-construction
A record of health and safety incidents must be kept on site.	Contractor/ site manager, Safety Officer	Pre-construction and throughout construction. Weekly
Any health and safety incidents must be reported to the projectmanager immediately.	Contractor/ site manager, Safety Officer	Pre-construction and throughout construction.
First aid facilities must be available on site at all times.	Contractor/ site manager, Safety Officer	Pre-construction and throughout construction. Monthly checks
Workers have the right to refuse work in unsafe conditions.	Contractor/ site manager, Safety Officer	Daily
The contractor must ensure that all construction workers are well educated about HIV/ AIDS and the risks surrounding this disease. The location of the local clinic where more information and counselling is offered must be indicated to workers.	Contractor/ site manager, Safety Officer	Pre-construction and throughout construction. Monthly checks

Material stockpiles or stacks, such as, pipes must be stable and well secured to avoid collapse and possible injury to site workers / local residents	Contractor/ site manager, Safety Officer	Pre-construction and throughout construction. Monthly checks
An STI and HIV/AIDS awareness campaign should be launched, which is not only directed at construction workers but also at thecommunity as a whole.	Contractor/ site manager, Safety Officer	Pre-construction and throughout construction. Monthly checks
Condoms should be distributed by placing them at centrally located points and by ensuring that construction workers and community members are aware of the availability and location of condoms. The distribution of condoms should be approached with the necessary cultural sensitivity.	Contractor/ site manager, Safety Officer	Pre-construction and throughout construction. Monthly checks
Access at the construction site should be controlled to prevent sex workers from either visiting and/or loitering at the construction camp.	Contractor/ site manager, Safety Officer	Pre-construction and throughout construction. Daily
Ensure that the local community communicate their expectations of construction workers' behaviour with them.	Contractor/ site manager, Safety Officer	Pre-construction and throughout construction. Monthly checks
Personal Protective Equipment (PPE) must be made available to all construction staff and their usage must be compulsory. Hardhats and safety shoes must be worn at all times and other PPE worn were necessary i.e., dust masks, ear plugs etc.	Contractor/ site manager, Safety Officer	Pre-construction and throughout construction. Monthly checks
No person is to enter the site without the necessary PPE.	Contractor/ site manager, Safety Officer	Pre-construction and throughout construction. Daily
To the extent possible. Pre-construction and, construction activities should be undertaken during daylight working hours between the hours of 07:00 – 17:00 on weekdays and 07:00 – 13:00 on weekends	Contractor/ site manager, Safety Officer	Pre-construction and throughout construction. Monthly checks

The workforce is to be provided with sufficient potable waterand under no circumstances are they to use untreated water from the local watercourses for drinking.	Contractor/ site manager, Safety Officer	Pre-construction and throughout construction. Monthly checks
Noise		
Construction site yards and other noisy fixed facilities should belocated well away from noise sensitive areas adjacent to the development sites.	Contractor/ site manager, Safety Officer	Pre-construction and throughout construction. Monthly checks
All construction vehicles and equipment are to be kept in goodrepair.	Contractor/ site manager, Safety Officer	Pre-construction and throughout construction. Monthly checks
Portable acoustic shields should be used in the case where noisyequipment is not stationary (for example drills, angle grinders, chipping hammers, poker vibrators).	Contractor/ site manager, Safety Officer	Pre-construction and throughout construction. Daily
Construction staff working in areas where the 8-hour ambientnoise levels exceed 75dBA should wear ear protection equipment.	Contractor/ site manager, Safety Officer	Pre-construction and throughout construction. Daily
Blasting operations are to be strictly controlled with regard to the size of explosive charge in order to minimise noise and airblast, and timings of explosions. The number of blasts per dayshould be limited, blasting should be undertaken at the same times each day and no blasting should be allowed at night.	Contractor/ site manager, Safety Officer	Pre-construction and throughout construction. Monthly checks
With regard to unavoidable very noisy construction activities in the vicinity of noise sensitive areas, the contractor and ECO should liaise with local residents on how best to minimise impact, and the local population should be kept informed of thenature and duration of intended activities.	Contractor/ site manager, Safety Officer	Pre-construction and throughout construction. Monthly checks

Noise suppression measures must be applied to all constructionequipment. Construction equipment must be kept in good working order and where appropriate fitted with silencers whichare kept in good working order.	Contractor/ site manager, Safety Officer	Pre-construction and throughout construction. Monthly checks
Should the vehicles or equipment not be in good working order, the Contractor may be instructed to remove the offending vehicle or machinery from site.	Contractor/ site manager, Safety Officer	Pre-construction and throughout construction. Monthly checks
Where possible labour shall be transported to and from the siteby the contractor or his Sub-Contractors by the contractor's owntransport.	Contractor/ site manager, Safety Officer	Pre-construction and throughout construction. Daily
Construction activities are to be contained to reasonable hoursduring the day and early evening. Night-time activities near noise sensitive areas should not be allowed.	Contractor/ site manager, Safety Officer	Pre-construction and throughout construction. Monthly checks
To the extent possible, construction activities should be undertaken during daylight working hours between the hours of 07:00 – 17:00 on weekdaysand 07:00 – 13:00 on Saturdays.	Contractor/ site manager, Safety Officer	Pre-construction and throughout construction. Daily
Should any equipment, such as generators on-site, generatingexcessive noise, they should be fitted with appropriate noise abatement measures.	Contractor/ site manager, Safety Officer	Pre-construction and throughout construction. Monthly checks

6.2 Post Construction

- Once construction has been completed on site and all excess material has been removed, the storage area shall be rehabilitated. If the area was badly damaged, re- seeding shall be done and fencing in of the area shall be considered if livestock/faunal species specific to the area may subsequently have access to such an area.
- Such areas shall be rehabilitated to their natural state. Any spilled concrete shall be removed, and soil compacted during construction shall be ripped, levelled and re- vegetated.
- Only designated areas must be used for storage of construction materials, soil stockpiles, machinery and other equipment.
- Specific areas must be designated for cement/concrete mixing/ batching plants. Sufficient drainage for these plants must be in place to ensure that soils do not become contaminated.
- The construction camp must be kept clear of litter at all times.
- Spillages within the construction camp need to be cleaned up immediately and disposed of in the hazardous skip bin for correct disposal.
- All remaining material including building rubble and waste are to be removed from the site.
- All areas disturbed should be managed to ensure efficient drainage.
- The area designated for the deposition of spoil material is to be levelled and shaped to ensure the efficient drainage of the site. Under no circumstances is general or hazardous waste to be disposed of at this site.

6.2.1 Infrastructure

- Disassemble all temporary infrastructure units and remove components from the working areas and contractor's camp. This will include storage structures and containers, water storage container, power supply, workers accommodation, sewage systems
- Drain all potable chemical toilets, being careful not to spill the contents. Transfer the waste to an appropriate disposal site.
- Drain all wastewater and sewage associated with temporary ablution facilities and transfer the waste to an appropriate disposal site to be identified by the contractor.
- Disassemble all fencing around the camp and either sell, suction or donate to the local community or transfer the waste components to a disposal site or the contractor's base.
- Do not leave any components, waste or infrastructure units within the working area and camp unless specifically required for the operation and maintenance phases and as agreed by the ECO

6.2.2 Contaminated Substrate and Pollution Control Structures

- Excavate all areas of contaminated substrate, transfer the contaminated substrate to an appropriate disposal site and treat the affected areas.
- Remove all plastic linings used for pollution control and transfer to an appropriate disposal site.
- Break up all concrete structures that have been created and remove concrete waste to an appropriate disposal site.

6.2.3 Waste

- Remove all remaining construction materials from the camp and working areas and either sell, auction, donate to the local community or transfer the waste components to a disposal site or the contractor's base.

- Remove all construction debris, litter and domestic waste from the camp and workingareas and transfer to an appropriate disposal site. Remove all waste receptacles fromthe camp and working areas and either sell, auction, donate to the local community or transfer the waste components to a disposal site or the contractor's base

SPECIFIC FINAL PRE-CONSTRUCTION WALKTHROUGH MITIGATION MEASURES (2022): CONSTRUCTION PHASE

6.3 AQUATIC ECOLOGY MITIGATION MEASURES

CONSTRUCTION PHASE (INCLUDING THE FINAL PRE-CONSTRUCTION WALKTHROUGH; (2022))

Impact management outcome: Minimise disturbance to Aquatic systems						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
Avoid the delineated watercourse and buffers areas where feasible except for limited watercourse crossings as per final layout	Project manager, Environmental Officer	A no-go buffer of 30 m must be applied around them Crossing designs should be informed by hydrological demands of the systems, limiting impacts to flow regimes and enabling connectivity across the systems. Ensure that construction methods accommodate all requirements to ensure aquatic continuity	Life of operation	ECO	Ongoing	Buffers respected around drainage lines
A competent Environmental Control Officer (ECO) must oversee the construction phase of the project	Environmental Officer, Contractor	Appoint a competent Environmental Officer before construction phase commences.	Construction phase	ECO	Ongoing	Evidence of competent Environmental Officer.
Impact management outcome: Minimise direct loss, disturbance, and degradation of watercourses						
Minimize the disturbance footprint and the unnecessary clearing of vegetation outside of this area.	Contractor	Undertake clearing of vegetation, stripping and stockpiling topsoil as well as storage of equipment in as required	Construction Phase	ECO	Continuous and as and when required	Evidence of site clearing activities undertaken to reduce disturbance and degradation. Evidence of staff toolbox talks

		Conduct toolbox talks and by including them in site inductions as well as the final site layout plan. Begin construction of the structures furthest down the system, working up the catchment to the extent possible. Restrict all non-essential activities (e.g., cement mixing and equipment watercourse machinery storage) to outside of watercourses and their prescribed buffers and structure footprint area.. Request the watercourse spatial data, load it onto a GPS and use it to mark out the positions to plan for the required activities to reduce the disturbance footprint and the unnecessary clearing of vegetation. Demarcate the construction area as well as the prescribed 30 m buffer on the ground (e.g. painted wooden poles). Construct as far as possible during winter when flow volumes are lowest				Photographic evidence.
Impact management outcome: Minimise occurrence of bare surfaces, runoff and potential for erosion						

Minimise erosion and run-off on site	Contractor	Keep cleared and excavated area neat and tidy. Ensure soil stockpiles and concrete / building sand are sufficiently safeguarded against rain wash. Mixing of concrete must under no circumstances take place in any watercourse or their buffers. Do not situate any of the construction material laydown areas within any watercourse Separate topsoil and sub-soil and backfill in same order. Ensure topsoil is spread back over the cleared area. Scrape the area where mixing and storage of sand and concrete occurred to clean once finished. No machinery should be allowed to be parked in any watercourses. Only machinery and equipment required to be in the watercourses is permitted and must be operational. Flatten and lightly till (no deeper than 30 cm) excavated / cleared areas to encourage vegetation establishment as soon as possible	Construction Phase	ECO	Continuous and as and when required	Evidence of site clearing activities undertaken to reduce disturbance and degradation. Photographic evidence.

Impact management outcome: Minimise degradation of watercourse vegetation and the introduction and spread of alien and invasive vegetation						
Minimise degradation of watercourse vegetation and spread of alien invasive species	Contractor	Promptly remove all alien and invasive plant species that may emerge during construction (i.e., weedy annuals and other alien forbs) must be removed. The use of herbicides is not recommended in or near watercourses (opt for mechanical removal). Landscape and re-vegetate all denuded areas as soon as possible. Clearly demarcate construction footprint and limit all activities to within this area. Minimize unnecessary clearing of vegetation	Construction Phase	ECO	Continuous and as and when required	Proof of no or minimal degradation of watercourse vegetation and the introduction and spread of alien and invasive vegetation
Impact management outcome: Minimise Increased sediment loads to downstream reaches and altered hydrology						
Minimise increased sediment loads to downstream reaches and altered hydrology Re-instate topsoil and lightly till disturbance footprint.	Contractor	Prioritise construction during the dry season, starting with the structure furthest down the system. Excavations must only be made on a need basis and not left open. Structure should be dredged as construction progresses up the catchment and excessive sediment deposition is evident at a structure.	Construction Phase	ECO	Continuous and as and when required	Evidence of no sediment loading to the downstream reaches. Photographic evidence.

		Implement rehabilitation of the areas as soon as possible for each structure prioritise that vegetation has re-established. Ensure culverts are correctly installed and set if required. Maximum size culverts are preferred, and the number of culverts should span the width of the channel. Avoid concentrating flows through a minimum number of culverts Separate topsoil and sub-soil and backfill in same order. Only machinery and equipment required to be in the watercourses is permitted and must be operational. Flatten and lightly till (no deeper than 30 cm) excavated / cleared areas to encourage vegetation establishment as soon as possible Excavations must preferably be either filled with gabions or backfilled within a day of the cut.				

Impact management outcome: Minimise Contamination of watercourses with hydrocarbons due to machinery leaks and eutrophication of watercourses with human sewerage and other waste						
Minimise contamination of watercourses with hydrocarbons	Contractor	Make sure all excess consumables and building materials / rubble is removed from site and deposited at an appropriate waste facility. Appropriately contain any generator diesel storage tanks, machinery spills (e.g., accidental spills of hydrocarbons oils, diesel etc.) or construction materials on site (e.g., concrete) in such a way as to prevent them leaking and entering the watercourse. Dispose of waste as required Construct appropriate bunding facilities for storage tanks and spills purposes Regularly maintain stormwater infrastructure, pipes, pumps and machinery to minimise the potential for leaks. Check for oil leaks, keep a tidy operation, install bins and promptly clean up any spills or litter. Provide appropriate sanitation facilities during construction and service them regularly. Alternatively provide off-site facilities for staff. No	Construction Phase	ECO	Continuous and as and when required	No evidence of watercourse contamination with hydrocarbons No evidence of eutrophication

		indiscriminate use of the watercourse area for ablutions may be permitted				
Impact management outcome: Minimise contamination of watercourse with concrete						
Minimise contamination of watercourse with concrete and batching plant	Contractor	It is preferable that prefabricated materials be used, with no pouring of concrete within the watercourse areas. All materials and structures must be stored beyond the buffer, and only brought into the watercourse for installation. Short-term storage (, 1 day) in a cleared area is permissible. All manufacturing must be undertaken beyond the buffer area. Make sure that the soil is backfilled and compacted to accepted geotechnical standards to avoid conduit formation around the structures i.e. gabion baskets	Construction Phase	ECO	Continuous and as and when required	No proof of contamination of watercourse with concrete .
Impact management outcome: Minimise disruption of watercourse soil profile and alteration of hydrological regime						
Ensure topsoil is spread back over the cleared area	Contractor	Ensure that topsoil is appropriately stored and re-applied during backfilling and landscaping of the area. Make sure that the soil is backfilled and compacted to accepted geotechnical standards to avoid conduit formation around the structures i.e. gabion baskets	Construction Phase	ECO	Continuous and as and when required	Photographic evidence.

6.4 TERRESTRIAL ECOLOGY MITIGATION MEASURES
CONSTRUCTION/POST CONSTRUCTION PHASE (INCLUDING THE FINAL PRE-CONSTRUCTION WALKTHROUGH; (2022))

Impact management outcome: Minimise disturbance to Vegetation and Habitats						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
Prevent encroachment of turbines onto drainage lines	Project manager, Environmental Officer	A no-go buffer of 20 m must be applied and demarcated around drainage lines. Limited access road crossings are acceptable subject to mitigation prescribed by the aquatic specialist. The aquatic ecology walkdown report must be consulted.	Construction Phase,	ECO	Ongoing	Evidence of buffers erected around drainage lines Proof of aquatic specialist mitigation adhered to on access road crossings
Avoid fragmenting rocky habitats	Project manager, Environmental Officer	Ensure that rocky outcrops are demarcated and avoided.	Construction Phase	ECO	Ongoing	Proof of rocky outcrops left undisturbed (photographic evidence)
Prevent accidental clearing of protected flora	Environmental Officer & Contractor	To the extent possible within construction timelines, the floral search and rescue operation must be	Construction Phase	ECO	Ongoing	Evidence of floral search

		undertaken before the end of February for the summer flowering species, and during August for the winter flowering species.				and rescue operation
Prevent encroachment of turbines within Very High Site Ecological Importance areas (SEI)	Developer,	Site all turbines out of Very high SEI in final layout	Construction phase	Environmental Officer & Contractor	Once off	Final revised layout showing all turbines out of very high SEI
Prevent Fragmentation of or disturbance of indigenous vegetation and secondary communities outside of the direct turbine footprint	Project manager, Environmental Officer	Areas of indigenous vegetation, even secondary communities outside of the direct turbine footprint, should under no circumstances be fragmented or disturbed further. Clearing of vegetation should be minimized and avoided where possible. All activities must be restricted too flat areas as far as possible. Rehabilitation of the disturbed areas existing in the project area must be made a priority. It is recommended that areas to be developed be specifically demarcated so that during the construction phase, only the demarcated areas be impacted upon.	Construction Phase,	ECO	Ongoing	Evidence of areas of indigenous vegetation left undisturbed.

		All temporary disturbance footprints to be rehabilitated and landscaped after installation is complete Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type				
Prevent fragmentation of or disturbance of indigenous vegetation and secondary communities related to the development of access roads.	Environmental Officer & Design Engineer	Existing access routes, especially roads must be made use of. The development areas and access roads should be specifically demarcated so that during the construction phase, only the demarcated areas may be impacted upon Demarcate the access roads and development areas	Construction/Operational Phase	ECO	Ongoing	Proof of only the demarcated areas impacted upon
Prevent potential spillage, contamination of the surrounding environment due to placement of infrastructure outside demarcated areas	Environmental Officer & Design Engineer	All laydown, chemical toilets etc. should be restricted to the identified and demarcated laydown/site camp areas. All materials not required during the operational phase must be removed from the project area once the construction phase has been concluded.	Construction/Operational Phase	ECO	Ongoing	Evidence of laydowns, chemical toilets, materials and vehicles stored in the

		No permanent construction structures should be permitted. No storage of vehicles or equipment will be allowed outside of the designated project areas. Place all laydown or chemical toilets offsite No permanent construction structures should be erected Store all vehicles or equipment in the designated project areas.				designated areas only.
Prevent potential spillage, contamination of the soil of the surrounding environment.	Environmental Officer & Contractor	A hydrocarbon spill management plan (Emergency Preparedness, Response and Fire Management Plan, Appendix K) must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers for off-site disposal.	Construction Phase,	ECO	Ongoing	Monitoring of hydrocarbon spill management plan (Emergency Preparedness, Response and Fire Management Plan, Appendix K) and evidence of compliance to the plan.

		Appropriately contain any generator diesel storage tanks, machinery spills (e.g., accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them leaking and entering the environment. Construction activities and vehicles could cause spillages of lubricants, fuels and waste material potentially negatively affecting the functioning of the ecosystem. Develop and implement a hydrocarbon spill management plan (Emergency Preparedness, Response and Fire Management Plan, Appendix K). Avail a spill kit for use when required Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use.				No hydrocarbon contamination as per audit reporting.

		No servicing of equipment on site unless necessary All vehicles and equipment must be maintained, and all re-fueling and servicing of equipment is to take place off-site where possible, or within specifically demarcated areas on-site				
Prevent illegal removal and clearing of protected species from site	Project manager, Environmental Officer	It should be made an offence for any staff to take/ bring any plant species into/out of any portion of the project area. No plant species whether indigenous or exotic should be brought into/taken from the project area, (except in accordance with the rehabilitation plan) to prevent the spread of exotic or invasive species or the illegal collection of plants Any individual of the protected plants that are present needs a relocation or destruction permit in order for any individual that may be removed or destroyed due to the development.	Construction Phase,	ECO	Ongoing	Photographic evidence. Proof of no plant species taken in or out of the project area. Evidence of permits in place for any relocation or

		If left undisturbed the sensitivity and importance of these species needs to be part of the environmental awareness program. Acquire relocation or destruction permit when required All protected and red-data plants should be relocated, and as many other geophytic species as possible. Turbine infrastructure, development areas and routes where protected plants cannot be avoided, these plants many being geophytes or small succulents should be removed from the soil and relocated/ re-planted in similar habitats where they should be able to resprout and flourish again.				destruction of protected plants Evidence of floral search and rescue operation
A fire management plan (Emergency Preparedness, Response and Fire Management Plan, Appendix K) needs to be complied and implemented to restrict the	Environmental Officer & Contractor	Develop and implement a fire management plan (Emergency Preparedness, Response and Fire Management Plan, Appendix K)	Construction Phase.	ECO	Ongoing	Monitoring of fire management plan (Emergency

impact fire might have on the surrounding areas						Preparedness, Response and Fire Management Plan, Appendix K) and no fire recorded
Prevent destruction of threatened species	Site Manager, Environmental Officer & Contractor	For the threatened species that may not be destroyed, it is recommended that professional service providers that deal with plant search and rescue be used to remove such plants and use them either for later rehabilitation work other conservation projects Contract professional service providers for search and rescue to remove threatened species for later rehabilitation work or other conservation projects To the extent possible within construction timelines, the floral search and rescue operation must be undertaken before the end of February for the summer flowering species, and	Construction phase	ECO	During Phase	Proof of professional service contracted

		during August for the winter flowering species.				
Impact management outcome: Minimise disturbance to Fauna						
Minimise disturbance to fauna	Project manager, Environmental Officer	The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environment, Signs must be put up to enforce this. The duration of the construction should be minimized to as short term as possible, to reduce the period of disturbance on fauna. No trapping, killing, or poisoning of any wildlife is to be allowed. All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife.	Construction/Operational Phase	ECO	Ongoing	Proof of demarcation and compliance to those demarcations Construction is not delayed or extended further than necessary

		Speed limits must still be enforced to ensure that road killings, dust and erosion is limited, this is especially true due to the presence of the Verrox's Tent Tortoise's. The speed limits should be restricted to maximum 30 km/h.				
Minimize disturbance to amphibian species and nocturnal mammal related to noise	Environmental Officer	Noise must be kept to an absolute minimum during the evenings and at night to minimize all possible disturbances to amphibian species and nocturnal mammals	Construction/Operational Phase	ECO	Ongoing	No complaints of noise
Prevent mortality associated with driving at night.	Project manager, Environmental Officer & Design Engineer	Driving on access roads at night should be restricted in order to reduce or prevent wildlife road mortalities which occur more frequently during this period	Construction Phase,	ECO, Site Manager	Ongoing	No/ limited faunal fatalities on roads.
Prevent entrapment and mortality of fauna associated with excavation activities.	Environmental Officer & Contractor, Engineer	Any holes/deep excavations must be dug and planted in a progressive manner and should ideally not be left open overnight; Should the holes need to remain overnight they must be fenced/covered temporarily to ensure no small fauna species fall in, and/or the holes must be inspected each morning and any	Construction phase	ECO, Site Manager	Ongoing	Proof of progressive excavations being implemented

		trapped fauna released. by a suitably experienced individual				
Reduce the risk of electrocution of fauna	Environmental Officer & Contractor, Engineer	Ensure that cables and connections are insulated successfully to reduce electrocution risk	Construction Phase,	ECO	Ongoing	Evidence of proper insulation and no electrocutions recorded.
Impact management outcome: Minimise disturbance due to Alien species						
Minimise disturbance to alien species.	Project manager, Environmental Officer & Contractor	The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. Footprint of the roads must be kept to prescribed widths.	Construction Phase,	ECO	Life of operation	No additional footprint visible to the project area
Impact management outcome: Minimise dust emissions						
Minimise disturbance to dust associated with construction activities.	Contractor	Wetting of exposed soft soil surfaces, or other appropriate dust suppression techniques No non environmentally friendly suppressants may be used as this could result in pollution of water sources	Life of operation	ECO	Dust monitoring program	no complaints of dust
Impact management outcome: Waste management						
Reduce the influx of pest and rodents on site associated with incorrect waste management practices.	Environmental Officer, Contractor &	Waste management must be a priority and all waste must be collected and stored adequately. It is recommended	Life of operation	ECO	Life of operation	Proof of waste collection

	Health and Safety Officer	that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site Develop waste management plan and implement Refuse bins will be emptied and secured Temporary storage of domestic waste shall be in covered waste skips or other suitable containers. Restrict Maximum domestic waste storage period to 10 days.				Proof of regularly disposed waste within stipulated period
Reduce, litter, spills, fuels, chemicals and human waste in and around the project area.	Environmental Officer, Contractor & Health and Safety Officer	Reduce litter, spills etc around the project area. Implement waste management plan. The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility	Construction/Closure Phase	ECO	Daily	No excessive waste around the project area. Proof of sealed and marked bins
Sufficient toilets must be provided for on-site workers.	Environmental Officer, Contractor & Health and Safety Officer	Install or place one toilet for every 10 persons or as per the requirements of the Occupational Health and Safety Act.	Design Phase, Construction Phase, Operation Phase,	ECO	Daily	Proof of sufficient toilets kept in good order.

		Portable toilets must be pumped dry to ensure the system does not degrade over time and spill into the surrounding area	Decommissioning Phase			
Prevent illegal dumping and disposal of waste.	Environmental Officer, Contractor & Health and Safety Officer	Where a registered disposal facility is not available close to the project area, the Contractor shall provide a method statement with regard to waste management. Develop method statement for waste disposal. Under no circumstances may domestic waste be burned on site	Life of operation	ECO	Ongoing	No waste lying around
Impact management outcome: environmental awareness training						
All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area to inform contractors and site staff of the presence of Red / Orange List species, their identification, conservation status and importance, biology, habitat requirements and management requirements the Environmental Authorisation and within	Environmental Officer, Health and Safety Officer	Conduct environmental awareness training	Life of operation	ECO	Ongoing	Proof of training conducted

the EMPr. The avoidance and protection of the very high sensitivity areas must be included into a site induction. Contractors and employees must all undergo the induction and made aware of the "no-go" to be avoided.						
Impact management outcome: Minimise Erosion						
Minimise erosion on site	Project manager, Environmental Officer	Speed limits of 30 km/h must be put in place to reduce erosion. Reducing the dust generated by the listed activities, especially the earth moving machinery, through wetting the soil surface (or other suitable dust suppression measures) and putting up signs to enforce speed limit as well as speed bumps built to force slow speeds; Where possible, existing access routes and walking paths must be made use of. Make use of existing access routes and walking paths as far as possible. Signs must be put up to enforce this.	Life of operation	ECO	Ongoing	Proof of no dust generated Evidence of access routes made use of.

Prevent erosion during flooding and strong wind events	Project manager, Environmental Officer	Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood and wind events. Assess the state of rehabilitation and encroachment of alien vegetation Livestock should be kept out of areas that have been recently re-planted until these areas are well established	Life of operation	ECO	Progressively	Photographic evidence. Proof of revegetation
A stormwater management plan must be compiled and implemented	Project manager, Environmental Officer	Develop and implement the stormwater management plan	Life of operation	ECO	Before construction phase: Ongoing	Monitoring of stormwater management and evidence of compliance to the plan

6.5 AVIFAUNA MITIGATION MEASURES

CONSTRUCTION PHASE (INCLUDING THE FINAL PRE-CONSTRUCTION WALKTHROUGH; (2022)

Impact management outcome: Minimise disturbance to Avifauna						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
Minimise disturbance to Avifauna	Contractor and ECO	Action all mitigation measures as prescribed in the EMPr compiled in 2018 by Arcus. Unless agreed otherwise with the avifaunal specialist contracted to the project, based on best available information at the time	Pre-construction, Construction, Operation and Decommissioning	Contractor and ECO	Ongoing	Monitoring and audit of EMPr throughout the life of the project. Minimum non-compliance from audits
Minimise electrocution and collision resulting in mortality of avifauna	Contractor and ECO	Where feasible, and other constraints permit, all 33kV cables should be installed below ground;. Bird flight diverters should be fitted to all overhead powerlines within the WEF. Where cables are required to be aboveground, pole designs and spanning mitigation measures should be informed by the Endangered Wildlife Trust and Birdlife South Africa; Consult the Endangered Wildlife Trust for pole designs where cables are required to be aboveground.	Pre-construction Construction	Contractor and ECO	Once off	Proof of most 33kV cables installed Photographic evidence of installation of Bird Flight Diverters. Evidence of communication and agreement with the Endangered Wildlife Trust and Bird Life South Africa.

6.6 BAT MITIGATION MEASURES

CONSTRUCTION/POST CONSTRUCTION PHASE (INCLUDING THE FINAL PRE-CONSTRUCTION WALKTHROUGH; (2022)

Impact management outcome: Minimise disturbance to Bats						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
Minimise disturbance to Bats	Contractor and ECO	Map and construct the turbines to avoid the medium and high bat sensitivity areas. Implement recommendations to reposition, relocate and implement curtailment as specified by the Bat walkthrough specialist report. No turbine tower or blades will encroach into any High bat sensitive area. Two turbines (Turbines 1 and 14), which are proposed in Medium-High sensitive bat areas, will require curtailment. Where turbines encroach into Medium-High sensitive areas, implement curtailment of all these turbines as soon as each starts operating. Curtailment will require implementation of an initial cut-in speed of 4.5m/s between 1 September and 31 May, when temperatures are 12ºC or higher, during the following seasonal time periods: a) Autumn: 18h30 to 04h00; b) Spring: 19h00 to 04h00; and c) Summer: 20h00 to 04h00.	Construction	Contractor and ECO	Once off	Evidence of the turbine relocated to less Bat sensitive areas.

		Spring = 1 Sept – 15 Nov Summer = 16 Nov – 15-Mar Autumn = 16 Mar – 31 May Winter = 1 Jun – 31 Aug Initial mitigation should be measured against the bat fatality threshold guidelines (MacEwan et al. 2020 or later). Adaptive mitigation should take place if fatalities exceed the calculated bat fatality threshold for the Umsinde WEF, and bat fatality monitoring must continue to monitor the efficacy of adaptive mitigation. Plan and Implement bat fatality monitoring in accordance with best practise guidelines				

6.7 HERITAGE & PALAEONTOLOGICAL MITIGATION MEASURES

CONSTRUCTION/POST CONSTRUCTION PHASE (INCLUDING THE FINAL PRE-CONSTRUCTION WALKTHROUGH; (2022))

Impact management outcome: Minimise disturbance to heritage resources						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
Minimise irreparable damage or destruction to identified heritage sites heritage resources due to construction activities close to these sites.	Heritage specialist, Contractor and ECO	Place infrastructure outside of sensitive areas identified in the Heritage walkthrough. Implement buffers around identified site. Construction activities close to these identified sites can damage and cause irreparable damage or destroy the resource. Implement a 30-meter buffer around rock engravings sites (U0002, U0003) with a rating of IIIB/IIIC. If the engravings cannot be avoided, then they should be photographed and traced as necessary to produce a clear record. Turbine placements underlain by bedrock of the Lower Beaufort Group	Pre-construction, Construction,	ECO	Once, prior to construction Monthly reports during construction/ as or when required	Adherence to a layout and sensitivity map indicating avoidance of heritage sensitive areas and/or suitable mitigation where avoidance is not possible

		had to be avoided if possible. If this could not be done a "Watching Brief" during the construction phase had to be conducted. The sites should be demarcated with a 30-meter buffer and should be avoided if any construction is to happen close to it. If the markers cannot be avoided, then they should be moved (before any construction) to the boundary of the footprint and reinserted. This will require a permit. The co-ordinates of the original and new locations need to be taken and photographed				
A management plan for the heritage resources has been compiled and needs to be submitted for approval by HWC and SAHRA for implementation during construction and operations.	Heritage specialist, Contractor and ECO	Submit the management plan for approval by HWC.	Pre-construction, Construction, Operation and Decommissioning	ECO	Monthly.	Implementation of the heritage management plan and proof of compliance to the management through monitoring audits.

A chance finds protocol has been developed that includes the process of work stoppage, site protection, evaluation and informing HWC of such finds and a final process of mitigation implementation.	Site Environmental Officer	The Site Environmental Officer and ECO must be familiar with the implementation of the Chance Find Protocol. A Chance find and Chance find Procedure has to be developed and implemented for the project. If any evidence of fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted. A professional palaeontologist must be contracted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA.	Duration of construction phase	ECO, Heritage specialist,	Ongoing	The Chance Find Protocol must be implemented, and all findings must be reported accordingly.
The Heritage Management Plan (HMP)	Contractor and Site Environmental Officer	Fully comply to and implement the (HMP)	Duration of construction phase	ECO	Monthly	Implementation of the e management plan and

needs to be implemented during construction and operations as part of the EMPr.			and decommissioning			proof of compliance to the management through monitoring audits. Monthly reports during Construction / as or when required) Yearly Report to be submitted to HWC
Prevent potential damage to in situ deposits	Developer ECO	Appoint an independent heritage specialist to identify and assess site significance	As soon as possible, before construction	Developer / ECO	On receipt	HWC to review report
Prevent damage to the site by inexperienced contractors.	Developer ECO	Appoint experienced project and contractors in agreement with the TOR and management plans to be implemented for the project	To comply with project time frames	Developer / ECO	As required	Proof of experienced contractors awarded tenders
Prevent damage to sites or unnecessary removal of deposits due to inexperience	Developer ECO	Appoint Archaeologist/heritage specialist to develop heritage Plan	Construction phase	Developer / ECO	As required	Appoint an experienced person
Prevent un-coordinated and inefficient rehabilitation and conservation work.	Developer / ECO Archaeologist/heritage specialist	Planning and co-ordination must be done in conjunction with a development company, Officer (ECO) and Archaeologist/heritage specialist	I During the planning, construction and operational phases	Developer / ECO Archaeologist/heritage specialist	Monthly	All parties to report to Developer

Reduce risk to heritage resources related to poor quality materials and workmanship during rehabilitation and conservation initiatives.	Developer / Archaeologist/heritage specialist, ECO	Archaeologist/heritage specialist to be present throughout monitoring; During excavation, monitoring of the turbine foundations as well as access roads and underground cables by a palaeontologist is recommended Implement Chance Find Fossil Procedure	Necessary	Developer / Archaeologist/heritage specialist, ECO	Monthly (during construction)	Regular inspections by ECO Check site is kept tidy at all times. Monthly progress reports (during the construction phase) and final reports to be delivered to HWC by ECO A monitoring report has to be submitted to SAHRA
Prevent theft and damage that will lead to loss of information and site integrity.	All parties involved in the archaeological / heritage mitigation project. The contractor shall familiarise all employees with the HMP contents, either in writing or verbally.	Ensure that all personnel are familiar with the aims of the HMP and the statement of significance. No artefacts or other material may be moved, picked up or removed from the site without a permit.	At the start of construction Training by Developer	All parties involved in the archaeological / heritage mitigation project. The contractor shall familiarise all employees with the HMP contents, either in writing or verbally.	Start of contract	ECO shall require written proof or confirmation from the contractor that HMP training has been done. Proof of Cultural Awareness Training should be submitted to HWC.

						Spot checks to ensure personnel are not removing artefacts.
Prevent loss of information through inadequate recording	Developer ECO/ Archaeologist/heritage specialist, HWC	Any archaeological or historical material found accidentally must be reported to responsible Archaeologist/heritage specialist or HWC	Necessary Reports to be submitted to HWC	Developer ECO/ Archaeologist/heritage specialist, HWC	As required	Check sites are recorded and photographs are taken. Reports to be peer reviewed
Prevent impact beyond areas requiring mitigation	Developer ECO Archaeologist/heritage specialist	Developer and Archaeologists/heritage specialist must indicate to contractors the area of work for the duration of the contract, including the access road to be used, construction lay-down areas, materials storage and delivery requirements, work stations, pedestrian routes and operational demarcation, etc.	During the planning, construction and operational phases	Developer ECO Archaeologist/heritage specialist	Before start of construction	Maps to be signed off at the start of each contract Check contractor works within demarcated areas
Avoid unnecessary disturbances to adjacent areas	Developer ECO	Boundaries of the sites and conservation areas shall be demarcated by the Contractor, as instructed by the Client and the Archaeologist/heritage specialist, prior to any work commencing on the site.	During the planning, construction and operational phases	Developer ECO	Weekly	No encroachment beyond the demarcated boundaries is to be permitted. The contractor must ensure all labour and materials remain

		Sensitive sites within the construction area must be demarcated to avoid accidental destruction of sensitive areas. The workforce must be made aware of these areas, and why they are sensitive. Any changes must be recorded in writing.				within the boundaries of the site.
Prevent damage to heritage resources sites	Developer ECO	Sensitive areas identified by Developer and/or Archaeologist / Heritage Specialist to be demarcated.	During the planning, construction and operational phases	Developer / ECO	Weekly	Check that danger fencing is in the correct place
Prevent damage to sites and deposits related to access roads	Contractor / ECO / Developer	Only those roads agreed to between Developer, Archaeologist/ Heritage Specialist and Contractor, as described in the current layout, may be used during maintenance activities and day to day activities A walk down of access roads and the final turbine positions prior to construction The access roads should be specifically demarcated so that during the construction phase, only the	During the planning, construction and operational phases	Contractor / ECO / Developer	Weekly	ECO and site manager to check access roads regularly Check rehabilitation of temporary access roads against those agreed

		demarcated areas may be impacted upon. Access roads must be planned to deviate around trees or other natural features marked out in an approved manner by Developer. Temporary roads and off-road access can damage sites and interfere with the integrity of the cultural landscape. No off-road driving allowed; temporary access roads must be rehabilitated after usage and width of roads restricted to a maximum of 3 metres				
Prevent un-coordinated movement that can lead to damage of sites and landscape	Contractor and ECO	The contractor must ensure that all construction personnel, labourers and equipment remain within demarcated restoration sites at all times. Movement outside boundaries may be done only with permission from the ECO	Necessary	Contractor and ECO	Weekly	Check that all work is done within demarcated areas.
Reduce erosion caused by continuous use of paths	Contractor	Confine pedestrian routes to paths.	Necessary	Contractor	Continuous and as and when required	Photographic evidence or no erosion

SECTION 7: OPERATION PHASE MITIGATION MEASURES

Once the construction and commissioning of the WEF is completed the project becomes operational. The operator of the WEF has the responsibility to ensure that the mitigation measures proposed for the operational phase of the WEF is implemented and conducted appropriately. The main impacts associated with the operation phase of the WEF relate to birds and bats.

During the operation and maintenance of the WEF (including the normal operation of the turbines themselves) a certain amount of disturbance results. An operational WEF will normally have various day to day activities occurring on site, such as (but not limited to) security control, routine maintenance, road clearing/cleaning, grass/bush cutting and clearing.

These factors can all lead to birds avoiding the area for feeding or breeding, and effectively leading to habitat loss and a potential reduction in breeding success (Larsen & Madsen 2000; Percival 2005). Turbines can also be disruptive to bird flight paths, with some species altering their routes to avoid them (Dirksen *et al.* 1998, Tulp *et al.* 1999, Pettersson & Stalin 2003). While this reduces the chance of collisions it can also create a displacement or barrier effect, for example between roosting and feeding grounds and result in an increased energy expenditure and lower breeding success (Percival 2005). This could potentially occur for any waterbirds regularly utilizing one of the larger dams on either side of the WEF site for foraging but roosting on the other side of the turbines (or vice versa).

Disturbance distances (the distance from wind farms up to which birds are absent or less abundant than expected) can vary between species and also within species with alternative habitat availability (Drewitt & Langston 2006). Some studies have recorded distances of 80 m, 100 m, 200 m and 300 m (Larsen & Madsen 2000, Shaffer & Buhl 2015) but distances of 600 m (Kruckenberg & Jaehne 2006) and up to 800 m have been recorded (Drewitt & Langston 2006).

Raptors are generally fairly tolerant of wind farms and continue to use the area for foraging (Thelander *et al.* 2003, Madders & Whitfield 2006), so are not affected by displacement, which however increases their collision risk.

It is expected that some species potentially occurring on the WEF site will be susceptible to displacement, for example smaller passerines such as larks, coursers and large terrestrial red data species such as Karoo Korhaan and Ludwig's Bustard. The extent of the impact will be local and restricted to the WEF site. As some species may not return the duration is potentially long-term.

WEFs have the potential to impact bats directly through collisions and barotrauma resulting in mortality (Horn et al. 2008; Rollins et al. 2012), and indirectly through the modification of habitats (Kunz et al. 2007b). Direct impacts pose the greatest risk to bats and, in the context of the project, habitat loss and displacement should not pose a significant risk (unless a large roost in discovered on site and bats are reluctant to leave this roost if disturbed) because the project footprint (i.e. turbines, roads and infrastructure) is small relative to the area monitored.

The developer has the responsibility to ensure that all operational mitigation measures outlined in this document, and all revisions thereof, are complied with.

Table 7:1 Operational Phase Mitigation Measures (as per ACUS EMPr 2018, Amended, 2022)

Mitigation Measure	Responsibility	Frequency
Ecology		
Wherever excavation is necessary, topsoil should be set aside and replaced after construction to encourage natural regeneration of the local indigenous species. The recovery of the indigenous shrub/grass layer should be encouraged through leaving some areas intact through the construction phase to create a seed source for adjacent cleared areas. Due to the disturbance at the site as well as the increased runoff generated by the hard infrastructure,alien plant species are likely to be a long-term problem at the site and a long-term control plan will need to be implemented. Problem woody species such as *Prosopis* are already present in the area and are likely to increase rapidly if not controlled. Regular monitoring for alien plants within the development footprint as well as adjacent areas whichreceive runoff from the facility as there are also likely to be prone to invasion problems. Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible.	Site engineer/ site manager	Throughout operation. monthly checks

All roads and other hardened surfaces should have runoff control features which redirect water flow anddissipate any energy in the water which may pose anerosion risk. Regular monitoring for erosion after construction toensure that no erosion problems have developed asresult of the disturbance. All erosion problems observed should be rectified as soon as possible, using the appropriate erosion controlstructures and revegetation techniques. All cleared areas should be revegetated with indigenous perennial grasses from the local area. These can be cut when dry and placed on the clearedareas if natural recovery is slow.	Site engineer/ site manager	Throughout operation. monthly checks

No unauthorized persons should be allowed onto thesite. Any potentially dangerous fauna such snakes or fauna threatened by the maintenance and operational activities should be removed to a safe location. The collection, hunting or harvesting of any plants oranimals at the site should be strictly forbidden. If the site must be lit at night for security purposes, this should be done with downward-directed low-UV type lights (such as most LEDs), which do not attractinsects. All hazardous materials should be stored in the appropriate manner to prevent contamination of thesite. Any accidental chemical, fuel and oil spills thatoccur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. All vehicles accessing the site should adhere to a lowspeed limit (30km/h max) to avoid collisions with susceptible species such as snakes and tortoises. If parts of the facility are to be fenced, then no electrified strands should be placed within 30cm of theground as some species such as tortoises are susceptible to electrocution from electric fences as they do not move away when electrocuted but rather adopt defensive behaviour and are killed by repeated shocks. Alternatively, the electrified strands should be placed on the inside of the fence and not the outside.	Site manager	Throughout operation. monthly checks

Mitigation Measure	Responsibility	Frequency
Birds		
Post-construction/operational monitoring must be done in line with the latest Best Practice Guidelines[5] and must be conducted as soon as the turbines become operational, any mortalities must be reportedto BirdLife SA. Bird carcasses must be reported to the ECO for recording and removal to reduce the spread avian disease and contamination of the affected environment. As a minimum this monitoring programme must: • Continue for the first two years of operations,longer if a need is identified. • Record the numbers /densities of birds regularly present or resident within and around the operational WEF. • Document patterns of bird movements in thevicinity of the operational WEF. • Compare these data with baseline figures andhence quantify the impacts of displacement and/or collision mortality; and • Carcass surveying at the WEF for fatalities shouldalso be done for a minimum of two years after construction and should be repeated again at year five and every five years thereafter. • Wind turbines should be placed outside of the core territory of eagles to reduce the risk of collisions;	Site Manager / Environmental Officer	Throughout operation. Monthly checks

• Areas associated with increased flight activity and/or risky behaviour should also be avoided, for example the edge the escarpment, ridge tops, cliffs, steep slopes and particularly slopes that are perpendicular to the prevailing wind direction; • Dedicated surveys must be conducted to identify potential nest sites. Cliff-lines should be surveyed for evidence of nesting. These surveys should extend beyond the development footprint to include the likely territory of any pair that may regularly use the site; • A buffer of 3 km is recommended around all nests (including alternate nests); • Vantage point surveys should be conducted for a minimum of 72 hours per vantage point per year; • Fieldwork must include surveys during the breeding season; • Surveys (including vantage point monitoring) should extend beyond the developable area; • The relative extent and type of use of the site by eagles must be assessed; • Steps should be taken to avoid increasing the prey population (and thereby attracting eagles to the wind farm). For example, excavated rocks and animal carcasses should be removed; • If it is suspected that a proposed wind farm may pose a significant risk to Verreauxs' Eagles, the duration of pre-		

construction monitoring should be extended to two years, particularly where alternate nests are some distance apart and/or turbines are proposed in areas that may be associated with increased flight activity and/or risky behaviour; • No construction activities (e.g. new roads) should be allowed within 1 km of nests during the breeding season; and • Nests should be monitored for breeding activity throughout the lifespan of the wind farm (including during construction), but care must be taken to ensure that monitoring activities do not disturb breeding birds.		
Post-construction monitoring is to include manual searching of the site for carcasses to identify potentially problematic WTGs and critical to inform aneffective curtailment plan. (if required)	Site engineer/ site manager	Throughout operation. Monthly checks
Results of post-construction bird monitoring must be used to design mitigation measures where necessary. As a starting point for the review of possible mitigations, the following may need to be • Assess the suitability of using deterrent devices(e.g., DT Bird and ultrasonic/radar/electromagnetic deterrents forbats) to reduce collision risk. • Identify options to modify turbine operation toreduce collision risk. Considered:	Site engineer/ site manager	Throughout operation. Monthly checks

Nests of Verreaux's Eagle must be monitored for breeding activity throughout the lifespan of the facility as per the Verreaux's Eagle guidelines.	Site manager	Throughout operation, unless advised otherwise by avifaunal specialist in consultation with BirdLife SA
Mitigation measures (e.g., curtailment or shut-down- on-demand) must be implemented on any turbines responsible for the fatalities of two or more Verreaux'sEagle.	Site manager	Throughout operation
Any overhead power lines must be of a design that minimizes electrocution risk by using adequately insulated 'bird friendly' monopole structures, with clearances between live components of 2 m or greater.	Site engineer/ site manager	Throughout operation. monthly checks
The on-site WEF manager (or a suitably appointed Environmental Manager) must be trained by the avifaunal specialist to identify the potential priority species and Red Data species as well as the signs thatindicate possibly breeding by these species. If a priority species or Red Data species is found to be breeding (e.g., a nest site is located) on the operational Wind Farm, the nest/breeding site must not be disturbed, and the avifaunal specialist must be contacted for further instruction.	Site Manager / Environmental Officer	Throughout operation. monthly checks
Animal carcasses encountered on the facility must be recorded and reported to the Site Environmental Officer for removal during the operation to reduce the chances of attracting avifauna into the project site.	Site Manager / Environmental Officer	Throughout operation
Bats		
Acoustic bat monitoring that commenced before andduring construction should continue into the first two years of	Site Manager / Environmental Officer	Throughout operation

operations in accordance with best practice guidelines in effect at the time.		
Perform operational bat monitoring according to thelatest SABAA guidelines	Site Manager / Environmental Officer	Throughout operation
Adaptively manage bat fatalities by consulting thelatest SABAA guidelines	Developer to implement	Throughout operation
Implement curtailment as outlined below: The importance of mitigating bat fatalities cannot be over-emphasised. Whilst acoustic deterrents are showing positive results for lowering bat fatalities at WEFs in some parts of the world, in South Africa, data are very limited, and deterrent devices are not readily available for installation. Therefore, curtailment is still the most effective and available bat fatality minimization strategy in this country. For the Umsinde WEF, IWS recommends the following strategy: **1** All parts of all turbines (including the full rotorswept area) are not to encroach into any High sensitive areas. The layout meets this requirement. 2 Operational bat monitoring according to Aronson *et al.* 2020 (or later editions relevantat the time of the monitoring) must be implemented as soon as the wind turbines become operational. The quality of the operational monitoring and data analysis are to be conducted to a high standard so that there is confidence in the data and the fatality estimate results.	Site engineer/ site manager	Throughout operation

3 Where turbines encroach into **Medium sensitive areas**, implement curtailment of all these turbines as soon as each startsoperating. Curtailment will require implementation of an initial cut-in speed of 4.5m/s between 1 September and 31 May, when temperatures are 12ºC or higher, during the following seasonal time periods: a. Autumn: 18h30 to 04h00 b. Spring: 19h00 to 04h00 c. Summer: 20h00 to 04h00 Spring = 1 Sept – 15 Nov Summer = 16 Nov – 15-Mar Autumn = 16 Mar – 31 May Winter = 1 Jun – 31 Aug 4 If the bat fatality threshold (as determined according to the latest relevant SABAAguidelines *viz.* MacEwan *et al.* 2018 or later editions relevant at the time of the monitoring) is exceeded, further adaptive management and mitigation (possibly including greater curtailment) must be implemented (refer to Aronson *et al.* 2018 orlater editions). 5 If the quality of the operational monitoring and data analysis is not conducted according to Aronson *et al.* 2020 (or later editions relevant at the time of the monitoring), the above-recommended curtailment strategy should be		

implemented at all turbines at the WEF. 6 The specialist conducting the Year 1 and Year2 operational monitoring should providerecommendations for adaptive management of the above strategy after the second year of operational monitoring. Allowance should be made in the financial provision for such adaptive management and mitigation.		
Best practice (not essential): Forward all (live and fatality) bat monitoring data to SANBI's database or the database recommended by SABAA to expand scientific knowledge base for more informed decision making and mitigation.	Specialist	Throughout operation
Best practice (not essential): Submit quarterly carcass searching reports to SABAAP and quarterly progress and annual operational bat monitoring reports to SABAAP, EWT and DFFE	Specialist	Throughout operation
Social		
The enhancement measures listed in Construction phase Section, i.e., to enhance local employment and business opportunities during the construction phase,also apply to the operational phase. In addition: The proponent should implement a training and skills development programme for locals during the first 5 years of the operational phase. The aim of the programme should be to maximise the number of South African's and locals employed during the operational phase of the project.	Developer to implement	Throughout operation. monthly checks

The proponent, in consultation with the BWLM, shouldinvestigate the options for the establishment of a Community Development Trust or other mechanism to invest in local socio-economic development initiatives		

SPECIFIC FINAL PRE-CONSTRUCTION WALKTHROUGH MITIGATION MEASURES (2022): OPERATION PHASE

7.1 AQUATIC ECOLOGY MITIGATION MEASURES

OPERATIONAL PHASE (INCLUDING THE FINAL PRE-CONSTRUCTION WALKTHROUGH; 2022))

Impact management outcome: Minimise Potential for increased stormwater runoff leading to Increased erosion and sedimentation						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
Minimise Potential for increased stormwater runoff leading to Increased erosion and sedimentation	Contractor/Operation and maintenance team	Design and implement an effective stormwater management plan. Promote water infiltration into the ground beneath the turbines. Release only clean water into the environment. Stormwater leaving the site should not be concentrated in a single exit drain but spread across multiple drains around the site each fitted with energy dissipaters (e.g., slabs of concrete with rocks cemented in). Minimise the extent of concreted / paved / gravel areas. A covering of soil and grass (regularly cut and maintained) below turbines is ideal for infiltration.	Operation Phase	Site Environmental Officer	Continuous and as and when required	Photographic evidence or no erosion

		If not feasible then gravel is preferable over concrete or paving. Re-vegetate denuded areas as soon as possible. Regularly clear drains. Avoid excessively compacting the ground.				
Impact management outcome: Minimise Altered surface flow dynamics leading to Increased erosion and sedimentation						
Minimise erosion caused by altered surface flow	Contractor/Operation and maintenance team	Development and implementation of stormwater management plan. Install energy dissipaters at discharge areas. Stabilise banks susceptible to erosion/collapse with gabion baskets or bank stabiliser blankets	Operation Phase	Site Environmental Officer (EO)	Continuous and as and when required	Photographic evidence or no erosion
Impact management outcome: Minimise potential for increased contaminants entering a watercourse.						
Minimise contaminants entering watercourses and drainage lines	Contractor/Operation and maintenance team	Where possible minimise the use of herbicides to control vegetation. If herbicides must be used do so well prior to any significant predicted rainfall events	Operation Phase	Site Environmental Officer (EO)	Continuous and as and when required	Proof of no or minimal contamination of watercourse
Impact management outcome: Minimise disturbance to Aquatic systems						
Minimise disturbance to Aquatic systems	Project manager, Environmental Officer	Avoid the delineated watercourse and buffers areas where feasible a no-go buffer of 30 m must be applied around them	Life of operation	Site Environmental Officer (EO)	Ongoing	Evidence buffers erected around drainage lines

7.2 TERRESTRIAL ECOLOGY MITIGATION MEASURES

OPERATIONAL PHASE (INCLUDING THE FINAL PRE-CONSTRUCTION WALKTHROUGH; 2022))

Impact management outcome: Minimise disturbance to Vegetation and Habitats						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
Minimise disturbance to vegetation and habitats elated to turbine footprints,	Project manager, Environmental Officer	A no-go buffer of 30 m must be applied and demarcated around them Limited access road crossings are acceptable subject to mitigation prescribed by the aquatic specialist. The aquatic ecology walkdown report must be consulted,	Design Phase, Construction Phase, Operation Phase, Decommissioning Phase	Site Environmental Officer (EO)	Ongoing	Evidence buffers erected around drainage lines Proof of aquatic specialist mitigation adhered to on access road crossings
Prevent fragmentation of indigenous vegetation areas and secondary communities outside of the direct turbine	Project manager, Environmental Officer	All temporary disturbance footprints disturbed areas to be rehabilitated and landscaped after installation is complete. Rocky outcrops must be avoided as much as possible. Avoid fragmenting rocky habitats	Life of operation	Site Environmental Officer (EO)	Ongoing	Evidence of areas of indigenous vegetation left undisturbed.

		Unnecessary clearing of vegetation should be minimised and avoided where possible . Rehabilitation of the disturbed areas existing in the project area must be made a priority Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type				
Prevent fragmentation of or disturbance of indigenous vegetation and secondary communities related to the development of access roads	Environmental Officer & Design Engineer	Existing access routes, especially roads must be made use of. The development areas and access roads should be specifically demarcated so that during the operational phase, only the demarcated / developed areas may be impacted upon. Only authorised access roads as per the layout map be used during the operations phase.	Operational Phase	Site Environmental Officer (EO)	Ongoing	Proof of non-compliance via audit reporting.
Prevent potential spillage, contamination of the surrounding environment due to storage of equipment and vehicles outside demarcated areas.	Environmental Officer & Design Engineer	Store all vehicles or equipment in the designated project areas. No materials may not be stored and all materials must be removed from the project area once the construction phase has been concluded. No	Construction/Operational Phase	Site Environmental Officer (EO)	Ongoing	Evidence of laydowns, chemical toilets, materials and vehicles stored in the designated areas only.

		storage of vehicles or equipment will be allowed outside of the designated project areas. Livestock should be kept out of areas that have been recently re-planted until these areas are well established				
Prevent erosion of denuded areas	Environmental Officer & Contractor	Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood and wind events. Assess the state of rehabilitation and encroachment of alien vegetation Livestock should be kept out of areas that have been recently re-planted until these areas are well established	Operational phase	Site Environmental Officer (EO)	Quarterly for up to two years after the closure of construction	Photographic evidence Proof of revegetation of denuded areas with indigenous vegetation.
Prevent potential spillage, contamination of the soil of the surrounding environment.	Environmental Officer & Contractor	A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. An emergency spill kit must always be complete and available on site.	Life of operation	Site Environmental Officer (EO)	Ongoing	Monitoring of hydrocarbon spill management plan (Emergency Preparedness, Response and Fire Management Plan, Appendix K) and

		All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers. Appropriately contain any generator diesel storage tanks, machinery spills (e.g., accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them leaking and entering the environment. Develop and implement a hydrocarbon spill management plan (Emergency Preparedness, Response and Fire Management Plan, Appendix K). Avail a spill kit for use when required Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment on site unless necessary				evidence of compliance to the plan. No hydrocarbon contamination

		All vehicles and equipment must be maintained, and all re-fueling and servicing of equipment is to take place off-site where possible, or within specifically demarcated areas on-site				
Prevent illegal removal and clearing of protected species from site	Project manager, Environmental Officer	It should be made an offence for any staff to take/ bring any plant species into/out of any portion of the project area. No plant species whether indigenous or exotic should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants Any individual of the protected plants that are present needs a relocation or destruction permit in order for any individual that may be removed or destroyed due to the development.	Life of operation	Site Environmental Officer (EO)	Ongoing	Photographic evidence. Proof of no plant species taken in or out of the project area Evidence of permits in place for any relocation or destruction of protected plants

		If left undisturbed the sensitivity and importance of these species needs to be part of the environmental awareness program. Acquire relocation or destruction permit when required All protected and red-data plants should be relocated, and as many other geophytic species as possible.				
A fire management plan (Emergency Preparedness, Response and Fire Management Plan, Appendix K) needs to be complied and implemented to restrict the impact fire might have on the surrounding areas	Environmental Officer & Contractor	Develop and implement a fire management plan (Emergency Preparedness, Response and Fire Management Plan, Appendix K)	Life of operation	Site Environmental Officer (EO)	Ongoing	Monitoring of fire management plan (Emergency Preparedness, Response and Fire Management Plan, Appendix K) and no fire recorded
Impact management outcome: Minimise disturbance to Fauna						
Minimise disturbance to fauna outside of the developed footprint	Project manager, Environmental Officer	The developed footprint must be fenced must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments,	Construction/Operational Phase	Site Environmental Officer (EO)	Ongoing	Proof of demarcation and compliance to those demarcations

		Signs must be put up to enforce this				
Minimize disturbances to amphibian species and nocturnal mammals due to noise.	Environmental Officer	Noise must be kept to an absolute minimum during the evenings and at night	Construction/Operational Phase	Site Environmental Officer (EO)	Ongoing	No complaints of noise
Prevent trapping, killing, or poisoning of any wildlife.	Environmental Officer/ Health and Safety Officer	Signs must be put up to enforce this and prohibit	Design Phase, Construction Phase, Operation Phase, Decommissioning Phase	Site Environmental Officer (EO), site manager	Ongoing	No killings or trapping occurring.
Reduce and minimize road kill incidents	Project manager, Environmental Officer & Design Engineer	All maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings, dust and erosion is limited, this is especially true due to the presence of the Verrox's Tent Tortoise's. The speed limits should be restricted to maximum 30 km/h.	Design Phase, Construction Phase, Operation Phase, Decommissioning Phase	Site Environmental Officer (EO)	Ongoing	Evidence of speed limits erected in place
Prevent mortality associated with driving at night	Project manager, Environmental	Driving on access roads at night should be restricted in order to reduce or prevent wildlife road	Life of operation	Site Environmental Officer (EO), Site manager	Ongoing	No/ limited faunal fatalities on roads.

	Officer & Design Engineer	mortalities which occur more frequently during this period;,				
Reduce the risk of electrocution of fauna.	Environmental Officer & Contractor, Engineer	Ensure that cables and connections are insulated successfully to reduce electrocution	Life of project	Site Environmental Officer (EO)	Ongoing	Evidence of proper insulation and no electrocutions recorded.
Impact management outcome: Minimise to dust emission						
Minimise dust emissions during the operational phase.	Contractor	Dust-reducing mitigation measures must be put in place and must be strictly adhered to. Wetting of exposed soft soil surfaces, or other suitable dust suppressant measures No non environmentally friendly suppressants may be used as this could result in pollution of water sources	Life of operation	Site Environmental Officer (EO)	Dust monitoring program	no complaints of dust
Impact management outcome: waste management						
Waste management must be a priority and all waste must be collected and stored adequately.	Environmental Officer, Contractor & Health and Safety Officer	It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site Sealable and properly marked domestic waste collection bins must be made available and all solid waste	Life of operation	Site Environmental Officer (EO)	Life of operation	Proof of waste collection and waybills

		collected shall be disposed of at a licensed disposal facility. Install specified bins for temporary waste storage. Where a registered disposal facility is not available close to the project area, the Contractor shall provide a method statement with regard to waste management. Refuse bins will be emptied and secured Temporary storage of domestic waste shall be in covered waste skips or other suitable containers Under no circumstances may domestic waste be burned on site				Proof of sealed and marked bins Proof of regularly disposed waste within stipulated period.
Impact management outcome: Environmental awareness training						
All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area to inform contractors and site staff of the presence of Red / Orange List species,	Health and Safety Officer/ Environmental Officer	Conduct environmental awareness training	Design Phase, Construction Phase, Operation Phase, Decommissioning Phase	Site Environmental Officer (EO)	Ongoing	Proof of training conducted

their identification, conservation status and importance, biology, habitat requirements and management requirements the Environmental Authorisation and within the EMPr. The avoidance and protection of the very high sensitivity areas must be included into a site induction. Contractors and employees must all undergo the induction and made aware of the "no-go" to be avoided.						
Impact management outcome: Minimise Erosion						
Reduce erosion related to vehicles travelling at high speeds	Project manager, Environmental Officer	Speed limits of 30 km/h must be put in place to reduce erosion. Reducing the dust generated by especially the earth moving machinery, through wetting the soil surface (or other suitable dust suppression measures) and putting up signs to enforce speed limit as well as speed bumps built to force slow speeds; Signs must be put up to enforce this.	Life of Operation	Site Environmental Officer (EO)	Ongoing	Proof of no dust generated

Minimise erosion related to access roads and paths.	Project manager, Environmental Officer	Where possible, existing access routes and walking paths must be made use of. Make use of existing access routes and walking paths as far as possible	Life of Operation	Site Environmental Officer (EO)	Ongoing	Evidence of access routes made use of.
Prevent erosion of denuded areas	Project manager, Environmental Officer	Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood and wind events. *Assess the state of rehabilitation and encroachment of alien vegetation* *Livestock should be kept out of areas that have been recently re-planted until these areas are well established*	Life of operational	Site Environmental Officer (EO)	Progressively	Photographic evidence. Proof of revegetation
A stormwater management plan must be compiled and implemented	Project manager, Environmental Officer	Develop and implement the stormwater management plan	Life of operation	Site Environmental Officer (EO)	Before construction phase and : Ongoing	Monitoring of stormwater management and evidence of compliance to the plan

7.3 AVIFAUNA MITIGATION MEASURES

OPERATIONAL PHASE (INCLUDING THE FINAL PRE-CONSTRUCTION WALKTHROUGH; 2022))

Impact management outcome: Minimise disturbance to Avifauna						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
Minimise disturbance to Avifauna	Site Manager and ECO	Action all mitigation measures as prescribed in the EMPr compiled in 2015 and 2020 Arcus Arcus (as per table 7.1 above). Unless agreed otherwise with the avifaunal specialist contracted to the project, based on best available information at the time	Pre-construction, Construction, Operation and Decommissioning	Contractor and ECO	Ongoing	Monitoring and audit of EMPr throughout the life of the project. Minimum non-compliance from audits
Post-construction/operational monitoring must be done in line with the latest Best Practice Guidelines and must be conducted as soon as the turbines become operational, any mortalities must be reported to BirdLife SA.	Site Manager and ECO	As a minimum this monitoring programme must: • Continue for the first two years of operations, longer if a need is identified; • Record the numbers/densities of birds regularly present or resident within and around the operational WEF; • Document patterns of bird movements in the vicinity of the operational WEF.	Post construction and Operation	ECO	Ongoing	Proof of reporting of mortalities to BirdLife SA.

		• Compare these data with baseline figures and hence quantify the impacts of displacement and/or collision mortality; and • Carcass surveying at the WEF for fatalities should also be done for a minimum of two years after construction and should be repeated again at year five and every five years thereafter. Manual searching of the site for carcasses is recommended as a strategy and these data are essential in identifying potentially problematic WTGs and critical to inform an effective curtailment plan. Results of post construction bird monitoring must be used to design mitigation measures where necessary. Mitigation measures (e.g. curtailment or shut-down-on-demand) must be implemented on any WTGs responsible for the fatalities of two or more Verreaux's Eagle.				

7.4 BAT MITIGATION MEASURES

OPERATIONAL PHASE (INCLUDING THE FINAL PRE-CONSTRUCTION WALKTHROUGH; 2022))

Impact management outcome: Minimise disturbance to Bats						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
Investigate and minimize bat facilities associated with the operation WEF.	Site manager	Plan and Implement bat fatality monitoring. In accordance with best practise guidelines. Initial mitigation should be measured against the bat fatality threshold guidelines (MacEwan et al. 2020 or later). Adaptive mitigation should take place if fatalities exceed the calculated bat fatality threshold for the Umsinde WEF, and bat fatality monitoring must continue to monitor the efficacy of adaptive mitigation.	Construction	Environmental Officer, Site Manger	Once off	Evidence of periodical bat fatality monitoring Evidence of implementation of curtailment for turbines located within Medium-High Sensitivity areas as per the final sensitivity map
Operational bat monitoring according to Aronson et al. 2020 (or later editions relevant at the time of the monitoring) must be implemented as soon as the wind turbines become operational. The quality of the operational monitoring and data analysis are to be conducted to a high standard so that	ECO / Bat Specialist	Implement operational bat monitoring. The specialist conducting the Year 1 and Year 2 operational monitoring should provide recommendations for adaptive management of the above strategy after the second year of operational monitoring. Allowance should be made in the financial provision for such adaptive management and mitigation.	Operation	Environmental officer, site manager	Ongoing	Evidence of monitoring results/ data.

there is confidence in the data and the fatality estimate results						
Minimise disturbance to bats	Site Manager	Implement recommendations to reposition, relocate and implement curtailment as specified by the Bat walkthrough specialist report. No turbine tower or blades will encroach into any High bat sensitive area. Two turbines (Turbines 1 and 14), which are proposed in Medium-High sensitive bat areas, will require curtailment. Where turbines encroach into Medium-High sensitive areas, implement curtailment of all these turbines as soon as each starts operating. Curtailment will require implementation of an initial cut-in speed of 4.5m/s between 1 September and 31 May, when temperatures are 12°C or higher, during the following seasonal time periods: a) Autumn: 18h30 to 04h00; b) Spring: 19h00 to 04h00; and c) Summer: 20h00 to 04h00. Spring = 1 Sept – 15 Nov Summer = 16 Nov – 15-Mar	Operation	EO	Ongoing	Evidence as per audit reporting.

		Autumn = 16 Mar – 31 May Winter = 1 Jun – 31 Aug If the bat fatality threshold (as determined according to the latest relevant SABAAguidelines *viz.* MacEwan *et al.* 2018 or later editions relevant at the time of the monitoring) is exceeded, further adaptive management and mitigation (possibly including greater curtailment) must be implemented (refer to Aronson *et al.* 2018 orlater editions). If the quality of the operational monitoring and data analysis is not conducted according to Aronson *et al.* 2020 (or later editions relevant at the time of the monitoring), the above-recommended curtailment strategy should be implemented at all turbines at the WEF.				

7.5 HERITAGE & PALAEONTOLOGICAL MITIGATION MEASURES

OPERATIONAL PHASE (INCLUDING THE FINAL PRE-CONSTRUCTION WALKTHROUGH; 2022))

Impact management outcome: Minimise disturbance to heritage resources						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
Minimise disturbance to heritage resources during operational activities associated with WEF	Heritage specialist, Contractor and ECO	A management plan for the heritage resources has been compiled and needs to be submitted for approval by HWC, and SAHRA for implementation during operation	Pre-construction, Construction, Operation and Decommissioning	Environmental Officer	Monthly Yearly Report during Operation/ as or when required	Implementation of the heritage management plan and proof of compliance to the management through monitoring audits.
Prevent irreparable damage and destruction of resources due to maintenance activities close to these identified sites .	Heritage specialist, Contractor and ECO	Identify Rock Engravings (U0002) as no-go areas Sensitive areas identified by Developer and/or Archaeologist / Heritage Specialist to remain demarcated.	Operation	Environmental Officer	Monthly reports / as or when required	Adherence to a layout and sensitivity map indicating avoidance of heritage sensitive areas
Prevent damage to the site by inexperienced contractors	Developer, ECO	Appoint experienced project and contractors in agreement with the TOR and management plans to be implemented for the project	To comply with project time frames	Site manager, Environmental Officer	As required	Proof of experienced contractors awarded tenders.
Prevent damage to sites or unnecessary	Developer, ECO	Archaeologist/heritage specialist to develop heritage Plan	Necessary Appoint before implementing mitigation measures	Site manager, Environmental Officer	As required	Appoint an experienced person

removal of deposits due to inexperience						
Prevent un-coordinated and inefficient rehabilitation and conservation work	Developer ECO Archaeologist/heritage specialist	Planning and co-ordination must be done in conjunction with a development company, Officer (ECO) and Archaeologist/heritage specialist	During the planning, construction and operational phases	Environmental Officer, Site manager / Archaeologist/heritage specialist	Monthly	All parties to report to Developer
Reduce risk to heritage resources related to poor quality materials and workmanship during rehabilitation and conservation initiatives	Developer / Archaeologist/heritage specialist, ECO	Archaeologist/heritage specialist to be present throughout monitoring; During Excavation monitoring of the turbine foundations as well as access roads and underground cables by a palaeontologist is recommended	Necessary	Archaeologist/heritage specialist, Environmental Officer, Site manager	Monthly (during construction)	Regular inspections by ECO Check site is kept tidy at all times. Monthly progress reports (during the construction phase) and final reports to be delivered to HWC by ECO
.Prevent loss of information through inadequate recording	Developer / Site manager / Archaeologist/heritage specialist, HWC	Any archaeological or historical material found accidentally must be reported to responsible Archaeologist/heritage specialist or HWC	Necessary Reports to be submitted to HWC	Environmental Officer/ Archaeologist/heritage specialist, HWC Site manager	As required	Check sites are recorded and photographs are taken. Reports to be peer reviewed

Prevent impact beyond areas requiring mitigation	Developer / Site manager Archaeologist/heritage specialist	Developer and Archaeologists/heritage / site manager specialist must indicate to contractors the area of work for the duration of the contract, including the access road to be used, construction lay-down areas, materials storage and delivery requirements, work stations, pedestrian routes and operational demarcation, etc.	During the planning, construction and operational phases	Environmental Officer Archaeologist/heritage specialist Site manager	Before start of construction	Maps to be signed off at the start of each contract Check contractor works within demarcated areas
Prevent damage to sites and deposits related to access roads	Contractor, Site manager, Developer	Only those roads agreed to between Developer, Archaeologist/ Heritage Specialist and Contractor, as described in the current layout, may be used during maintenance activities and day to day activities	During the planning, construction and operational phases	Contractor, Environmental Officer Site manager	Weekly	Environmental officer and site manager to check access roads regularly
Prevent un-coordinated movement that can lead to damage of sites and landscape	Contractor and Site manager	The contractor must ensure that all construction personnel, labourers and equipment remain within demarcated restoration sites at all times. Movement outside boundaries may be done only with permission from the ECO	Necessary	Site manager and Environmental Officer	Weekly	Check that all work is done within demarcated areas.
Reduce erosion caused by continuous use of paths	Contractor, Site manager	Confine pedestrian routes to paths.	Necessary	Site Manager, Environmental officer	Continuous and as and when required	Photographic evidence or no erosion

SECTION 8: DECOMMISSIONING PHASE MITIGATION MEASURES

Should the WEF be decommissioned a decommissioning plan must be produced. The plan must include details on the decommissioning and dismantling of the WEF, taking in consideration the potential environmental impact associated with it. Environmental monitoring plans must be produced so ensure no pollution occurs during this phase. The plan must include the steps that will be taken to rehabilitate the area after the WEF is dismantled, as well as recycling options of the equipment and structure

SPECIFIC FINAL PRE-CONSTRUCTION WALKTHROUGH MITIGATION MEASURES (2022): DECOMMISSIONING PHASE

8.1 AQUATIC ECOLOGY MITIGATION MEASURES

DECOMMISSIONING PHASE (INCLUDING THE FINAL PRE-CONSTRUCTION WALKTHROUGH; (2022))

: DECOMMISSIONING PHASE (INCLUDING THE FINAL PRE-CONSTRUCTION WALKTHROUGH; (2022)) **Impact management outcome:** Minimise Potential loss or degradation of nearby watercourses through inappropriate closure						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
Minimise loss or degradation of watercourses through inappropriate decommissioning practices	Decommissioning contractor	Develop and implement a rehabilitation and closure plan. Appropriately rehabilitate the project area by ripping, landscaping and re-vegetating with locally indigenous species	Decommissioning phase	Environmental Officer	Continuous and as and when required	Photographic evidence Rehabilitation plan monitored and implemented to satisfaction
Impact management outcome: Minimise disturbance to Aquatic systems						
Minimise disturbance to aquatic systems during decommissioning activities.	Project manager, Environmental Officer	Avoid the delineated watercourse and buffers areas except for limited watercourse crossings as per final layout. Aa no-go buffer of 30 m must be applied around them	Life of operation	Environmental Officer	Ongoing	Evidence buffers erected around drainage lines

8.2 TERRESTRIAL ECOLOGY MITIGATION MEASURES

DECOMMISSIONING PHASE (INCLUDING THE FINAL PRE-CONSTRUCTION WALKTHROUGH; (2022))

Impact management outcome: Minimise disturbance to Vegetation and Habitats						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
Minimise disturbance to vegetation and habitats during decommissioning activities	Project manager, Environmental Officer	Drainage lines must be avoided during decommissioning activities. A no-go buffer of 30m must be applied and demarcated around them	Decommissioning Phase	ECO	Ongoing	Evidence of buffers erected around drainage lines
Minimize fragmentation and disturbance to areas of indigenous vegetation, and secondary communities outside of the direct turbine footprint,	Project manager, Environmental Officer	It is recommended that areas to be decommissioned be specifically demarcated so that during the decommissioning phase, only the demarcated areas be impacted upon. All temporary disturbance footprints disturbed areas to be rehabilitated and landscaped after installation is complete Clearing of vegetation should be minimized and avoided where possible.	Decommissioning Phase	ECO	Ongoing	Evidence of areas of indigenous vegetation left undisturbed.

		All activities must be restricted to flat areas as far as possible. Rehabilitation of the disturbed areas existing in the project area must be made a priority. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type				
Prevent potential spillage, contamination of the soil of the surrounding environment	Environmental Officer & Contractor	A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers. Appropriately contain any generator diesel storage tanks, machinery	Decommissioning Phase	ECO	Ongoing	Monitoring of hydrocarbon spill management plan (Emergency Preparedness, Response and Fire Management Plan, Appendix K) and evidence of compliance to the plan. No hydrocarbon contamination

		spills (e.g., accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them leaking and entering the environment. Avail a spill kit for use when required Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment on site unless necessary All vehicles and equipment must be maintained, and all re-fueling and servicing of equipment is to take place off-site where possible, or within in specifically demarcated areas on-site				
Prevent illegal removal and clearing of protected species from site.	Project manager, Environmental Officer	It should be made an offence for any staff to take/ bring any plant species into/out of any portion of the project area.	Decommissioning Phase	ECO	Ongoing	Photographic evidence. Proof of no plant species taken in or out of the project area

		No plant species whether indigenous or exotic should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants Any individual of the protected plants that are present needs a relocation or destruction permit in order for any individual that may be removed or destroyed due to the development. If left undisturbed the sensitivity and importance of these species needs to be part of the environmental awareness program. Acquire relocation or destruction permit when required All protected and red-data plants should be relocated, and as many other geophytic species as possible. Decommissioning areas and routes where protected plants cannot be				

		avoided, these plants many being geophytes or small succulents should be removed from the soil and relocated/ re-planted in similar habitats where they should be able to resprout and flourish again. To the extent possible within construction timelines, the floral search and rescue operation must be undertaken before the end of February for the summer flowering species, and during August for the winter flowering species				
A fire management plan (Emergency Preparedness, Response and Fire Management Plan, Appendix K) needs to be complied and implemented to restrict the impact fire might have on the surrounding areas	Environmental Officer & Contractor	Develop and implement a fire management plan (Emergency Preparedness, Response and Fire Management Plan, Appendix K)	, Decommissioning Phase	ECO	Ongoing	Monitoring of fire management plan (Emergency Preparedness, Response and Fire Management Plan, Appendix K) and no fire recorded
Impact management outcome: Minimise disturbance to Fauna						
Prevent trapping, killing, or poisoning of wildlife	Environmental Officer/ Health	Signs must be put up to enforce and prohibit this;	Decommissioning Phase	ECO	Ongoing	No killings or trapping occurring.

	and Safety Officer					
All decommissioning and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife.	Project manager, Environmental Officer & Design Engineer	Speed limits must still be enforced to ensure that road killings, dust and erosion is limited, this is especially true due to the presence of the Verrox's Tent Tortoise's. The speed limits should be restricted to maximum 30 km/h	Decommissioning Phase	ECO/ Health and Safety Officer	Ongoing	Evidence of speed limits erected in place
Prevent mortality of fauna associated with driving at night	Project manager, Environmental Officer & Design Engineer	Driving on access roads at night should be restricted in order to reduce or prevent wildlife road mortalities which occur more frequently during this period. Limit night time driving on site as far as possible	Design Phase, Construction Phase, Operation Phase, Decommissioning Phase	ECO	Ongoing	Proof of activities scheduled away from migration, nesting and breeding seasons.
Reduce the risk of electrocution of fauna.	Environmental Officer & Contractor, Engineer	Ensure that cables and connections are insulated successfully to reduce electrocution risk	Decommissioning Phase	ECO	Ongoing	Evidence of proper insulation and no electrocutions recorded.
Impact management outcome: Minimise disturbance due to Alien species						
Minimise disturbance due to alien invasive species	Project manager, Environmental Officer & Contractor	The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. Footprint of the roads must be kept to prescribed widths.	Decommissioning phase	ECO	Decommissioning phase	No additional footprint visible to the project area

Impact management outcome: Minimise dust emissions						
Reduce dust emissions associated with decommissioning activities	Contractor	Dust-reducing mitigation measures must be put in place and must be strictly adhered to. Wetting of exposed soft soil surfaces, or other appropriate dust suppression techniques No non environmentally friendly suppressants may be used as this could result in pollution of water sources	Decommissioning Phase	ECO	Dust monitoring program	No complaints of dust
Impact management outcome: waste management						
Waste management must be a priority and all waste must be collected and stored adequately.	Environmental Officer, Contractor & Health and Safety Officer	The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility. Install specified bins for temporary waste storage Under no circumstances may domestic waste be burned on site. Refuse bins will be emptied and secured Temporary storage of	Decommissioning Phase Waste management plan must be and implemented	ECO/Contractor	Ongoing, every 10 days	Proof of waste collection Proof of sealed and marked bins

		domestic waste shall be in covered waste skips or other suitable containers. Restrict Maximum domestic waste storage period to 10 days.				Proof of regularly disposed waste within stipulated period.
Reduce litter, spills, fuels, chemicals and human waste in and around the project area	Environmental Officer, Contractor & Health and Safety Officer	Reduce litter, spills etc around the project area.	Decommissioning Phase	ECO	Daily	No excessive waste around the project area.
Sufficient toilets must be provided for on-site workers.	Environmental Officer, Contractor & Health and Safety Officer	Install or place one toilet for every 10 persons or as per the requirements of the Occupational Health and Safety Act. Portable toilets must be pumped dry to ensure the system does not degrade over time and spill into the surrounding area	Decommissioning Phase	ECO	Daily	Proof of sufficient toilets provided, and toilets kept in good order.
Impact management outcome: environmental awareness training						
All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area to inform contractors and site staff of	Health and Safety Officer	Conduct environmental awareness training	Decommissioning Phase	ECO	Ongoing	Proof of training conducted

the presence of Red / Orange List species, their identification, conservation status and importance, biology, habitat requirements and management requirements the Environmental Authorisation and within the EMPr. The avoidance and protection of the very high sensitivity areas must be included into a site induction. Contractors and employees must all undergo the induction and made aware of the "no-go" to be avoided.						
Impact management outcome: Minimise Erosion						
Minimise erosion associated with driving at high speed.	Project manager, Environmental Officer	Speed limits of 30 km/h must be put in place to reduce erosion. Reducing the dust generated by the listed activities above, especially the earth moving machinery, through wetting the soil surface (or other suitable dust suppression measures) and putting up signs to enforce speed limit as well as speed bumps built to force slow speeds; Signs must be put up to enforce this.	Decommissioning Phase	ECO	Ongoing	Proof of no dust generated

Reduce erosion caused by continuous use of paths.	Project manager, Environmental Officer	Where possible, existing access routes and walking paths must be made use of	, Decommissioning Phase	ECO	Ongoing	Evidence of access routes made use of.
Prevent erosion of denuded areas	Project manager, Environmental Officer	Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood and wind events Assess the state of rehabilitation and encroachment of alien vegetation Livestock should be kept out of areas that have been recently re-planted until these areas are well established	Decommissioning Phase	ECO	Progressively	Photographic evidence. Proof of revegetation
A stormwater management plan must be compiled and implemented	Project manager, Environmental Officer	Implement the stormwater management plan	Design Phase, Construction Phase, Operation Phase, Decommissioning Phase	ECO	Before construction phase: Ongoing	Monitoring of stormwater management and evidence of compliance to the plan

8.3 AVIFAUNA MITIGATION MEASURES

DECOMMISSIONING PHASE (INCLUDING THE FINAL PRE-CONSTRUCTION WALKTHROUGH; (2022)

Impact management outcome: Minimise disturbance to Avifauna						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
Minimise disturbance to Avifauna during the decommissioning phase	Contractor and ECO	Action all mitigation measures as prescribed in the EMPr compiled in 2015 and 2020 by Arcus as per Table 6:1 . Unless agreed otherwise with the avifaunal specialist contracted to the project, based on best available information at the time	Decommissioning	Contractor and ECO	Ongoing	Monitoring and audit of EMPr throughout the life of the project. Minimum non-compliance from audits

8.4 HERITAGE & PALAEONTOLOGICAL MITIGATION MEASURES DECOMMISSIONING PHASE (INCLUDING THE FINAL PRE-CONSTRUCTION WALKTHROUGH; (2022))

Impact management outcome: Minimise disturbance to heritage resources						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
A management plan for the heritage resources has been compiled and needs to be submitted for approval by HWC and SAHRA for implementation during construction and operations. Identify Rock Engravings (U0002) as no-go areas.	Heritage specialist, Contractor and Site Environmental Officer	Submit the management plan for approval by HWC. This management plan for the heritage resources needs to be approved for implementation during construction and operations.	Decommissioning	ECO	Monthly	Implementation of the e management plan and proof of compliance to the management through monitoring audits.
The Heritage Management Plan (HMP) needs to be implemented during construction and operations as part of the EMPr.	Relevant Heritage specialist, Contractor and Site Environmental Officer	Fully comply to and implement the (HMP)	decommissioning	ECO	Monthly	Implementation of the heritage management plan and proof of compliance to the management through monitoring audits.
Prevent damage to the site by inexperienced contractors.	Developer Site Environmental Officer	Appoint experienced project and contractors in agreement with the TOR and management plans to be implemented for the project	To comply with project time frames	Site Manager ECO	As required	Evaluate applicants according to previous experience. Proof of experienced contractors awarded tenders.

SECTION 9: CONCLUSION

In terms of the National Environmental Management Act 107 of 1998 everyone is required to take reasonable measures to ensure that they do not pollute the environment. Reasonable measures include informing and educating employees about the environmental risks of their work and training them to operate in an environmentally acceptable manner.

Furthermore, in terms of the 'Act', the cost to repair any environmental damage shall be borne by the person responsible for the damage.

It is therefore imperative that the management plan is successfully implemented, as a failure to comply could have legal implications.
The environmental impacts on the site will not be significant if the construction management is well implemented, and a set of operational guidelines are developed by the long-term site management body.

APPENDICES

Appendix A: Company profile & Curricula Vitae of EAP
Appendix B: Bird Monitoring
Appendix C; Heritage Sites
Appendix D: Grievance Mechanism for Public Complaints and Issues
Appendix E: Alien Invasive Management Plan
Appendix F: Plant Rescue and Protection Plan
Appendix G: Re-vegetation and habitat Rehabilitation Plan
Appendix H: Erosion Management Plan
Appendix I: Stormwater Management and wash water Management Plan
Appendix J: Waste Management Plan
Appendix K: Emergency Preparedness, Response and Fire Management Plan
Appendix L: Key Legislation
Appendix M: Chance Find Procedure
Appendix N: Traffic Management Plan
Appendix O: Bat Operational Monitoring Programme

SPECIALIST FINAL WALKTHROUGH REPORTS:

Appendix A1: Terrestrial Ecology Pre-Construction Walkthrough
Appendix B1: Aquatic Ecology Pre-Construction Walkthrough
Appendix C1: Avifauna Pre-Construction Walkthrough
Appendix D1: Bat Pre- Construction Walkthrough
Appendix E1: Heritage Pre-Construction Walkthrough
Appendix E2: Palaeontological Pre-Construction Walkthrough