NGXWABANGU WIND ENERGY FACILITY (WEF) AND ASSOCIATED INFRASTRUCTURE NEAR COFIMBAVA, EASTERN CAPE PROVINCE

STORMBERG REDZ

DFFE Reference Number: TBA
DFFE Pre-Application Reference: 2022-11-0011

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

PREPARED FOR:

NGXWABANGU WIND POWER (PTY) LTD
Waterfront Business Park, Building 4, First Floor,
1204 Humerail Road, Humerail, 6001
+27 (0)41 506 4900

PREPARED BY:

GRAHAMSTOWN/MAKHANDA BRANCH
67 African Street, Grahamstown, 6139
☎ +27 (0)46 622 2364
✉ a.carter@cesnet.co.za | c.evans@cesnet.co.za
CES also has offices in East London, Gqeberha (Port Elizabeth), Cape Town, Johannesburg and Maputo (Mozambique)
www.cesnet.co.za

MAY 2023

This Report should be cited as follows: *Draft Environmental Management Programme: Ngxwabangu Wind Energy Facility near Cofimvaba, Eastern Cape Province. May 2023.*

CES
ENVIRONMENTAL AND SOCIAL ADVISORY SERVICES

REPORT TITLE:

NXGWABANGU WIND ENERGY FACILITY AND ASSOCIATED INFRASTRUCTURE:

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

REPORT VERSION:

DRAFT

NAME (CES)	RESPONSIBILITY	DATE
Dr Alan Carter	EAP and Quality Control	May 2023
Ms Caroline Evans	Input and EMPr	May 2023
Ms Robyn Thomson	Input and EMPr	May 2023

DEFINITIONS

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

TERMS	DESCRIPTION
Alien Vegetation	Alien vegetation is defined as undesirable plant growth which shall include, but not be limited to all declared category 1 and 2 listed invader species as set out in the Conservation of Agricultural Resources Act (CARA) regulations. Other vegetation deemed to be alien shall be those plant species that show the potential to occupy in number, any area within the defined construction area and which are declared to be undesirable. This includes plant species identified as Alien and invasive species in the National Environmental Management Biodiversity Act of 2004, Alien and Invasive Species Regulations, 2014.
Cement-laden water	Cement laden water refers to water containing cement or concrete arising from the Contractor's activities.
Contaminated water	Contaminate water refers to water that has been contaminated by the Contractor's activities such as with hazardous substances, hydrocarbons, paints, solvents and runoff from plant, workshop or personnel wash areas but excludes water containing cement/ concrete or silt.
Construction Camp	Construction camp (site camps) refers to all storage and stockpile sites, site offices, container sites, workshops and testing facilities and other areas required to undertake construction activities.
Environment	Environment refers to the surroundings within which humans exist and that could be 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 Aspect	An environmental aspect is any component of a Contractor's construction activity that is likely to interact with the environment.
Environmental Authorisation (EA)	An Environmental Authorisation (EA) refers to a written statement from the relevant environmental authority, with or without conditions, that records the approval (partial approval or refusal) of a proposed project and the mitigating measures required to prevent or reduce the effects of environmental impacts during the lifespan of a contract.
Environmental Control Officer (ECO)	An Environmental Control Officer (ECO) refers to a suitably qualified and experienced person or entity appointed for the construction and/or operation of works, to perform the obligations specified in the EA.
Environmental Impact	An impact or environmental impact is the change to the environment, whether desirable or undesirable, that will result from the effect of a construction activity. An impact may be the direct or indirect consequence of a construction activity.
Environmental Management Plan/Programme (EMP/EMPr)	An Environmental Management Plan (EMP) or Programme (EMPr) is an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning specific to a project are prevented; and that the positive benefits of the project are enhanced.

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

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

TABLE OF CONTENTS

1 INTRODUCTION

1.1 PROJECT DESCRIPTION

Ngxwabangu Wind Power (Pty) Ltd., a subsidiary of EDF Renewables South Africa (Pty) Ltd. plans to develop, construct and operate a Wind Energy Facility (WEF) approximately 15 km North of Cofimvaba in the Eastern Cape Province. The project site is situated in the Intsika Yethu Local Municipality (LM) which forms part of the Chris Hani District Municipality (DM). The proposed Ngxwabangu WEF is situated within the Stormberg Renewable Energy Development Zone (REDZ4) which was promulgated in GN R. 840 for large scale wind and solar photovoltaic energy facilities.

The proposed Ngxwabangu WEF will consist of up to 36 turbines, with a total facility output of up to 260MW. The WEF will also include up to four (4) 33kV medium voltage internal collector substations (SS), two (2) 33kV medium voltage underground powerlines of up to 6km and 9km in length (two alternatives), a 33 kV medium voltage Overhead Line (OHL) of approximately 12km to connect the northern section to the southern section of the site, an IPP SS (two alternatives) which will include a 33kV/132kV Switching Station area in order to connect the WEF to the existing Eskom Substation via a 132kV OHL (two alternatives). The WEF will also include a Battery Energy Storage System (BESS) (two alternatives), temporary and permanent laydown areas, a Concrete Tower Manufacturing Facility (CTMF), a Construction Compound (CC), and access roads. The construction footprint of the proposed WEF will be up to 209 ha (inclusive of roads), rehabilitated to an operational footprint of up to 118 ha (inclusive of roads). Please see Figure 1-1 for the layout map.

In summary, the proposed Ngxwabangu WEF will include:

- Up to 36 turbines with a maximum nominal power output of up to 260MW.
- The proposed WEF will include turbines with a hub height of up to 130m, a rotor diameter of up to 170m, blade length of up to 85m, and a maximum tip height of up to 215m and a lower tip height of 30m.
- Permanent laydown areas adjacent to each wind turbine (up to 4 000 m^2).
- Temporary laydown areas adjacent to each wind turbine (up to 3 150 m^2).
- Foundations (up to 900 m^2) for each wind turbine.
- An IPP Substation of up to 4ha (inclusive of a 33/132kV Eskom Substation, offices and parking and a permanent Substation laydown area). Two alternatives are proposed:
  - IPP Substation Alternative 1: situated in southern area.
  - IPP Substation Alternative 2: situated in the northern area. This is the preferred alternative.
- Four (4) Collector Substations of up 3ha each (33kV). Two (2) of the Collector Substations are situated within the western cluster of turbines and two (2) of the Collector Substations are situated within the eastern cluster of turbines.
- Temporary Laydown Area, Temporary Buffer Yard, Temporary Batching Plant, Temporary CTMF and Temporary Site Camp (Construction Compound) of up to 9ha.
- BESS of up to 3ha. Two alternatives are proposed:
  - BESS Alternative 1: Situated adjacent to the southern IPP Substation (Alternative 1).
  - BESS Alternative 2: Situated adjacent to the northern IPP Substation (Alternative 2). This is the preferred alternative.
- Two (2) medium voltage underground powerlines (up to 33kV) between the Collector Substation and the IPP Substation of up to 6km and 9km in length. Two alternatives are proposed:
  - 33kV Powerline Alternative 1: Connecting the Northern and Eastern Collector Substations to the southern IPP Substation (Alternative 1).
  - 33kV Powerline Alternative 2: Connecting the Northern and Eastern Collector Substations to the northern IPP Substation (Alternative 2). This is the preferred alternative.
- A 33kV medium voltage OHL of approximately 12km to connect the northern section to the southern section of the site.
- Ngxwabangu WEF will require Grid Infrastructure in order to connect to the existing Eskom Grid network. This is proposed via a 132kV OHL from the proposed onsite IPP Substation (33/132kV) to the existing

Qolweni Substation. The proposed OHL will be strung with a single circuit tern conductor, up to 22km in length. Four alternatives are being considered.

- Alternative 1a is proposed from the southern IPP Substation (Alternative 1). This OHL is 132kV and is up to 20km in length.
- Alternative 1b is proposed from the southern IPP Substation (Alternative 1). This OHL is 132kV and is up to 20km in length.
- Alternative 2a is proposed from the northern IPP Substation (Alternative 2). This OHL is 132kV and is up to 20km in length. This is the preferred alternative (2a)
- Alternative 2b is proposed from the northern IPP Substation (Alternative 2). This OHL is 132kV and is up to 20km in length.

- Medium voltage cabling (up to 33kV) between turbines and the collector substations, to be laid underground and along roads, where technically feasible.
- Internal access roads of up 101km constructed at up to 15m wide (construction phase), rehabilitated to 8m wide (operational phase). Existing roads will be used as far as possible. However, where required, internal access roads will be constructed between the turbines.

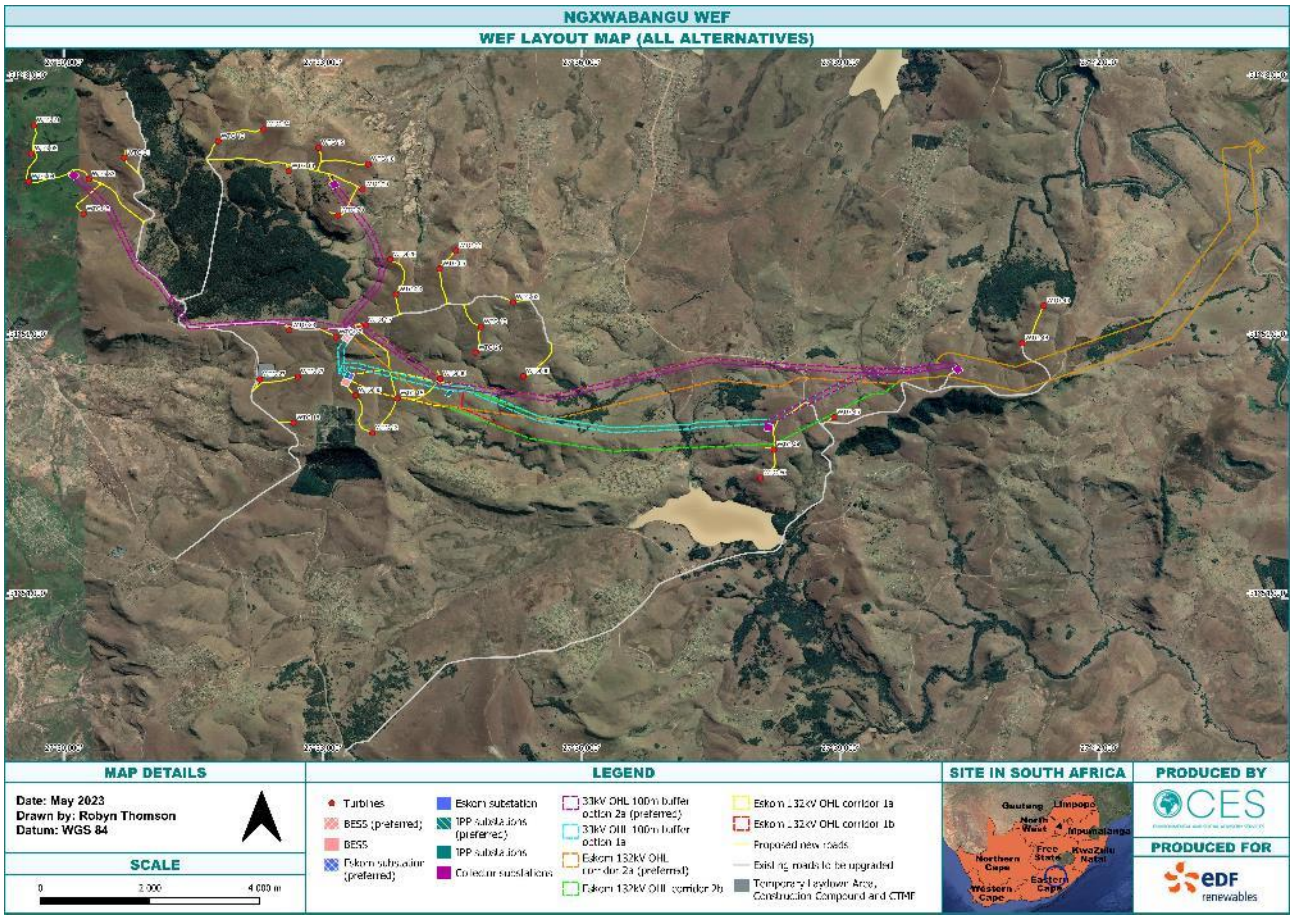

Figure 1-1: Layout Map of the Proposed Ngxwabangu WEF and Associated Infrastructure.

CES has been appointed by Ngxwabangu Wind Power as the Environmental Assessment Practitioner (EAP) to conduct the necessary BA Process for the project in terms of the National Environmental Management Act (NEMA, Act No. 107 of 1998 and subsequent amendments) EIA Regulations (2014, as amended).

The turbine footprints and associated facility infrastructure (internal access roads, substations, construction compound, batching plant and operations building) will potentially cover a total combined area of approximately 209 ha during the construction phase. This footprint will be reduced through rehabilitation, resulting in a maximum final total combined footprint of approximately 118 ha.

The footprint of the facility is calculated as follows:

Table 1-1: Construction Footprint of the Ngxwabangu WEF.

FACILITY COMPONENT	CONSTRUCTION FOOTPRINT (PRE-MITIGATION)	OPERATIONAL FOOTPRINT (POST-MITIGATION)
Permanent Turbine Laydown Area	TOTAL 4 000 m^2 x 36 turbines = 144 000 m^2 which equates to **14.400 ha**	TOTAL 4 000 m^2 x 36 turbines = 144 000 m^2 which equates to **14.400 ha**
Permanent Turbine Foundation Area	TOTAL Up to 900m^2 x 36 turbines = 32 400 m^2 which equates to **3.240 ha**	TOTAL Up to 900m^2 x 36 turbines = 32 400 m^2 which equates to **3.240 ha**
Permanent Turbine Transformer Area	TOTAL Up to 25m^2 x 36 turbines = 900 m^2 which equates to **0.090 ha**	TOTAL Up to 25m^2 x 36 turbines = 900 m^2 which equates to **0.090 ha**
Permanent BESS Area	TOTAL Up to 30 000m^2 which equates to **3.000 ha**	TOTAL Up to 30 000m^2 which equates to **3.000 ha**
Permanent IPP Substation (including a 33/132kV Switching Station)	TOTAL Up to 40 000m^2 = 40 000 m^2 which equates to **4.000 ha**	TOTAL Up to 40 000m^2 = 40 000 m^2 which equates to **4.000 ha**
Permanent Collector Substations (33kV)	TOTAL Up to 30 000m^2 x 4 = 120 000 m^2 which equates to **12.000 ha**	TOTAL Up to 30 000m^2 x 4 = 120 000 m^2 which equates to **12.000 ha**
Permanent WEF Gatehouse	TOTAL Up to 40m^2 which equates to **0.004 ha**	TOTAL Up to 40m^2 which equates to **0.004 ha**
Temporary Turbine Laydown Area	TOTAL 3 150 m^2 x 36 turbines = 113 400 m^2 which equates to **11.340 ha**	TOTAL 0 m^2 x 36 turbines = 0m^2 which equates to **0.000 ha**
Temporary WEF Site Camp **Temporary WEF Laydown Area** **Temporary WEF CTMF Area** **Temporary Buffer Yard** **Temporary WEF Batching Plant**	TOTAL Up to 90 000m^2 which equates to **9.000 ha**	TOTAL Up to 0m^2 which equates to **0.000 ha**
New Internal Access Roads (15 m construction, rehabilitated to 8 m during operation)	TOTAL Up to 57 000 m x 15m = 855 000 m^2 which equates to **85.500 ha**	TOTAL Up to 57 000 m x 8m = 456 000 m^2 which equates to **45.600 ha**
Upgraded Existing Internal Access Roads (15 m construction, rehabilitated to 8 m during operation)	TOTAL Up to 44 000 m x 15m = 660 000 m^2 which equates to **66.000 ha**	TOTAL Up to 44 000 m x 8m = 352 000 m^2 which equates to **35.200 ha**
TOTAL FOOTPRINT:	**Up to 57.074 ha** ***of clearing needed for the construction phase of the development of the proposed WEF (excluding roads)*** **Up to 208.574 ha** ***of clearing needed for the construction phase of the development of the proposed WEF (including roads)***	**Up to 36.734 ha** ***of clearing remaining during the post-construction operational phase (after rehabilitation) of the proposed WEF (excluding roads)*** **Up to 117.534 ha** ***of clearing remaining during the post-construction operational phase (after rehabilitation) of the proposed WEF (including roads)***

In summary, the Ngxwabangu WEF includes the following dimensions of WEF design specifications (Table 1-2)

Table 1-2: Ngxwabangu WEF Design Specifications.

NGXWABANGU WEF DESIGN SPECIFICATIONS	
Number of turbines	Up to 36
Power output per turbine	Unspecified
Facility output	Up to 260 MW

Turbine hub height	Up to 130 m
Turbine rotor diameter	Up to 170 m
Turbine blade length	Up to 85 m
Turbine upper tip height	Up to 215 m
Turbine lower tip height	30 m
IPP Substations (SS)	33kV
Collector Substations (SS)	33kV
Eskom Substation (SS)	33/132kV
Connecting Overhead Line (OHL)	Up to 132kV
Length of Connecting OHL	Up to 22 km
Conductor Type of OHL	Tern Conductor
Tower Type of OHL	Monopole and/or Lattice Structures
Connecting Cabling	33kV (underground, where technically feasible)
Access Roads	Two Access Points
Main Facility Roads	15 m (construction phase), to be rehabilitated to 8m (operational phase)
OHL Service Road	Up to 3 m jeep track
BESS Technology	Solid State (Li-Ion) or REDOX-Flow
REDZ	Stormberg

~~The project will also require grid connection infrastructure. Due to the fact that this infrastructure will be owned and managed by Eskom, should the project receive Environmental Authorisation and be selected as a preferred bidder, it has been assessed in a separate report. The information regarding the grid infrastructure has not been assessed or included in this report.~~

1.2 OBJECTIVES OF THE EMPR

This ~~Environmental Management Programme (~~EMPr~~)~~ has been compiled to provide mitigation, monitoring and institutional measures to be taken during the construction and operation of the Ngxwabangu WEF and Associated Infrastructure near Cofimvaba in the Eastern Cape Province. These measures aim to eliminate, offset and/or reduce adverse environmental and social impacts.

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

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

The general objectives of the EMPr are to:

- Ensure compliance with the regulatory authority stipulations and guidelines which could be local, provincial, national and/or international;
- Ensure that there is sufficient allocation of resources on the project budget so that the scale of EMPr-related activities is consistent with the significance of project impacts;
- Verify environmental performance through information on impacts as they occur;
- Respond to unforeseen events;
- Provide feedback for continual improvement in environmental performance;
- Identify a range of mitigation measures which could reduce and mitigate the potential impacts to minimal or insignificant levels;
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project;
- Identify measures which could optimize beneficial impacts;

- Create management structures which address the concerns and complaints of I&APs relating to the development;
- Establish a method of monitoring and auditing environmental management practices during all phases of the activity;
- Ensure that safety recommendations are complied with; and
- Specify time periods within which the measures contemplated in the final EMPr must be implemented, where appropriate.

1.3 STRUCTURE AND FUNCTION OF THE EMPR

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

As such, the EMPr provides specifications which must be adhered to in order to minimise adverse environmental and social impacts associated with the construction and operation of the Ngxwabangu WEF. The contents of the EMPr are consistent with the requirements as set out in Appendix 4 of the ~~National Environmental Management Act (~~NEMA~~)~~ (Act No. 107 of 1998, as amended) ~~Environmental Impact Assessment (~~EIA~~)~~ Regulations (2014, as amended ~~and subsequent 2017 amendments~~), as stipulated below.

REQUIREMENTS OF AN ENVIRONMENTAL MANAGEMENT PROGRAMME IN TERMS OF APPENDIX 4 OF GN R. 982 ~~(GN R. 326, 2017)~~
(1) An EMPr must comply with Section 24(N) of the Act and include - (a) Details of – (i) The EAP who prepared the EMPr; and (ii) The expertise of the EAP to prepare an EMPr, including a curriculum vitae; (b) A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description; (c) A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers; (d) A description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including – (i) Planning and design; (ii) Pre-construction activities; (iii) Construction activities; (iv) Rehabilitation of the environment after construction and where applicable post closure; and (v) Where relevant, operation activities; (f) A description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable include actions to – (i) Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) Comply with any prescribed environmental management standards or practices; (iii) Comply with any applicable provisions of the Act regarding closure, where applicable; (iv) Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;

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

(2) Where a government notice *gazetted* by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.

1.4 LEGAL REQUIREMENTS

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

The Contractor must identify and comply with all relevant South African national and provincial environmental legislation, including associated regulations and all local by-laws relevant to the project. Key legislation currently applicable to the phases of the project must be complied with. The list of applicable legislation provided in Table 1-3 below is intended to serve as a guideline only and is not exhaustive.

Table 1-3: Relevant Legislation, Policies and Guidelines.

TITLE OF LEGISLATION, POLICY OR GUIDELINE:	DATE:
National Environmental Management Act (NEMA) (Act No. 107 of 1998) and its subsequent amendments	1998 and 2014 amendments
National Environmental Management Act (NEMA) (Act No. 107 of 1998) Environmental Impact Assessment (EIA) Regulations (2014, as amended)	2014, and 2017 and 2021 amendments
The Constitution Act (Act No. 108 of 1996)	1996
National Heritage Resources Act (NHRA) (Act No. 25 of 1999)	1999
National Water Act (NWA) (Act No. 36 of 1998) and its subsequent amendments	1998
National Environmental Management: Waste Act (NEMWA) (Act No. 59 of 2008) and its subsequent amendments	2008
National Environmental Management: Protected Areas Amendment Act (NEMPAA) (Act No. 31 of 2004)	2004
National Environmental Management: Air Quality Act (NEMAQA) (Act No. 39 of 2004) and its subsequent amendments	2004
Conservation of Agricultural Resources Act (CARA) (Act No. 43 of 1983)	1983

TITLE OF LEGISLATION, POLICY OR GUIDELINE:	DATE:
National Environmental Management: Biodiversity Act (NEMBA) (Act No. 10 of 2004)	2004
National Forest Act (NFA) (Act No. 84 of 1998) and its subsequent amendments	1998
National Environmental Management: Biodiversity Act, Alien and Invasive Species Regulations (2014)	2014
Occupational Health and Safety Act (OHSA) (Act No. 85 of 1993)	1993
Hazardous Substances Act (HSA) (Act No. 15 of 1973)	1973
Spatial Planning and Land Use Management Act (SPLUMA) (Act No. 16 of 2013)	2013
Electricity Regulation Act (Act No. 4 of 2006) and its subsequent amendments	2006
Aviation Act (Act No. 74 of 1962): 13th Amendment of the Civil Aviation Regulations 1997, dated 2008	1962, 1997 and 2008
Minerals and Petroleum Resources Development Act (MPRDA) (Act No. 28 of 2002) and subsequent 2013 amendments	2002 and 2013 amendments
Subdivision of Agricultural Land Act (Act No. 70 of 1970)	1970
National Road Traffic Act (NRTA) (Act No. 39 of 1996)	1996
National Veld and Forest Fire Act (Act No. 101 of 1998)	1998
Environment Conservation Act (ECA) (Act No. 73 of 1989) Noise Control Regulations	1989
Telecommunication Act (1966)	1966
Provincial Nature and Environmental Conservation Ordinance (No. 19 of 1974)	1974
Local Municipality: Land Rezoning Permit. LUPO Ordinance (No. 15 of 1985)	1985
National Energy Regulator of South Africa (NERSA): Generation License	
Eskom: Connection agreement and Power Purchase Agreement (PPA)	
Intsika Yethu Local Municipality Spatial Development Framework (SDF), Integrated Development Plan (IDP) and municipal by-laws	
Chris Hani District Municipality SDF and IDP	

1.5 ENVIRONMENTAL AUTHORISATION

In accordance with the requirements of the NEMA EIA Regulations (2014, as amended), and due to the fact that the proposed Ngxwabangu WEF is situated within the Stormberg REDZ, the proposed WEF and associated infrastructure has been subjected to a Basic Assessment (BA) Process.

In terms of the BA Process, all reports generated from the environmental studies form part of a series of documents for the project. The Basic Assessment Report (BAR) identified potentially significant environmental and social impacts and was the main report in the series. Additional specialist assessments serve to supplement the assessment contained in the BAR.

This EMPr interprets the findings of the BAR and prescribes project-specific specifications to be achieved. The EMPr is a progressive working document which will be updated based on the relevant conditions stipulated in the ~~Environmental Authorisation (~~EA~~)~~. The EMPr will then be submitted to DFFE (along with the final layout) for approval prior to the commencement of construction.

2 DETAILS OF THE EAP AND ENVIRONMENTAL ASSESSMENT TEAM

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

NEMA registered Company: Coastal and Environmental Services (Pty) Ltd, trading as CES.

Contact Person: Ms Caroline Evans

Physical Address: 67 African Street, Makhanda (Grahamstown), 6140 (Grahamstown Branch)

Postal Address: P.O. Box 934, ~~Grahamstown~~Makhanda, 6140

Telephone: +27 (0)46 622 2364

Website: www.cesnet.co.za

Email: c.evans@cesnet.co.za | a.carter@cesnet.co.za

DR ALAN CARTER

Alan has extensive training and experience in both financial accounting and environmental science disciplines with international accounting firms in South Africa and the USA. He is a member of the American Institute of Certified Public Accountants (licensed in Texas) and holds a PhD in Plant Sciences. Alan has been responsible for leading and managing numerous and varied consulting projects over the past 25 years. He is a registered professional with the South African Council for Natural Scientific Professionals (SACNASP) and with the Environmental Assessment Practitioners Association of South Africa (EAPASA). Alan has led large scale EIAs for 20+ wind and solar energy projects.

MS CAROLINE EVANS

Caroline Evans is a Principal Environmental Consultant with more than eight (8) years' experience and based in the Grahamstown branch. She holds a BSc degree in Zoology and Environmental Science (with distinction) and a BSc Honours degree in Environmental Science (with distinction), both from Rhodes University. Caroline has completed accredited courses in environmental impact assessments and wetland assessments. Caroline's primary focuses include Project Management, the general Environmental Impact Assessment Process, Visual Impact Assessments and Wetland Impact Assessments. Examples of fields in which Caroline was the project manager and lead report writer include Wind Energy Facilities and the associated infrastructure (including powerlines), Solar PV, Wastewater Treatment Works, Housing Developments and Agricultural Developments. Her experience with wind energy facilities and associated infrastructure includes the project management and report writing for the Umsobomvu WEF, Dassiesridge WEF, Scarlet Ibis WEF, Waaihoek WEF and the Great Kei WEF. Caroline is well versed in South African policy and legislation relating to development, particularly in the Eastern Cape Province. In addition, Caroline's project management experience has helped her gain knowledge and experience in the technical and financial management and coordination of large specialist teams, competent authority and stakeholder engagement, and client liaison.

MS ROBYN THOMSON

Robyn Thomson is a Principal Environmental Consultant with 16 Years's experience. She holds a BSc degree with majors in Archaeology, Environmental and Geographical Science, as well as a BSc Honours in Environmental Science from the University of Cape Town and Rhodes University respectively. Robyn's key experience includes renewable energy developments, linear developments, residential developments and mining developments, with her main interest being on renewable energy. Her areas of expertise include project management, basic assessment processes, scoping and EIA process, the environmental authorisation (EA) amendment processes, the public participation process (PPP), water use licence applications and associated reports, and GIS mapping. Robyn completed both the Introduction to Environmental Impact Assessment Procedure and Introduction to Environmental Risk Assessment Short Courses by Coastal and Environmental Services and the Department of Environmental Science, Rhodes University, respectively. In addition, Robyn is a member of the International Association for Impact Assessment (IAIA). Her experience

with renewable energy facilities and associated infrastructure includes the management and report writing for various components of the Chaba, Haga Haga, and Great Kei WEFs in the Great Kei LM, Albany WEF in the Makana LM, and ~~Ngxawabangu~~Ngxwabangu WEF in the Intsika Yethu LM, Eastern Cape; the Waaihoek WEF in the Emadlangeni LM, Kwa-Zulu Natal; and the Soyuz WEFs in the Pixley Ka Seme DM, Northern Cape.

3 PROPOSED ACTIVITY

3.1 DESCRIPTION OF THE PROPOSED ACTIVITY

The proposed Ngxwabangu WEF will consist of up to 36 turbines, with a total facility output of up to 260MW. The WEF will also include up to four (4) 33kV medium voltage internal collector substations (SS), two (2) 33kV medium voltage underground powerlines of up to 6km and 9km in length (two alternatives), a 33 kV medium voltage OHL of approximately 12km to connect the northern section to the southern section of the site, an IPP SS (two alternatives) which will include a 33kV/132kV Switching Station area in order to connect the WEF to the existing Eskom Substation via a 132kV OHL (two alternatives). The WEF will also include a BESS (two alternatives), temporary and permanent laydown areas, a CTMF, a CC, and access roads. The construction footprint of the proposed WEF will be up to 209 ha (inclusive of roads), rehabilitated to an operational footprint of up to 118 ha (inclusive of roads). Please see Figure 3-1 for the layout map.

Please refer to Appendix E for the Sensitivity Map, which consists of the proposed layout preferred alternatives (2023) superimposed on the identified site sensitivity.

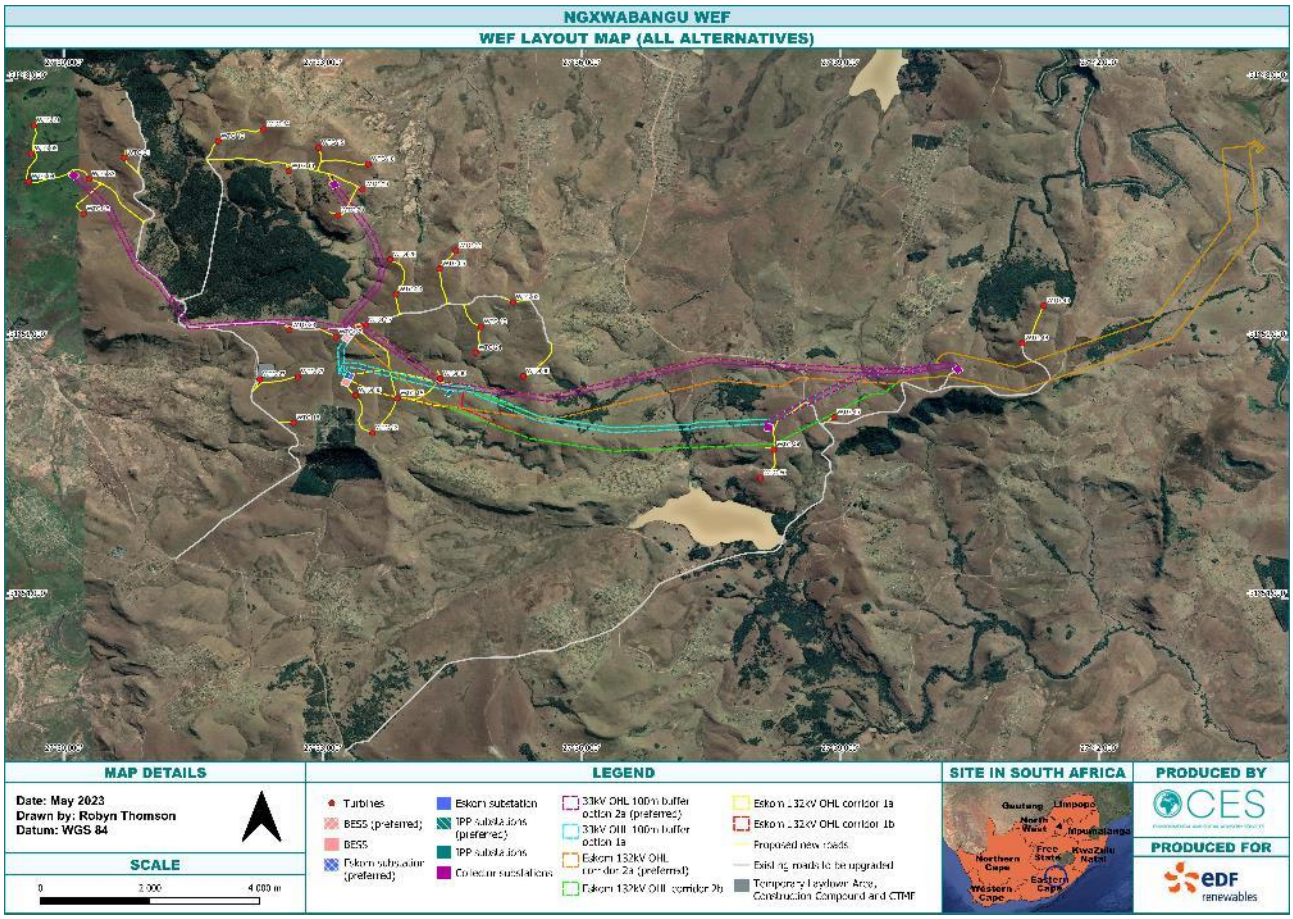

Figure 3-1: Layout Map of the Ngxwabangu WEF and Associated Infrastructure

3.2 PROJECT LOCALITY

Ngxwabangu Wind Power (Pty) Ltd., a subsidiary of EDF Renewables South Africa (Pty) Ltd. plans to develop, construct and operate a WEF approximately 15 km North of Cofimvaba in the Eastern Cape Province. The project site is situated in the Intsika Yethu LM which forms part of the Chris Hani DM. Table 3-1 indicates the towns in the vicinity of the proposed site and Table 3-2 lists the affected properties. The study site is approximately 29 000 ha in extent, of which the Ngxwabangu WEF and associated infrastructure will cover a

total combined area of ~209 ha during the construction phase, rehabilitated to ~118ha for the operational phase.

Table 3-1: Towns in the vicinity of the Ngxwabangu WEF.

TOWN NAME	APPROXIMATE DISTANCE	DIRECTION
Cofimvaba	15 km	South
Qamata	20 km	Southwest
Komani	40 km	West

Table 3-2: Ngxwabangu WEF Properties.

NGXWABANGU WIND ENERGY FACILITY			
FARM NAME	**SG DIGIT NUMBER**	**FARM NUMBER/PORTION**	**AREA (HA)**
Nququ Plantation	**C10600000000006600000**	Portion 0 of Farm 66	1 390
Lower Nququ	**C10600000000009500000**	Portion 0 of Farm 95	4 605
Farm 98	**C10600000000009800000**	Portion 0 of Farm 98	2 589
Mcambalala	**C10600000000010100000**	Portion 0 of Farm 101	3 048
Farm 123	**C10600000000012300000**	Portion 0 of Farm 123	885
Ngxwabangu	**C10600000000017000000**	Portion 0 of Farm 170	3 110
Ngcagca	**C10600000000018100000**	Portion 0 of Farm 181	1450
Upper Ncuncuzo	**C10600000000018400000**	Portion 0 of Farm 184	2 284
Ncuncuzo	**C10600000000018300000**	Portion 0 of Farm 183	5 674
Mtshanyana	**C10600000000018800000**	Portion 0 of Farm 188	3 723
		TOTAL	**28 758**

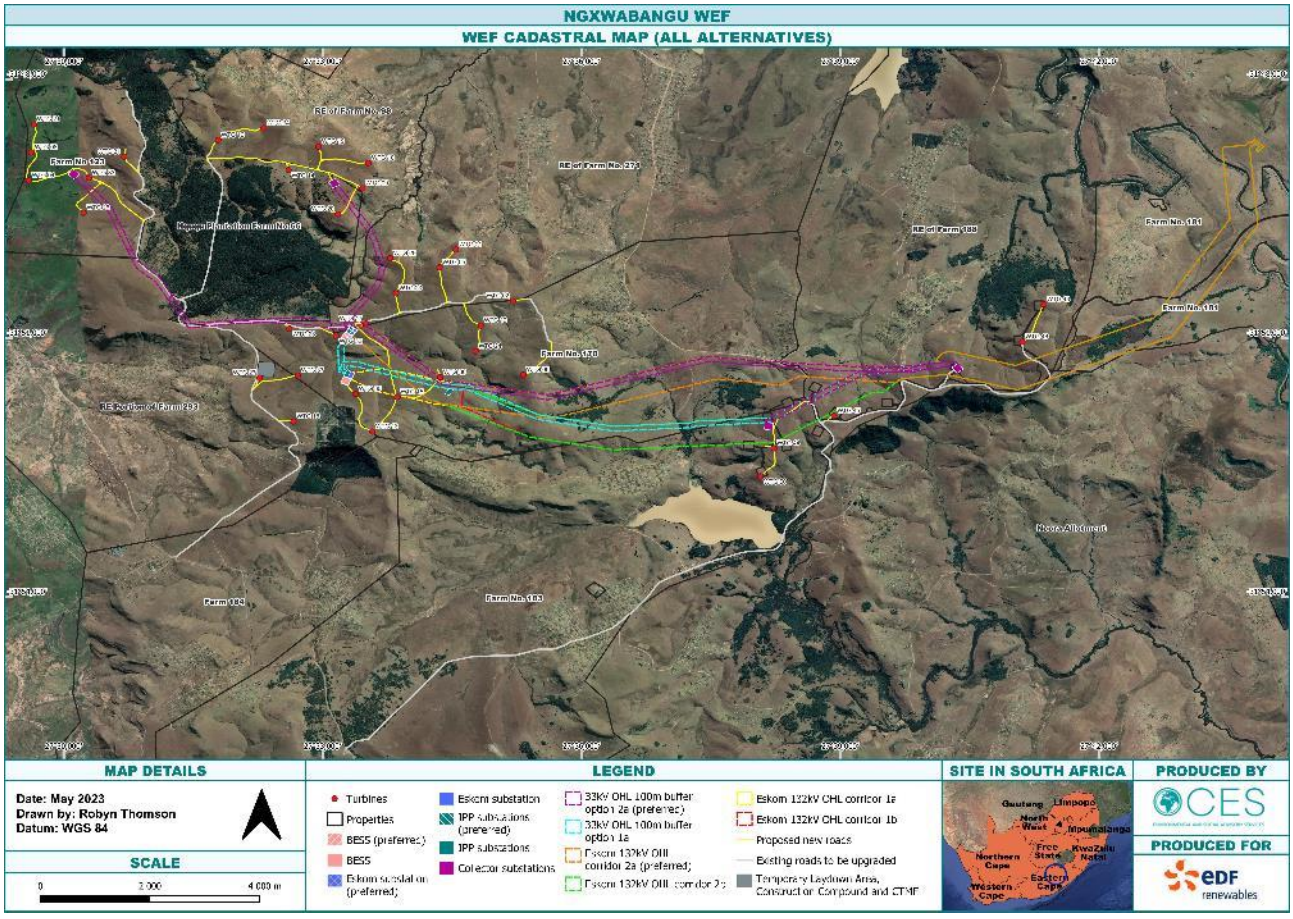

Figure 3-2: Cadastral Map of the Affected Properties within the Proposed Site.

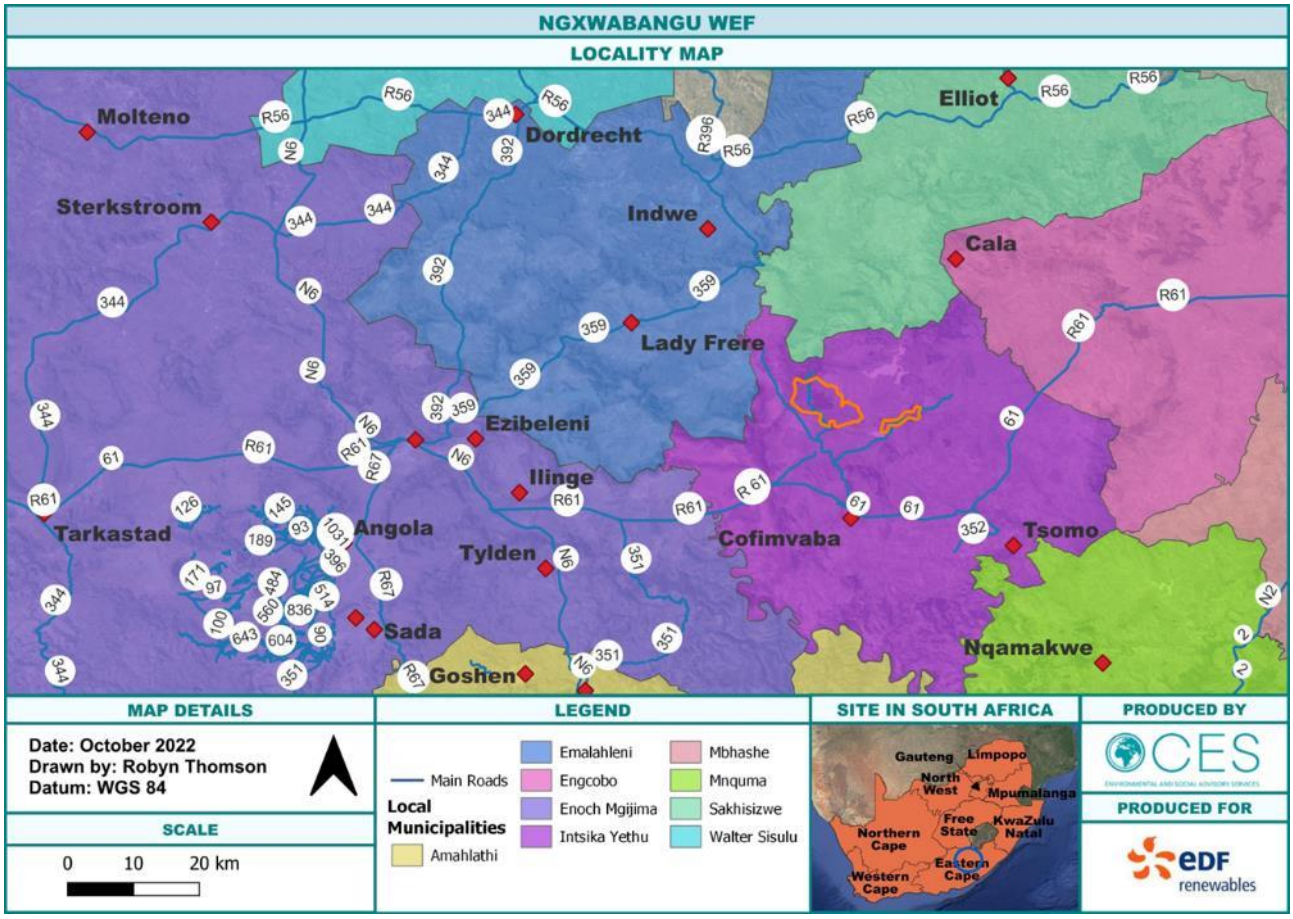

Figure 3-3: Locality Map of the Proposed Site.

3.3 CONSTRUCTION SITE: HOURS OF OPERATION

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

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

PHASE	DURATION	ACTIVITIES	TYPICAL PLANT & CONSTRUCTION EQUIPMENT
Site Establishment (low impact)	Dependent on the number of turbines. Generally, 1 – 2 years.	1. Setting out of construction area 2. Site camp establishment o Levelling of camp area o Import and placement of aggregates to form a free draining platform o Delivery of office and welfare containers o Electricity, sanitation, and internet connections 3. Erection of temporary stock-proof fencing across the site to separate stock from the construction area	1. LDV (i.e. bakkie) 2. Dump trucks, TLB, roller and possibly a grader or excavator 3. LDV

PHASE	DURATION	ACTIVITIES	TYPICAL PLANT & CONSTRUCTION EQUIPMENT
Civil and Electrical Works (high impact)		1. Topsoil stripping and bulk earthworks (excavations and backfill) for roads, hardstandings and WTG foundations. 2. Concrete works 3. Fixing reinforcement 4. Cable ducting, trenching and laying 5. Road and hardstanding construction (placement of aggregate layers) 6. Blasting (if hard rock present) 7. Pylon erection and electrical cable stringing (where there is an overhead power line) 8. Above activities but within the substation and relevant to substation construction and including building construction works e.g. bricklaying, roofing, installation and testing of electrical equipment such as transformers and switchgear	1. Dozer, excavator, dump trucks, water trucks, vibratory roller 2. Concrete pump and concrete delivery trucks 3. Flat-bed delivery trucks, telehandler/ excavator 4. Excavator/ TLB 5. As item 1 6. Specialist explosives sub-contractor with appropriate drilling equipment. Excavators and dump trucks. 7. Flat-bed delivery trucks, telehandler/ excavator, LDVs 8. As above
Wind Turbine Erection (possible low impact)		1. Delivery of WTG components 2. Assembly/erection of WTG 3. Crane and assembling tools shifting 4. Crane disassembling, cranes, and site DEMOB	1. Flat-bed or clamp style delivery trucks with components of up to 10m height and 120m length, mobile crane (250 tonne capacity), telehandler 2. Mobile crane, flat bed delivery trucks, telehandler 3. Main crane (750 tonne capacity), mobile crane, telehandler
Wind Turbine Testing and Commissioning (low impact)		1. Internal fit-out of WTG 2. Testing and commissioning	1. LDV, generator on a trailer towed by the LDV. 2. As above.
Overall Wind Farm Testing (low impact)		1. Testing	1. LDV for staff transport

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

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

4 LAYOUT OF THE EMPr

In order to ensure a holistic approach to the management of environmental and social impacts during the planning and design, construction, operational and decommissioning phases of the proposed Ngxwabangu WEF and Associated Infrastructure, this EMPr sets out the methods by which proper environmental controls are to be implemented by the Contractor and all other parties involved. The phases of development have been discussed in more detail below and have specific potential issues unique to each phase.

4.1 PLANNING AND DESIGN PHASE

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

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

4.2 CONSTRUCTION PHASE

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

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

4.3 OPERATIONAL PHASE

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

4.4 CLOSURE & DECOMMISSIONING PHASE

This section includes principles for the decommissioning and closure phase of the Ngxwabangu WEF. This section will be required to be re-visited and updated at the time of decommissioning.

5 IMPACT MANAGEMENT ACTIONS

5.1 GENERAL CONSTRUCTION PHASE MITIGATION AND MANAGEMENT MEASURES

In addition to the mitigation and management measures which are stipulated in the Ngxwabangu WEF and Associated Infrastructure BAR (Section 5.2) and associated specialist reports (Section 5.3), the following general Construction Phase mitigation and management measures apply. Should the mitigation and management measures specified in the Table 5-1 below contradict any of the measures in Sections 5.2 and 5.3, the latter will take precedence.

Table 5-1: General Construction Best Practise for the Ngxwabangu WEF and Associated Infrastructure.

GENERAL CONSTRUCTION PHASE		
Activity		**Mitigation and/or Management Measure**
1.	**Demarcation**	The location, layout and method of establishment of the construction camp, including the following, must be clearly indicated and demarcated prior to the commencement of construction: • All Contractors' offices; • Laydown areas; • Vehicle wash areas (if any); • Workshops and drip trays; • Fuel storage areas (including filling and dispensing from storage tanks); • Cement/concrete mixing areas (including the methods employed for the mixing of concrete and particularly the containment of runoff water from such areas and the method of transportation of concrete); and • Other infrastructure required for the project.
		• The Contractor must erect and maintain permanent and/or temporary fences in the locations directed by the ECO. Such fences should, if so specified, be erected before undertaking designated activities; and • Should "no-go" areas exist on the site, the Contractor must ensure that, insofar as he/she has the authority, no person, machinery, equipment or materials enter the "no-go" areas at any time.
2.	**Site Access**	Details, including a drawing, showing where and how the access points and routes will be located and managed must be submitted to the ECO and the Developer/Contractor. These should be supported by the following management requirements: • On the site and within such distance of the site as may be stated, the Contractor should control the movement of all vehicles, including vehicles of suppliers so that they remain on designated routes, are distributed so as not to cause an undue concentration of traffic and that all relevant laws are complied with. In addition, such vehicles should be routed and operated in a manner that minimises the disruption to regular users of the routes; • On gravel or earth roads on site and within 500 m of the site, the Contractor's vehicles as well as the suppliers' vehicles must not exceed a speed of 40 km/h or as per the conditions of the EA; and • The Contractor must supply the ECO with a Method Statement detailing the location and management of all access points and roads.
3.	**Materials Handling, Use & Storage**	• The Contractor must ensure that any delivery drivers are informed of all procedures and restrictions (including identified "no-go" areas) required to comply with this EMPr and the Generic EMPrs (substation and powerline); • The Contractor must ensure that these delivery drivers are supervised during offloading, by someone with an adequate understanding of the requirements of this EMPr and the Generic EMPrs;

		• Materials must be appropriately secured to ensure safe passage between destinations. Loads including, *but not limited* to, sand, stone chip, fine vegetation, refuse, paper and cement, should have appropriate cover to prevent them spilling from the vehicle during transit.; • The Contractor will be responsible for any clean up resulting from the failure by his/her employees or suppliers to properly secure transported materials; • All manufactured and/or imported material should be stored within the Contractor's camp and out of the rain; • All laydown areas outside of the construction camp should be subject to the ECO's approval; and • Imported gravel, fill, soil and sand materials should be free of weeds, alien invasive seed matter, plant material, litter and contaminants and must be obtained from sources approved by the ECO.
4.	**Stockpiling**	• Any stockpiling of gravel, cut, fill or any other material including spoil must only be in areas that have been approved by the ECO within the defined working area; • The Contractor should ensure that the material does not blow or wash away. If the stockpiled material is in danger of being washed or blown away, the Contractor should spray it with Dustex or cover it with a suitable material, such as hessian or plastic. Stockpiles of topsoil must not be covered with plastic; and • No stockpiling of any material will be allowed within 20 m of any "no-go" areas.
5.	**Solid Waste Management**	• Onsite burning, burying or dumping of any waste materials, litter or refuse must not occur; • The Contractor should provide vermin and weatherproof bins with lids of sufficient number and capacity to store the solid waste produced on a daily basis. The lids must always be kept firmly on the bins; • Bins must not be allowed to become overfull and should be emptied daily; • The waste from bins may be temporarily stored onsite in a central waste area that is weatherproof and scavenger proof, and which the ECO has approved; • Recyclable waste should be disposed of in separate skips/bins and removed offsite for recycling; • All solid waste must be disposed of offsite at an approved registered landfill site; • The Contractor must supply the ECO with the appropriate disposal certificates; and • The Contractor must submit a waste management plan, as part of the Pollution Control Method Statement, to the ECO.
6.	**Water Use**	• All sources of water for construction purposes must be approved by the DWS and the ECO in writing before any such sources can be used to obtain water; and • All wash water should be recycled for use as wash water again or for dust suppression, *where applicable*.
7.	**Hazardous Substances**	• The transportation and handling of hazardous substances must comply with the provisions of the Hazardous Substances Act (Act No.187 of 1993) and associated regulations as well as SABS 0228 and SABS 0229; • The Contractor must also comply with all other applicable regional and local legislation and regulations regarding the transport, use and disposal of hazardous substances. Hazardous chemical substances (as defined in the Regulations for Hazardous Chemical Substances) used during construction must be stored in secondary containers. The relevant Material Safety Data Sheets (MSDS) should be available onsite; • Procedures detailed in the MSDSs must be followed in the event of an emergency; • The Contractor should be responsible for the training and education of all personnel onsite that will be handling hazardous materials about their proper use, handling and disposal; and • If potentially hazardous substances are to be stored or used onsite, the Contractor must submit a Method Statement to the ECO detailing the substances/materials to

		be used, together with the transport, storage, handling and disposal procedures for the substances.
8.	**Cement & Mixing of Concrete**	• The proposed location of cement mixing areas (including the location of cement stores as well as sand and aggregate stockpiles) must be indicated on the site layout plan and approved by the ECO; • All wastewater generated from the operation and cleaning of concrete mixing equipment and other sources of concrete should be passed through a concrete wastewater settlement system; • The Contractor must ensure that minimal water is used for washing of concrete and cement mixing equipment; • Used cement bags must be disposed of in weatherproof bins onsite to prevent the generation of wind-blown cement dust and to prevent the bags from blowing away; • The Contractor must ensure that concrete is mixed on mortar boards, all visible remains of concrete are removed and disposed of as waste and that all surplus aggregate is removed; and • As part of the Pollution Control and Concrete Mixing Method Statement, a plan detailing all actions to be taken to comply with the requirements must be submitted to the ECO.
9.	**Fuel & Oil**	<u>Fuel Storage</u> • All construction materials including fuels and oil should be stored in demarcated areas which are contained within berms/bunds. Washing and cleaning of equipment should also be done in berms or bunds, in order to trap any cement and prevent excessive soil erosion; • All necessary approvals with respect to fuel storage and dispensing must be obtained from the appropriate authorities. Symbolic safety signs depicting “No Smoking” and “Danger”, conforming to the requirement of SABS 1186, must be prominently displayed in and around the fuel storage area. There must be adequate fire-fighting equipment at the fuel storage area; • The Contractor must ensure that all liquid fuels and oils are stored in tanks with lids, which are kept firmly shut and under lock and key at all times. The capacity of the tank should be clearly displayed, and the product contained within the tank clearly identified using the emergency information system detailed in SABS 0232 Part 1. The capacity of fuel storage tanks should not exceed 9 000 litres and must be kept on site only for as long as fuel is needed for construction activities, on completion of which they must be removed; • Tanks onsite should not be linked or joined via any pipe work but should remain as separate entities. The tanks must be situated on a smooth impermeable base with a bund. The volume inside the bund should be 110% of the total capacity of the largest storage tank. The base may be constructed of concrete, or of plastic sheeting with impermeable joints with a layer of sand over to prevent perishing. The impermeable lining should extend to the crest of the bund. The floor of the bund should be sloped to enable any spilled fuel and/or fuel-contaminated water to be removed. Appropriate material, approved by the ECO that absorbs/breaks-down or encapsulates minor hydrocarbon spillage and which is effective in water, should be installed in the sump; • The tanks and bunded areas should be covered by a roofed structure, taken offsite to a disposal site approved by the ECO and the material, which absorbs/breaks-down or encapsulates minor hydrocarbon spillages, should be replenished; • Adequate precautions should be provided to prevent spillage during the filling of any tank and during the dispensing of the contents. The dispensing mechanism for the fuel storage tanks should be stored in a waterproof container when not in use; and • As part of the required site layout for the construction camp, a plan must be submitted to the ECO detailing the design, location and construction of the fuel

		storage area as well as for the filling and dispensing from storage tanks and for the type of absorbing/breaking-down or encapsulating material to be used. <u>Refuelling</u> • Where reasonable and practical, the plant should be refuelled at a designated re-fuelling area/depot or at a workshop as applicable. If this is not reasonable or practical, then the surface under the refuelling area must be protected and appropriately bunded against pollution to the reasonable satisfaction of the ECO prior to any refuelling activities; • If fuel is dispensed from 200 litre drums, the proper dispensing equipment must be used, and the drum should not be tipped in order to dispense fuel. The Contractor should ensure that the appropriate fire-fighting equipment is present during refuelling operations; and • The Contractor must ensure that there is always a supply of absorbent material readily available to absorb/breakdown or, where possible, be designed to encapsulate minor hydrocarbon spillages. The quantities of such materials should be able to handle a minimum of 200 ℓ of hydrocarbon liquid spill. Prior to any refuelling or maintenance activities, the ECO must approve this material. <u>Used oil and hydrocarbon contaminated materials</u> • Used oil should be stored at a central location onsite prior to removal offsite for disposal at an approved disposal site; and • Old oil filters and oil, petrol and diesel-soaked material must be treated as hazardous waste. The Contractor should remove all oil, petrol, and diesel-soaked sand immediately and should dispose of it as hazardous waste or treat it onsite with material which breaks-down or encapsulates such spillages, as approved by the ECO.
10.	**Workshop, Equipment Maintenance & Storage**	• The Contractor should ensure that in the workshop and other plant maintenance facilities, including those areas where, after obtaining the ECO's approval, the Contractor carries out emergency plant maintenance, there is no contamination of the soil or vegetation. The workshop must have a smooth impermeable (concrete or thick plastic covered with sand) floor; • The floor should be bunded and sloped towards an oil trap or sump to contain any spillages. When servicing equipment, drip trays should be used to collect the waste oil and other lubricants. Drip trays should also be provided in construction areas for stationary plant (such as compressors) and for "parked" plant (such as scrapers, loaders and vehicles); • All vehicles and equipment must be kept in good working order and serviced regularly. Leaking equipment should be repaired immediately or removed from the site; • All vehicle and equipment washing must be undertaken in the workshop or maintenance areas, and these areas must be equipped with a suitable impermeable floor and sump/oil trap. The use of detergents for washing should be restricted to low phosphate and nitrate products and low sudsing-type detergents; and • As part of the site layouts, a plan must be submitted to the ECO detailing the design of the bunding of the workshop and how runoff from the workshop will be managed as well as how drip trays, which are used under plant, will be managed.
11.	**Ablution Facilities**	• Washing, whether of a person or of personal effects, and acts of excretion and urination are strictly prohibited other than at the facilities provided. The Contractor must provide the necessary ablution facilities for all the personnel prior to the commencement of work; • Ablution facilities must be supplied by the Contractor for the workers at a ratio of at least 1 toilet per 20 workers in areas approved by the ECO. Toilets should be situated within 200 m of any area where work is taking place and in numbers which are enough to meet the ratio depicted above for the workers in the area; • The facilities should be maintained in a hygienic state and serviced regularly. Toilet paper must be provided. Temporary/portable toilets should be secured to the

		ground to prevent them toppling due to wind or any other cause. This should be to the satisfaction of the ECO; and • Discharge into the environment and burial of waste is strictly prohibited. The Contractor must ensure that no spillage occurs when the toilets are cleaned or emptied and that the contents are removed from the site. Toilets must be emptied before any temporary site closure.
12.	**Eating Areas**	• The Contractor should designate eating area(s), subject to the approval of the ECO. No cooking is allowed outside of the Contractor's camp area onsite; • At mealtimes, all workers should eat in designated eating areas. These areas should have shade for the workers; • Enough bins must be present in these areas. All disposable food packaging must be disposed of in the bins after every meal; and • The feeding- or leaving of food for animals is strictly prohibited.
13.	**Site Structures**	• All site establishment components (as well as equipment) should be positioned to limit visual intrusion on neighbouring areas and the size of the land area disturbed. The type and colour of roofing and cladding materials of the Contractor's temporary structures should be selected to reduce reflection; and • The Contractor should supply and maintain adequate and suitable sheds for the storage of materials. Sheds for the storage of materials which could deteriorate or corrode if exposed to the weather should be weatherproof, adequately ventilated and provided with raised floors.
14.	**Lighting**	• The Contractor should ensure that any lighting installed on the site for their activities does not cause a reasonably avoidable disturbance to neighbouring residents or the naturally occurring fauna.
15.	**Noise**	• The Contractor should take precautions to minimise noise generated on site (e.g. install and maintain silencers on machinery); • The Contractor must comply with the Noise Induced Hearing Loss Regulations published under the Occupational Health and Safety Act; • Appropriate directional and intensity settings are to be maintained on all hooters and sirens; • Where reasonable and practical, work should be limited to daylight hours – between 06:00 and 18:00; and • No amplified music must be allowed on site. The Contractor must not use sound amplification equipment on site unless in emergency situations.
16.	**Dust Control**	• The Contractor will be responsible for the continued control of dust arising from their activities. The Contractor should take all reasonable measures to minimize the generation of dust as a result of construction activities to the satisfaction of the ECO. Appropriate dust suppression measures include spraying or dampening with water, using a commercial dust binder (such as Hydropam or Dustex), rotovating straw bales, planting of open cleared space and the scheduling of dust-generating activities. If the conditions are such that the Contractor cannot dampen the dust to the satisfaction of the ECO, then the ECO may halt operations until such time as the conditions are more suitable for lower dust generating construction activities; • Areas which are to have the topsoil stripped for construction purposes must be limited and only stripped prior to the work taking place; • Other activities and situations which could result in nuisance dust include site clearance and other earth moving operations, open cleared space, stockpiles of topsoil or sand and activities associated with concrete mixing; and • The appropriate health and safety equipment (e.g. dust masks) should be worn by workers during the phases of dust-producing construction activity.
17.	**Environmental Awareness Training**	• Environmental awareness training courses should be run for all personnel onsite (See **Appendix A** for a proposed Basic Environmental Education Course). At least two (2) courses should be run, one (1) for the Contractor's and Subcontractor's management and one (1) for all site staff and labourers. Courses should be run in the morning during normal working hours at a suitable venue provided by the Contractor. All attendees should remain for the duration of the course and sign an

		attendance register on completion, that clearly indicates participant's names, a copy of which must be handed to the ECO; • The Contractor should allow for enough sessions to train all personnel. Subsequent sessions should be run for any new personnel entering the site. A Method Statement with respect to the organisation of these courses should be submitted; and • Notwithstanding the specific provisions of this clause, the Contractor is obligated to convey the sentiments of the EMPr to all personnel and Subcontractors involved with the works.
18.	**Fire Control**	• The Contractor must take all the necessary precautions to ensure that fires are not started as a result of site activities; • No open fires must be permitted on the site; • Smoking must not be permitted in areas where there is a fire hazard. Such areas include the workshop and fuel storage areas and any areas where vegetation or other material is such as to support the rapid spreading of an initial flame; • The Contractor should appoint a Fire Officer who will be responsible for ensuring immediate and appropriate actions in the event of a fire and will ensure that employees are aware of the procedures to be followed. The Contractor must forward the name of the Fire Officer to the ECO for approval within seven (7) days of being on site; • The Contractor must ensure that basic firefighting equipment is always available onsite. This should include at least rubber beaters, when working in urban open spaces and natural areas, and at least one (1) fire extinguisher of the appropriate type when welding or other "hot" activities are undertaken; and • The Contractor will be liable for any expenses incurred by any organisations called to assist with fighting fires which resulted due to their activities or the activities of their personnel, and for any cost relating to the rehabilitation of burnt areas, or consequential damages.
19.	**Emergency Procedures**	• Emergency procedures, including the names and contact details of responsible personnel and emergency services must be made available to all staff and should be clearly displayed at relevant locations at the site. The Contractor should advise the ECO of any emergencies onsite, together with a record of action taken, within 24 hours of the emergency occurring; and • The Contractor must submit a Method Statement which covers the procedures for emergencies, such as fire and accidental leaks and spillages. <u>Fire</u> • The Contractor should advise the relevant authority of a fire as soon as one (1) starts. It is crucial that this is done before the fire is out of control; and • The Contractor must ensure that all employees are aware of the procedures to be followed in the event of a fire. <u>Accidental leaks and spillages</u> • The Contractor must ensure that all employees are aware of the procedures to be followed for dealing with spills and leaks, which must include notifying the ECO and the relevant authorities. The Contractor must ensure that all the necessary materials and equipment for treating and remedying spills and leaks are available onsite at all times. Treatment and remediation of the spill areas must be undertaken to the reasonable satisfaction of the ECO; • In the event of a hydrocarbon spill, the source of the spillage must be isolated, and the spillage contained. The area should be cordoned off and secured. The Contractor should ensure that there is always a supply of absorbent material readily available to absorb/breakdown or where possible, be designed to encapsulate minor hydrocarbon spillages. The quantities of such materials should be able to handle a minimum of 200 ℓ of hydrocarbon liquid spill; and

		• Any spills must be cleared, and the contaminated soil or sludge disposed of in an appropriate manner, approved by the ECO, or at a licensed hazardous waste disposal site.
20.	**Protection of Natural Features**	• The Contractor must not deface, paint, damage or mark any natural features (e.g. rock formations or trees) situated in or around the site for survey or other purposes unless agreed upon beforehand with the ECO. Any features affected by the Contractor in contravention of this clause must be restored/rehabilitated to the satisfaction of the ECO; and • The Contractor and staff may not enter dense, intact vegetation without written approval from the ECO.
21.	**Protection of Flora & Fauna**	• A suitably qualified Botanist or Horticulturist should identify the need for plant search and rescue (prior to construction) to identify any plant Species of Conservation Concern (SCC) which require relocation; • Protected plant species should then be removed from the designated construction footprint and relocated to adjacent areas of similar habitat which will not be affected by construction activities. Or the plants should be stored in a suitable nursery and used in landscaping once construction is complete (if applicable); • Except to the extent necessary for the carrying out of the works, flora should not be removed, damaged or disturbed; • The removal and stockpiling of topsoil must be carried out in accordance with this EMPr; • Trapping, poisoning and/or shooting of animals is strictly forbidden. No domestic pets or livestock are permitted onsite during construction; • The use of chemicals of all forms should be carefully controlled and monitored to avoid contamination of surrounding areas; and • The construction phase should allow for the education of staff as to the significance of floral and faunal SCC.
22.	**Protection of Heritage Features**	• Construction managers and/or foremen must be informed, prior to the commencement of the construction phase, of the possible types of heritage sites and cultural material which could be encountered during construction activities and the procedures to follow if/when they find such sites; • If concentrations of palaeontological and/or archaeological heritage material and human remains are uncovered during construction, all work must cease immediately and be reported to the Eastern Cape Provincial Heritage Resources Authority (ECPHRA), the South African Heritage Resources Agency (SAHRA) (021 642 4502) and/or the South African Police Service (SAPS) in the case of human remains so that systematic and professional investigation/excavation can be undertaken; and • Any person who causes intentional damage to archaeological or historical sites and/or artefacts could be penalised or legally prosecuted in terms of the National Heritage Resources Act (Act No. 25 of 1999).
23.	**Vegetation Clearance**	• Vegetation clearing and trampling should be avoided in areas demarcated as “no-go” areas; • Temporary infrastructure such as the site camp, laydown areas and storage areas must be placed in the location which has been approved by the ECO; • The Contractor must work according to a plan, which demarcates areas to be cleared. The plan should be part of the Project Layout Plan developed during the Site Design Phase; • The minimum amount of vegetation clearance must take place; and • Collection of, or wilful damage to, any plants outside of the areas demarcated for clearing is not allowed.
24.	**Topsoil**	• Topsoil should only be stripped from the areas as indicated below: ○ The approved development footprint; ○ Any area which is to be used for temporary storage of materials; ○ Areas which could be polluted by any aspect of the construction activity; and ○ Areas designated for the dumping of soil.

		• Stripping of topsoil should be undertaken in such a manner as to minimise erosion by wind or runoff; • Outside of the development footprint, topsoil should not be stripped to a depth below 150 mm from the original ground level; • Areas from which the topsoil is to be removed must be cleared of any foreign material which could form part of the topsoil during removal, these materials include bricks, rubble, any waste material, litter, excess vegetation and any other material which could reduce the quality of the topsoil; • The Contractor must ensure that subsoil and topsoil are not mixed during stripping, excavation, storage, reinstatement or rehabilitation. If mixed with clay sub-soil the usefulness of the topsoil for rehabilitation of the site will be lost; • Soils should be exposed for the minimum time possible once cleared; • Topsoil should be temporarily stockpiled, separately from (clay) subsoil and rocky materials; • Topsoil should only be stockpiled in areas designated by the ECO; • Stockpiles should either be vegetated with indigenous grasses or covered by a suitable fabric to prevent erosion and invasion of weeds; and • Stockpiled topsoil must not be compacted.
25.	**Stormwater Management**	• Stormwater should be managed using suitable structures such as swales, gabions and rock rip-wrap so that any runoff from the development site is attenuated prior to discharge. Silt and sedimentation should be kept to a minimum, using the above-mentioned structures. Ensure that the structures do not create any form of erosion; and • Natural runoff must be diverted to stormwater drains, where these are available.
26.	**Erosion & Sedimentation Control**	• The Contractor must take all reasonable measures to limit erosion and sedimentation due to construction activities and must comply with such detailed measures as required by this EMPr and the Generic EMPrs; • Revegetate areas, which have been disturbed, as soon as possible; • Where erosion and/or sedimentation occur, whether on site or in proximity to the site, despite the Contractor complying with the aforementioned, rectification should be carried out in accordance with details specified by the ECO. Where erosion and/or sedimentation occur due to the fault of the Contractor, rectification must be carried out to the reasonable requirements of the ECO and at the expense of the Contractor; and • Actions must also be taken in the event of heavy rains and potential flooding, whereby diversion barriers must not cause excessive erosion.
27.	**Aesthetics**	• The Contractor must take reasonable measures to ensure that construction activities do not have an unreasonable impact on the aesthetics of the area.
28.	**Community Relations**	• The Contractor must keep a "Complaints Register" onsite. The Register should contain all contact details of the person who made the complaint, and information regarding the complaint itself as well as the date and time that the complaint was resolved; • The ECO and/or the Community Liaison Officer (CLO) will be responsible for responding to queries and/or complaints and may request assistance from the Contractor's Management Staff; and • Construction materials and other purchases relating to the project should be done, where possible, within the nearby community and at local stores.
29.	**Temporary Site Closure**	• If the site is closed for a period exceeding five (5) days, the Contractor's Safety, Health and Environment (SHE), in consultation with the ECO, should carry out the following checklist procedure and ensure that the following conditions are adhered to and report on compliance with this clause: <u>Fuels/flammables/hazardous materials stores</u> • Fuel stores are as low in volume as practicable; • There are no leaks; • The outlet is secure and locked;

		• The bund is empty; • Fire extinguishers are serviced and accessible; • The area is secure from accidental damage through vehicle collision and the like; • Emergency and contact numbers are available and displayed; and • There is adequate ventilation in enclosed spaces. <u>Safety</u> • Ensure that the site safety checks have been carried out in accordance with the Occupational Health and Safety Act (Act No. 85 of 1993) prior to site closure; • An inspection schedule and log for use by security or contracts staff is developed; • All trenches and manholes are secured; • Applicable notice boards are in place and secured; • Emergency and Management contact details are prominently displayed; • The contact details of the CLO are prominently displayed; • Security personnel have been briefed and have the facilities available to contact or be contacted by relevant management and emergency personnel; • Night hazards such as reflectors, lighting, traffic signage, etc. have been checked; • Fire hazards identified and the local authority notified of any potential threats e.g. large brush stockpiles, fuels etc.; • Pipe stockpiles are wedged/secured; • Scaffolds are secure; and • Structures vulnerable to high winds are secure. <u>Erosion</u> • Wind and dust mitigation measures such as straw, brush packs, irrigation, etc. are in place; • Excavated and filled slopes and stockpiles are at a stable angle; • Re-vegetated areas have a watering schedule and the supply to such areas is secured; and • There are enough detention ponds or channels in place. <u>Water contamination and pollution</u> • Hazardous fuel stores are secure; • Cement and material stores are secure; • Toilets are empty and secured; • Refuse bins are empty and secured; • Bunding is clean and treated with appropriate material which will absorb/ breakdown and, where possible, be designed to encapsulate minor hydrocarbon spillages; and • Drip trays are empty and secure.

5.2 BAR MITIGATION AND MANAGEMENT MEASURES

The following table sets out the potential general environmental and social issues which could occur during the lifespan of the Ngxwabangu WEF and Associated Infrastructure development, as per the *Draft Basic Assessment Report (BAR): Ngxwabangu Wind Energy Facility and Associated Infrastructure Near Cofimvaba, Eastern Cape Province. CES. May 2023*. The Draft BAR provides mitigation measures and recommendations in an effort to avoid impacts or reduce the significance of potential negative impacts and enhance potential benefits for the Planning and Design, Construction, Operational and Decommissioning Phases of the proposed Ngxwabangu WEF.

Table 5-2: General Impacts Ngxwabangu WEF and Associated Infrastructure.

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
PLANNING & DESIGN PHASE		
GENERAL IMPACTS		

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
TRAFFIC & TRANSPORT	Inadequate planning for the transportation of turbine parts and specialist construction equipment to the site by long and/or slow-moving vehicles could cause traffic congestion, especially if temporary road closures are required.	• Project planning must include a plan for traffic control that will be implemented, especially during the construction phase of the development. Consultation with the local Road Traffic Unit in this regard must be done early in the planning phase. The necessary road traffic permits must be obtained for transporting parts, containers, materials and construction equipment to the site.
	The integrity of existing highway infrastructure such as bridges and barriers may be compromised by the heavy vehicle traffic delivering components to the site.	• Careful planning of the routes taken by heavy vehicles must highlight areas of road that may need to be upgraded in order to accommodate these vehicles. Once identified, these areas must be upgraded if necessary.
STORAGE OF HAZARDOUS SUBSTANCES	Inappropriate planning for the storage of hazardous substances such as diesel, paint, pesticides, etc, tools and equipment used on site could lead to surface and ground water pollution e.g. due to oil leaks, spillage of diesel etc. In addition, these hazardous substances could be washed off into nearby drainage lines. The mixing of cement on site could result in ground water contamination from compounds in the cement. In addition, a large number of cement mixing stations on site could increase the presence of impermeable areas which in turn could increase rates of runoff and thereby increase the risk of localized flooding, soil erosion, silting, gully formation, etc.	• All hazardous substances such as paints, diesel and cement must be stored in a bunded area with an impermeable surface beneath them, where appropriate in terms of Health and Safety (H&S) Regulations. • Cement mixing must be conducted at a single location which must be centrally located, where practical. This mixing must take place on an impermeable surface, and dried waste cement must be disposed of with building rubble.

ENVIRONMENTAL LEGAL AND POLICY COMPLIANCE	Failure to adhere to existing policies and legal obligations could lead to the project conflicting with local, provincial and national policies, guidelines and legislation. This could result in lack of institutional support for the project, overall project failure and undue disturbance to the natural environment.	• Ensure that all relevant legislation and policy is consulted and further ensure that the project is compliant with such legislation and policy.
		• These must include (but not restricted to):
		  ○ Local and District Spatial Development Frameworks
		  ○ Local Municipal bylaws
		• In addition, planning for the construction and operation of the proposed energy facility must consider available best practice guidelines.

STORMWATER MANAGEMENT AND EROSION	The introduction of roads and impermeable areas could increase rates of runoff and therefore the risk of localised flooding.	• Structures must be located at least 32m away from identified drainage lines. The exception to this condition is the construction of roads, which must have the required water use licences in place prior to construction. • A Stormwater Management Plan must be designed and implemented to ensure maximum water seepage at the source of water flow. • The plan must also include management mitigation measures for water pollution, wastewater management and the management of surface erosion e.g. by considering the applicability of contouring, etc.

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
MANAGEMENT OF GENERAL WASTE	Inappropriate planning for management and disposal of waste e.g. storage disposal could result in surface and ground water contamination.	• Develop and implement a waste management plan for handling on site waste. • Designate an appropriate area where waste can be stored before disposal. • General Waste must be disposed of at a registered landfill site.
SCHEDULING OF CONSTRUCTION	Construction scheduling that does not take into account the seasonal requirements of the aquatic environment, e.g. allowing for unimpeded flood events, could lead to short-term (and potentially long-term) impacts such as excessive sediment mobilization, etc.	• Wherever possible, construction activities must be undertaken during the driest part of the year to minimize downstream sedimentation due to excavation, etc. • When not possible, suitable stream diversion structures must be used to ensure that rivers/streams are not negatively impacted by construction activity.
CONSTRUCTION PHASE		
GENERAL IMPACTS		
NUISANCE DUST	Dust is likely to be a potential nuisance due to the construction activities.	• Fugitive/nuisance dust must be reduced by implementing one of or a combination of the following: ○ Damping down of un-surfaced and un-vegetated areas; ○ Retention of vegetation where possible; ○ Excavations and other clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighbouring areas; ○ A speed limit of 40km/h must not be exceeded on dirt roads; • Any complaints or claims emanating from the lack of dust control must be attended to immediately by the Contractor.
FIRE	Risk of runaway fires from construction activities related to having people on site, such as cooking, smoking or burning of vegetation might lead to the burning of surrounding vegetation.	• There must be no burning of construction waste or debris onsite. • Cooking is only permitted in designated areas onsite. • Burning of vegetation is not permitted on site. • Smoking on site must be confined to a designated area in the vicinity of the site office which must be equipped with the necessary fire extinguishers.
STORMWATER MANAGEMENT	Sediment is likely to be created during construction. This could be washed off into the nearby drainage line e.g. during the excavation of foundations, the laying of access roads within the site, digging of cable runs and soil stripping and stockpiling to create foundations and temporary areas of hard-standing, such as the construction camp.	• The recommendations of the stormwater management plan must be implemented to avoid soil erosion and siltation of drainage line.
DEGRADATION OF DRAINAGE LINES FROM EARTHWORKS	Unplanned construction activities or earthworks that occur close to onsite drainage lines could cause adverse impacts	• There must be no earthworks within 32m of the drainage lines to avoid contamination of water sources. The exception to this condition is the

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	such as soil erosion, siltation, and blockage of the drainage line.	construction of roads, which must have the required water use licences in place prior to construction.
MANAGEMENT OF GENERAL WASTE	Littering by construction workers could cause surface and ground water pollution.	• A waste management plan incorporating recycling and waste minimisation must be implemented. The Waste Management Plan must be explained to all employees as part of the environmental induction training.
HAZARDOUS SUBSTANCES	Onsite maintenance of construction vehicles/machinery and equipment could result in oil, diesel and other hazardous chemicals contaminating surface and ground water. Surface and ground water pollution could arise from the spillage or leaking of diesel, lubricants and cement during construction activities.	• The storage of fuels and hazardous materials must be located away from sensitive water resources. • All hazardous substances (e.g. diesel, oil drums, etc.) must be stored in a bunded area, where appropriate in terms of applicable H&S Regulations. • The recommendations of the stormwater management plan must be implemented during construction.
MANAGEMENT OF CONSTRUCTION WASTE	Waste from construction activities e.g. excess concrete and cement mixture, empty paint containers, oil containers, etc., could cause pollution of ground and surface water when they come into contact with runoff water.	• A waste management plan for the project must be developed and implemented in the construction phase. • All waste must be disposed of at an appropriately licensed landfill site. • All construction materials must be stored in a central and secure location with controlled access with an appropriate impermeable surface. • The recommendations of the Stormwater Management Plan must be implemented to mitigate the impacts of runoff water on pollution.
WATER QUALITY	Wet concrete is highly alkaline. This could result in flash kills of macroinvertebrates and fish species in the vicinity. Soil erosion will decrease the quality of the aquatic habitat downstream of the construction activities by silting over exposed rocks and decreasing the clarity and oxygen saturation of the water. Soil erosion will decrease the quality of the aquatic habitat downstream of the construction activities by silting over exposed rocks and decreasing the clarity and oxygen saturation of the water.	• No concrete mixing will take place within 32m of any watercourse. • The concrete batching plant must be clearly demarcated, and no sprawl must be tolerated.
INFILLING/ EXCAVATION IN A WATERCOURSE	Excavated material stockpiles may increase sediment loads in watercourses during rainfall events. Materials used for the infilling of watercourses in order to construct water crossings may not be compatible with the surrounding bed/banks, etc., which could change the characteristics of the watercourse.	• Stockpiled excavated material must not be stored within 32m of a watercourse. • Stockpile areas must be suitably bunded to prevent Waterborne erosion of exposed soils where there is a likelihood that the soils will be washed into a watercourse. • Materials used for infilling must be suitably stabilized to ensure that scour and erosion of the existing bed/banks is exacerbated.
DISPOSAL OF SPOIL MATERIAL	Incorrect disposal of subsoil/spoil material could result in significant loss of a useful resource.	• Subsoil cannot be disposed of onsite without the appropriate Waste License in terms of the NEMA: Waste Act.

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
		• Spoil could be used to rehabilitate open borrow pits or erosion features. • Disposal of spoil material to a registered landfill must be the last option. • No spoil stockpiles will be allowed to remain onsite once construction activities have ceased.
OPERATIONAL PHASE		
GENERAL IMPACTS		
AIR QUALITY CLIMATE CHANGE	The electricity generated by the development will displace some of that produced by fossil fuel-based forms of electricity generation. The scheme, over its lifetime, will therefore avoid the production of a significant amount of CO_2, SO_2 and NO_2 that would otherwise be emitted to the atmosphere.	• Enhance this impact by promoting the use of renewable energy locally.
ARCHITECTURE OF ANCILLARY INFRASTRUCTURE	Control buildings, toilet facilities and other ancillary infrastructure could cause negative visual intrusion if allowed to fall into disrepair and not maintained properly.	• All project structures and buildings must be maintained.
HAZARDOUS CHEMICAL STORAGE	Inappropriate storage of chemical, herbicides, diesel and other hazardous substances on site could result in soil and water contamination and pose a high accident danger risk.	• All hazardous substances must be stored in appropriately bunded locations.
INCREASED STORMWATER RUNOFF	Failure to maintain the storm water system could increase the risk of surface water damage to the landscape and vegetation from increased rates of runoff and therefore the risk of localised flooding and increased sheet erosion downstream due to the presence of roads and impermeable areas of hard standing.	• Recommendations of the Stormwater Management Plan must be implemented.
WASTE MANAGEMENT	There could be littering by maintenance workers and security personnel on site.	• A waste management plan incorporating recycling and waste minimisation must be implemented. The Waste Management Plan must be explained to all employees as part of the environmental induction training.
DECOMMISSIONING PHASE		
GENERAL IMPACTS		
POLLUTION	Littering by construction workers could cause surface and ground water pollution.	• Littering must be avoided, and litter bins must be made available at various strategic points on site. • Refuse from the construction site must be collected on a regular basis and deposited at an appropriate landfill.
	Onsite maintenance of construction vehicles/machinery and equipment could result in oil, diesel and other hazardous chemicals contaminating surface and ground water. Surface and ground water pollution could arise from the spillage or leaking of diesel, lubricants, and cement during construction activities.	• No storage of fuels and hazardous materials must be permitted near sensitive water resources. All hazardous substances (e.g. diesel, oil drums, etc.) to be stored in a bunded area.

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES

DUST	Dust is likely to be a potential nuisance due to the decommissioning activities.	• Fugitive/nuisance dust could be implemented through the following:
		  ○ Damping down of un-surfaced and un-vegetated areas;
		  ○ Retention of vegetation where possible; Demolitions and other clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighbouring areas;
		  ○ A speed limit of 40km/h must not be exceeded on dirt roads.
		• Any complaints or claims emanating from the lack of dust control must be attended to immediately by the Contractor.

TRAFFIC & TRANSPORT	A high number of heavy vehicle movements will occur during the decommissioning phase. This may have a detrimental effect on sensitive receptors.	• Construction vehicles and machinery must make use of existing infrastructure such as roads as far as possible to minimise disturbance on the receiving environment.
SOIL EROSION	After the removal of all wind turbine related structures, the disturbed soils could become exposed, unstable and prone to erosion.	• After the removal of all wind turbine-related structures, the disturbed soils must be re-vegetated to avoid unnecessary soil erosion.
LAND-USE	Land previously unavailable for certain types of land use will now be available for those uses.	• No mitigation necessary.

5.3 SPECIALIST MITIGATION AND MANAGEMENT MEASURES

In addition to Section 5.2, which contains the General Ngxwabangu BAR issues with suitable recommendations and mitigation measures. The following table sets out the specialist issues which could occur during the lifespan of the Ngxwabangu WEF and Associated Infrastructure development, as included in the *Draft Basic Assessment Report (BAR): Ngxwabangu Wind Energy Facility and Associated Infrastructure near Cofimvaba, Eastern Cape Province. CES. May 2023*. The specialists have each provided mitigation measures and recommendations in an effort to avoid impacts or to reduce the significance of potential negative impacts and enhance potential benefits for the Planning and Design, Construction, Operational and Decommissioning Phases of the proposed Ngxwabangu WEF and its associated infrastructure.

Table 5-3: Specialist Impacts Ngxwabangu WEF and Associated Infrastructure.

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
PLANNING & DESIGN PHASE		
It is important to note that specialist planning and design phase impacts were not expected since the developer designed the layout presented in the BAR based on sensitivity data and constraints provided by the various specialists. The planning and design impacts were therefore mitigated at Planning Phase.		
AQUATIC IMPACT ASSESSMENT		
None identified by specialist		
AVIFAUNAL IMPACT ASSESSMENT		
None identified by specialist		
BAT IMPACT ASSESSMENT		
None identified by specialist		
ECOLOGICAL IMPACT ASSESSMENT		
None identified by specialist		
HERITAGE IMPACT ASSESSMENT		
None identified by specialist		
NOISE IMPACT ASSESSMENT		
None identified by specialist		
PALAENTOLOGICAL IMPACT ASSESSMENT		
None identified by specialist		
SOCIAL IMPACT ASSESSMENT		
None identified by specialist		
TRAFFIC IMPACT ASSESSMENT		
None identified by specialist		
VISUAL IMPACT ASSESSMENT		
None identified by specialist		
CONSTRUCTION PHASE		
AQUATIC IMPACT ASSESSMENT		
DISTURBANCE AND LOSS OF AQUATIC HABITAT	Activities resulting in physical disturbance of wetland or riparian areas which provide ecosystem services, especially where new crossings are made or large hard engineered surfaces are placed within the buffer zones. Loss can also include a functional loss, through change in vegetation type via alien encroachment, reducing aquatic biodiversity.	Mitigation measures to reduce residual risk or enhance opportunities: • The final design must avoid the indicated No-Go areas, especially the grid towers / poles regardless of the option used, i.e. all options intersect with wetlands at some point. • A pre-construction walkthrough with an aquatic specialist is recommended and they can assist with the development of the stormwater management plan and Aquatic Rehabilitation and Monitoring plan, coupled to micro-siting of the final layout. • Where large cut and fill areas are required these must be stabilised and rehabilitated during the construction process, to minimise erosion and sedimentation.

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
		• Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use. Any erosion / sedimentation must be resolved through whatever additional interventions maybe necessary (i.e., extension, energy dissipaters, spreaders, etc). • To minimise the impact of the access roads: • Use existing roads or upgrade existing tracks to cross wetlands rather than constructing entirely new roads wherever possible. • Use the smallest possible working corridor. Outside the working corridor, all watercourses are to be considered no go areas. Any unnecessary intrusion into these areas is prohibited. Where intrusion is required, the working corridor must be kept to a minimum and demarcated clearly before any construction commences. • Removal of vegetation must only be when essential for the continuation of the project. Do not allow any disturbance to the adjoining natural vegetation cover or soils. • All pipe culverts must be removed and replaced with suitable sized box culverts, where road levels are raised. Crossings that are installed below the natural ground level are to be constructed with an appropriate drop inlet structure on the upstream side to ensure that headcut erosion does not develop as a result of the gradient change from the natural ground level to the invert level of the culvert. • The channel profile, regardless of the current state of the river/watercourse, will be reinstated thus preventing any impoundments from being formed. The related designs must be assessed by an aquatic specialist during a pre-construction walkdown. • Water diversions must be temporary in nature and no permanent walls, berms or dams may be installed within a watercourse. Sandbags used in any diversion or for any other activity within a watercourse must be in a good condition, so that they do not burst and empty sediment into the watercourse. Upon completion of the construction at the site, the diversions shall be removed to restore natural flow patterns. Under no circumstance shall a new channel or drainage canals be excavated to divert water away from construction activities. • Any fauna (frogs, snakes, etc.) that are found within the construction area must be moved to the closest point of similar habitat type outside of the areas to be impacted.

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
		• All disturbed areas beyond the construction site that are intentionally or accidentally disturbed during the construction phase must be rehabilitated. • It is the contractor's responsibility to continuously monitor the area for newly established alien species during the contract and establishment period, which if present must be removed. Removal of these species shall be undertaken in a way which prevents any damage to the remaining indigenous species and inhibits the re-infestation of the cleaned areas.
IMPACT ON RIPARIAN AND WETLAND SYSTEMS THROUGH THE POSSIBLE INCREASE IN SURFACE WATER RUNOFF ON FORM AND FUNCTION DURING THE CONSTRUCTION AND INTO THE OPERATIONAL PHASE, I.E. CHANGES TO THE HYDROLOGICAL REGIME	Increase in hard surface areas, and roads that require stormwater management will increase through the concentration of surface water flows that could result in localised changes to flows (volume) that would result in form and function changes within aquatic systems. Additionally, crossings that concentrate flows in valley bottom wetlands can lead to further erosion and sedimentation of downstream areas. These impacts can result in deterioration in freshwater ecosystem integrity, and a reduction in the supply of ecosystem services.	• The buffer area must be considered as a No-Go area for development and large infrastructure. • A stormwater management plan must be developed in the preconstruction phase, detailing the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems. • The stormwater management infrastructure must be designed to ensure the runoff from the development is not highly concentrated before entering the buffer area. • The volume and velocity of water must be reduced through discharging the surface flow at multiple locations surrounding the development, preventing erosion. • Effective stormwater management must include effective stabilisation (gabions and Reno mattresses) of exposed soil. Contingency plans must be in place for high rainfall events which may occur during construction. • Monitoring of the project activities is essential to ensure the mitigation measures are implemented. Compliance with the mitigation recommendations must be audited by a suitably qualified independent Environmental Control Officer with an appropriately timed audit report.
CHANGES TO HYDROLOGICAL REGIMES THAT COULD ALSO LEAD TO SEDIMENTATION AND EROSION, THAT COULD ALSO OCCUR IN THE OPERATIONAL PHASE	Concentrated stormwater flow paths causing gully and rill erosion on the hillslope, and altered flow patterns causing erosion within the wetlands and rivers. The disturbed soils carried by unmanaged surface runoff then result in sedimentation of aquatic habitat down slope. These impacts can result in the deterioration of aquatic ecosystem integrity and a reduction/loss of habitat for flora & fauna.	• A stormwater management plan must be developed in the preconstruction phase, detailing the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems. The stormwater management infrastructure must be designed to ensure the runoff from the development is not highly concentrated before entering the buffer area. The volume and velocity of water must be reduced through discharging the surface flow at multiple locations surrounding the development, preventing erosion. Effective stormwater

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
		management must include effective stabilisation (gabions and Reno mattresses) of exposed soil. • Sedimentation must be minimised with appropriate measures. Any construction, within or directly upslope of a watercourse, causing bare slopes and surfaces to be exposed to the elements must include measures to protect against erosion using rows of silt fences, sandbags, hay bales and/or earthen berms spaced along contours at regular intervals. Construction must have contingency plans for high rainfall events during construction. • Energy dissipaters should be installed to prevent scour at any culvert outlet. This can be constructed of appropriately sized rock armour. Coarse bedding material or geotextile wrapped dump rock must be considered for use wherever the roads crosses wetland characterized by diffuse subsurface flows such as the seeps. • Stormwater infrastructure must be inspected at least once every year (before the onset of rains) to ensure that it is working efficiently. Any evidence of erosion from this stormwater system must be rehabilitated and the volume/velocity of the water reduced through further structures and/or energy dissipaters.
POTENTIAL IMPACT ON LOCALISED SURFACE WATER QUALITY	During construction or decommissioning, earthworks will expose and mobilise earth materials, and a number of materials as well as chemicals will be imported and used on site and may end up in the surface water, including soaps, oils, grease and fuels, human wastes, cementitious wastes, paints and solvents, etc. Any spills during transport or while works area conducted in proximity to a watercourse has the potential to affect the surrounding biota. This can result in possible deterioration in aquatic ecosystem integrity and species diversity.	• All liquid chemicals including fuels and oil, including for the BESS, must be stored in with secondary containment (bunds or containers or berms) that can contain a leak or spill. Such facilities must be inspected routinely and must have the suitable PPE and spill kits needed to contain likely worst-case scenario leak or spill in that facility, safely. • Washing and cleaning of equipment must be done in designated wash bays, where rinse water is contained in evaporation/sedimentation ponds (to capture oils, grease cement and sediment). • Mechanical plant and bowsers must not be refuelled or serviced within 100m of a river channel. • All construction camps, lay down areas, wash bays, batching plants or areas and any stores should be more than 50 m from any demarcated water courses. • Littering and contamination associated with construction activity must be avoided through effective construction camp management. • No stockpiling should take place within or near a water course.

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
		• All stockpiles must be protected and located in flat areas where run-off will be minimised and sediment recoverable. • ESO monitors the site on a daily basis to ensure plant is in working order (minimise leaks), spills are prevented and if they do occur, are quickly rectified.
CUMULATIVE IMPACTS ON THE AQUATIC RESOURCES OF THE AREA	The rating below is based on the premised that important or sensitive features will be avoided by the various projects, while the mitigations proposed will ensure that the form and or function of downstream areas remain intact.	• The formalisation of existing road crossings, with properly sized culverts with erosion protection measures, can improve the condition of wetlands of the area. Lastly, the adoption, rehabilitation and maintenance of buffers around watercourses in the area, especially the valley bottom systems, would result in a net benefit to aquatic biodiversity.
AVIFAUNAL IMPACT ASSESSMENT		
DESTRUCTION OF BIRD HABITAT	Expressed as a proportion of the overall site area, the area of natural vegetation to be transformed for the wind farm is relatively small. Most of this vegetation is grassland in a fairly untransformed state, although it has been heavily grazed. The significance of this habitat destruction will be MODERATELY NEGATIVE. Since this habitat destruction is large unavoidable, we anticipate that the impact significance will remain unchanged by mitigation. The impact has the most significant consequences for small grassland specialist bird species such as Rudd's Lark and Yellow-breasted Pipit. As described in Section 9.2 of the Avifaunal Impact Assessment, the portions of site identified as holding populations of these species were designed out of the project earlier on.	• The No-Go areas identified by this study (which build on those identified in the pre-construction bird monitoring) should be adhered to. • If more than five years elapses between this study and construction, there may be a need to conduct further monitoring on site to determine whether any significant avifaunal features have changed in the interim. • A pre-construction avifaunal walk down should be conducted to confirm final layout and identify any sensitivities that may arise between the conclusion of the Basic Assessment (BA) Process and the construction phase. This should be done as part of the EMPr and final layout approval, preferably between October and March. • All construction activities should be strictly managed according to generally accepted environmental best practice standards, so as to avoid any unnecessary impact on the receiving environment. • A Biodiversity Management Plan (BMP) must be designed by an ornithologist for the site prior to the Commercial Operation Date (COD). This BMP should include a bird fatality threshold and adaptive management policy, which identifies the number of bird fatalities of priority species which will trigger a management response, appropriate responses, and timelines for such responses. Fatalities of priority bird species are usually rare events (but with very high consequence) and it is difficult to analyse trends or statistics related to these fatalities as they occur. It is therefore important to have a threshold policy in place proactively to assist adaptive management. The BMP should form an annexure of the operational EMPr for the facility. A Draft Biodiversity Offset Strategy has
DISTURBANCE OF BIRDS	Effects of disturbance on birds are particularly likely during breeding and could typically include loss of breeding productivity; temporary or permanent abandonment of breeding; or even abandonment of nest site. There are no sensitive large bird species breeding close enough to site to be of concern. Smaller species are likely to breed on site, and the two most important of these species have been afforded spatial protection for their prime habitat areas. We judge the significance of this impact to be MODERATE NEGATIVE pre mitigation and LOW NEGATIVE post mitigation.	

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
		been developed as part of the BAR, please see Appendix E of the BAR. • One blade on each turbine must be painted subject to Civil Aviation Authority and turbine manufacturer regulations. Provision must be made by the developer for the resolution of any technical, warranty, supplier challenges that this may present. If this cannot be resolved, the developer will be responsible for substituting this with a suitable alternate mitigation measure in consultation with the ornithologist. • Any residual impacts after all possible mitigation measures have been implemented will need to be mitigated off site. The facility will need to address other sources of mortality of priority species in a measurable way (according to best practice) so as to compensate for residual effects on the facility itself. An example of such off-site mitigation could be the retrofitting of insulation onto existing Eskom power lines in the project vicinity which pose an electrocution risk to vultures. This is a measurable impact which is not currently mitigated adequately by Eskom due to the cost. The project could contribute to the cost of such mitigation. Note: in April-May 2023 it was decided between the EAP, ecological specialist and avifaunal specialist that the presence of CBA1 areas on site triggered the need for an offset. Since the main trigger for this is Cape Vulture, a Cape Vulture offset plan was developed and will be implemented. A Biodiversity Offset Strategy has been drafted as part of the BA Process, please see Appendix E of the BAR. • No internal medium voltage power lines (33kV) should be overhead. All such cables should be buried along road verges. Only the 132kV lines from the switching station to the existing Qolweni Substation should be above ground. One exception has been granted for a 33 kV Overhead Line from Ngxwabangu to Ncora, within the assessed 132 kV Overhead Line corridor. This line will be shielded by the taller 132kV line and will pose minimal collision risk. • For both collision and electrocution on power lines, the first and foremost approach to mitigation should be the selection of the shortest and most sensible possible length of new overhead power line to be constructed and the optimal route for this line. • To mitigate for collision of the relevant species, it is recommended that the conductors on the high bird collision risk sections of the line be fitted with the best available (at the time of construction) Eskom approved anti bird collision

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
		line marking device. This should preferably be a dynamic device, i.e. one that moves as it is believed that these are more effective in reducing collisions, especially for bustards (see Shaw 2013), which are one of the key species (Denham's Bustard) in this area. It is recommended that a durable device be used as this area is clearly prone to a lot of strong wind and dynamic devices may be susceptible to mechanical failure. It will be either EDFR or Eskom's responsibility to ensure that these line marking devices remain in working order for the full lifespan of the power line, as we cannot afford to have significant numbers of bird collisions on this new line. It is important that these devices are installed as soon as the conductors are strung, not only once the line is commissioned, as the conductors pose a collision risk as soon as they are strung. The devices should be installed alternating a light and a dark colour to provide contrast against dark and light backgrounds respectively. This will make the overhead cables more visible to birds flying in the area. Note that 100% of the length of each span needs to be marked (i.e. right up to each tower/pylon) and not the middle 60% as some guidelines recommend. This is based on a finding by Shaw (2013) that collisions still occur close to the towers or pylons. It is also recommended that the stay wires on the met masts on site be installed with these devices as soon as possible. • In the case of bird electrocution, the power line must be built on an Eskom approved bird-friendly pole structure which provides ample clearance between phases and phase-earth to allow large birds such as vultures to perch on them in safety. This typically means a phase-phase and phase-earth typical clearance of at least 1800mm, and a Bird Perch on top of any monopoles.
BAT IMPACT ASSESSMENT		
ROOST DISTURBANCE OR DESTRUCTION	During construction of infrastructure for the WEF, potential bat roosts (roosting bats and/or roost sites) in trees, buildings, scattered rocky outcrops, or elsewhere could be disturbed or destroyed (during possible tree felling, demolishment of old buildings, blasting) if overlooked and/or not adequately avoided. To reduce the intensity and duration of this Low significant impact, all High sensitive areas (especially indigenous tree clumps, and buildings and the 200 m buffers around these) must be avoided. If this, and other recommended mitigation measures are followed, the potential impact of roost	• Minimize road impacts. Minimize the length and breadth of proposed roads, and thus minimize the clearing and disturbance of natural areas (including potential bat roosting habitat). • Avoid blasting within 2 km of a confirmed roost. • Minimize degradation of terrestrial habitat (potential bat foraging and roosting habitat). Implement and maintain effective invasive alien plant, stormwater, erosion, sediment, and dust control measures. • Minimize artificial lighting on site. Apart from compulsory civil aviation lighting, minimize artificial lighting - especially high-intensity,

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	destruction or disturbance could be reduced to Insignificant.	steady-burning, sodium vapour, quartz, halogen, and other bright lights at sub-stations, offices, and turbines. All non-aviation lights should be hooded downward and directed to minimise horizontal and skyward illumination. Where possible, solar-powered motion-sensitive lights should be used. • Commence again with acoustic bat monitoring. A detector(s) should be installed on the meteorological mast just before construction commences, and monitoring should occur throughout construction, during the first and second years of operation, and again during the fifth year of operation, and every fifth year thereafter.
DESTRUCTION, DEGRADATION, AND FRAGMENTATION OF AND DISPLACEMENT FROM FORAGING HABITAT	Construction of the WEF will cause destruction, degradation, and fragmentation of mostly natural grassland habitat, where aerial-foraging bat species especially are likely to forage. Without careful planning, there could during construction also be destruction or disturbance of drainage lines and wetland areas, which currently provide bats with essential drinking water, concentrated insect prey, and/or which may represent important beacons or pathways for bat navigation and commuting. Furthermore, during operation, certain bats may be displaced from suitable foraging areas if they avoid the WEF (e.g. due to light pollution or obstruction to movement) or suffer fatality from collision with turbines. Considering that eight and 16 turbines impinge, respectively, on High and Medium-High sensitive areas, this impact was rated with High significance in the absence of mitigation. To reduce the significance of this impact to Medium, all High sensitive areas (especially perennial streams, and wetlands, and their 200 m buffers) must be avoided, the disturbance of Medium-High sensitive areas and the extent of the WEF road network should be minimized, undeveloped WEF-disturbed areas should be effectively rehabilitated post-construction, and light pollution should be minimized during all Project phases.	
ECOLOGICAL IMPACT ASSESSMENT		
IMPACTS ON THE TERRESTRIAL HABITAT OF STRATEGIC WATER SOURCE AREA (SWSA)	The clearance of vegetation and associated construction activities within the northern portion of the Ngxwabangu Study Site will directly impact the terrestrial habitat of the Eastern Cape Drakensberg SWSA resulting in increased run-off, possible erosion, and loss of topsoil. This in turn could impact on the water quality entering the nearby rivers. This impacted is rated as moderate. However, if the mitigation measures specified below are implemented this impact can be reduced to low significance.	• An Erosion Management Plan/Method Statement should be compiled and implemented during the Construction Phase. • Sub-Escarpment Grasslands occur in important catchment areas; healthy wetlands are therefore essential for the continued provision of good quality water, so impacts on wetlands in these grasslands should be avoided. Therefore, the mitigation measures identified by the Aquatic Specialist should be implemented and adhered to. • Activities within 500 m of a wetland and 100 m of a watercourse must obtain the necessary Water Use Authorisation prior to the commencement of construction activities. • Vegetation clearance must be kept to a minimum and retained where possible to avoid soil erosion. • Disturbed areas must be rehabilitated as soon as possible after construction.

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
		• The site must be monitored regularly for signs of erosion. Remedial action must be taken at the first signs of erosion.
LOSS OF DRAKENSBERG FOOTHILL MOIST GRASSLAND (LC)	The clearing of land for the Construction of the proposed Ngxwabangu WEF will result in the direct loss of approximately 204 ha of Drakensberg Foothill Moist Grassland, an ecosystem classified as Least Concern in terms of the Red List of Ecosystems (SANBI, 2021). The current remaining extent of this vegetation type is 7661 km2. Therefore, the clearance of 204 ha of this vegetation type will represent a 0.03% loss of the current remaining extent. It should be noted that portions of this vegetation type have already been lost within the project area, particularly due to subsistence farming, livestock grazing, the expansion of settlements and villages, and the infestation of alien plant species.	• Vegetation clearance must be strictly limited to that which is necessary for the construction of the proposed Ngxwabangu WEF. Blanket and strip clearing should be avoided where possible. • Maintain basal cover where possible and reduce/control soil erosion. These important management actions for restoring and maintaining healthy grasslands. • Where excavation is required, topsoil should be removed and managed for use during rehabilitation. Topsoil often contains a large seedbank which can aid in the restoration of impact areas. • Impacted areas that do not form part of the development footprint, and which are not required during the operational phase, must be rehabilitated as soon as possible after construction. Impacted areas should be spread with topsoil and planted species indigenous to the natural vegetation type of the project area. • Where possible, laydown areas should be located within previously disturbed areas. Laydown areas cannot be located within sensitive areas such as wetlands/ forest patches. • Employees must be prohibited from making open fires during the construction phase. • Existing roads must be utilised as far as practically and feasibly possible. • An Alien Invasive Management Plan must be compiled and implemented during all phases of the proposed development. • The footprint of the proposed development must be micro-sited prior to construction. Should populations of threatened SCC be identified during micro-siting, the design and placement of the turbine hardstands and associated infrastructure components should be amended to avoid these populations. If this is not possible, permits for the removal and translocation of these populations must be obtained. Should translocation of threatened SCC be required, threatened SCC must be translocated to the same habitat type by a qualified botanist/ horticulturalist. • Do not use herbicides or hoeing in the creation of firebreaks. • A Fire Management Plan must be drafted by a suitably qualified specialist and implemented during the operation of the proposed Ngxwabangu WEF
LOSS OF TSOMO GRASSLAND (LC)	The clearing of land for the construction of the proposed Ngxwabangu WEF will result in the direct loss of approximately 11 ha of Tsomo Grassland, an ecosystem classified as Least Concern in terms of the Red List of Ecosystems (SANBI, 2021). The current remaining extent of this vegetation type is 61374 km2. Therefore, the clearance of 11 ha of this vegetation type will represent a 0.002% loss of the current remaining extent. It should be noted that portions of this vegetation type have already been lost within the project area, particularly due to subsistence farming, livestock grazing, the expansion of settlements and villages, and the infestation of alien plant species.	

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
		• Permits must be obtained for the removal/translocation of SCC protected in terms of the Provincial Nature Conservation Ordinance (PNCO).
ENCROACHMENT OF CONSTRUCTION ACTIVITIES WITHIN THE SOUTHERN MISTBELT FOREST PATCHES	All natural forests are protected in terms of the National Forests Act (NFA) of 1998. Although the development footprint provided by the Applicant does not entail development within the Southern Mistbelt Forest patches, these patches have been delineated and declared no-go areas as they provide important habitat for faunal species as well as threatened plant SCC such as Sensitive species 1248 (VU). Encroachment of construction activities within these forest patches would have a high negative impact as this would signify the loss of habitat/potential habitat for a range of threatened plant SCC and faunal species. A minimum of a 50 m no-go buffer has been recommended around forest patches to prevent potential encroachment. Should the recommendations and mitigation measures specified below be implemented during construction, the impact significance would be negligible.	• All forest patches, which have been delineated, must be declared as no-go areas. • A 50 m no-go buffer must be established and delineated around all forest patches within the project area. • No construction activities must be permitted within no-go areas.
LOSS OF PLANT SPECIES OF CONSERVATION CONCERN	The clearance of vegetation could result in the loss of plant SCC (refer to Section 3.4.3), particularly species that are protected in terms of the Nature and Environmental Conservation Ordinance 19 of 1974, TOPS and List of Protected Trees. It is therefore recommended that the footprint of turbine hardstands, roads and other project related infrastructure is micro-sited prior to construction. Should any populations of threatened SCC be identified, the design and placement of project components should be amended to avoid these populations. If this is not possible, permits for the translocation of these SCC must be obtained. This impact is classified as high negative. However, if the recommended mitigation measures specified below are implemented, this impact can be reduced to low negative.	• The footprint of turbine hardstands, roads, and other project related infrastructure must be micro-sited prior to construction. Should populations of threatened SCC be identified during micro-siting, the design and placement of the project components should be amended to avoid these populations. If this is not possible, permits for the removal and translocation of these populations must be obtained. Should translocation of threatened SCC be required, threatened SCC must be translocated to the same habitat type by a qualified botanist/ horticulturalist. • Permits for the removal of plant species protected in terms of the Nature and Environmental Conservation Ordinance 19 of 1974, TOPS and List of Protected Trees must be obtained prior to vegetation clearance/translocation. • Construction vehicles and machinery must not encroach into identified 'no-go' areas or areas outside the project footprint.
LOSS OF CBA AND ESA	The construction of the proposed Ngxwabangu WEF will result in the loss of a portion of an area classified as a terrestrial CBA 1, CBA 2, ESA 1, and ESA 2 as well as an Aquatic ESA 1 and CBA 2. The classification of these areas was driven by the vegetation type, threat status, and the established national conservation target. Even though the site has been impacted by livestock grazing, alien plant	• Where possible, and inline with the ECBCP (2019), infrastructure should be placed outside of areas classified as CBA 1 and 2. The main reason for the classification of the CBA is the presence of vultures. As most of the development occurs within a CBA, an offset should be investigated for the area of influence lost due to the proposed development. The

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	species, subsistence agriculture and the expansion of villages, a systematic biodiversity planning algorithm will still select a site to ensure that the target is satisfied, recommending that degraded areas of CBAs are rehabilitated. Construction within these areas would therefore affect national conservation targets.	probability for success of the offset should be determined by a qualified avifaunal specialist, who should also be involved with the compilation of the required offset. This Biodiversity Offset Strategy has been drafted as a separate document and is available as Appendix E of the BAR. • The temporary laydown areas should be located within previously disturbed areas. • Existing roads must be utilised as far as practically and feasibly possible. • The footprint of turbine hardstands, roads, and other project related infrastructure must be micro-sited prior to construction. Should populations of threatened SCC be identified during micro-siting, the design and placement of the project components should be amended to avoid these populations. If this is not possible, permits for the removal and translocation of these populations must be obtained. Should translocation of threatened SCC be required, threatened SCC must be translocated within the same habitat type by a qualified botanist/horticulturalist. • Disturbed areas must be rehabilitated as soon as possible after construction. Only indigenous plant species must be used for rehabilitation.
HABITAT FRAGMENTATION AND DISRUPTION OF ECOSYSTEM PROCESSES	According to SANBI (2013), The ecological processes that maintain the 'health' of grassland ecosystems often operate at a large spatial scale. This means that large, contiguous and linked blocks of intact grassland habitat (i.e. corridors) are needed to allow ecological processes such as fire, grazing, dispersal and pollination to operate effectively. Development of the proposed WEF may isolated and fragment the habitat into small, isolated or disconnected patches which could lead to the breakdown of ecological processes (such as fire, grazing, dispersal and pollination). Of particular concern is the loss and altered fire regime. Fire is a major ecological driver within grassland ecosystems and the incorrect application, or the absence of burning, could result in a shift in species composition, infestation of alien invasive species, bush encroachment, an increase in densely-tufted or annual grass species, a decline in basal cover and an associated increase in soil erosion.	• The clearance of vegetation must be strictly limited to that which is necessary for the construction of turbine hard stands, roads, and other project related infrastructure. • The temporary laydown areas should be located within previously disturbed areas. • Any impacted areas outside of the development footprint must be rehabilitated using indigenous plant species commonly occurring within the vegetation types of the project area. • Existing access roads should be utilised where feasible. • A Fire Management Plan must be drafted by a suitably qualified specialist and implemented during the operation of the proposed Ngxwabangu WEF. • Identify and maintain ecological corridors within the broader landscape to ensure the maintenance of ecosystem processes.
ESTABLISHMENT OF ALIEN PLANT SPECIES	The removal of existing natural vegetation creates 'open' habitats which favours the establishment of undesirable vegetation in areas that are typically very difficult to eradicate and could pose a threat to surrounding ecosystems. Alien invasive	• The site must be checked regularly for the presence of alien invasive species. • All alien invasive species that establish as a result of the project must be removed and

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	species already present on site such as *Acacia mearnsii* and Pinus sp., amongst others, can become quickly established and invasive.	disposed of as per the Working for Water Guidelines. • An Alien Invasive Management Plan must be compiled and implemented from the proposed Ngxwabangu WEF, BESS and Grid Connection.
DISTURBANCE AND/OR DEATH OF HERPETOFAUNA AND/OR LOSS OF HABITATS	During the construction phase, construction activities associated with the proposed development (e.g., vegetation clearance, excavation of soil, and the movement of construction vehicles) could result in wildlife mortalities through road kills or accidental killing, and/or cause the displacement of herpetofauna via increased noise or air pollution. Additionally, the loss of vegetation/soil due to clearance will result in the direct loss of faunal habitat, which will directly, and indirectly, impact on amphibians and reptiles adapted to their ground dwelling habitats. Reptiles also face a high risk of being poached in the wild, and the increase in individuals associated with the construction of the proposed development could create reptile poaching opportunities. As such, this impact is rated moderate negative.	• The relevant permits must be acquired for any removal of amphibians and reptiles within the study area that are listed as either Schedule I or II on the PNCO. • All construction staff must be educated with regards to wildlife conservation, and all staff employed by the developer must ensure that any amphibians or reptiles encountered during construction of the proposed development are not harmed or killed. • Amphibians and reptiles encountered must be allowed to move away from the construction area. In the event they need to be translocated, amphibians must be released in the same catchment areas while reptiles must be relocated to directly adjacent areas of the proposed development. No amphibian or reptile species may be removed off site without proper authorisation from the relevant authority. • A rescue plan must be developed to protect reptiles which could fall into construction pits. • The appointed ECO should be trained in snake handling and removal techniques. • Any amphibian or reptile species that may die due to construction activities associated with the proposed development must be recorded (e.g., photographed and GPS coordinates taken) and reported to the appointed ECO and relevant authorities (i.e., EWT). Where needed, the carcass should be donated to SANBI. • All individuals, including construction workers must sign a register prior to accessing the construction site. • Construction workers must not be housed on site. • Speed restrictions (40 km per hour is recommended) must be implemented to reduce the chance of road kills, as well as to reduce the amount of dust caused by vehicle movement along the roads. • The construction of turbine handstands or project related infrastructure on rocky outcrops and/or permanent waterbodies must be avoided. Moreover, some amphibian species breed in temporary waterbodies, therefore it is recommended that where possible construction activities should take place outside of the wet and rainy season.

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
		• All reasonable and feasible measures should be implemented to reduce noise in ecologically sensitive areas.
DISTURBANCE AND/OR DEATH OF MAMMALS AND/OR LOSS OF HABITATS	During the construction phase, construction activities associated with the proposed development (e.g., vegetation clearance, excavation of soil and the movement of construction vehicles) could result in wildlife mortalities through road kills or accidental killing, and/or cause the displacement of mammals via increased noise or air pollution. Additionally, the loss of vegetation/soil due to clearance will result in the direct loss of faunal habitat, which will directly, and indirectly, impact on small sedentary species adapted to their ground dwelling habitats. Larger more agile species such as antelope are likely to disperse to more suitable habitats away from construction areas. As such, this impact is rated slight negative.	• The relevant permits must be acquired for the removal of any mammals within the study area that are listed as either Schedule I or II on the PNCO. • All construction staff must be educated with regards to wildlife conservation, and all staff employed by the developer must ensure that any mammals encountered during construction of the proposed development are not harmed or killed. • Any mammals encountered must be allowed to move away from the construction area. No mammal may be removed off site without proper authorisation from the relevant authority. • Any mammal species that may die due to construction activities associated with the proposed development must be recorded (e.g., photographed and GPS coordinates taken) and reported to the appointed ECO and relevant authorities (i.e., EWT). Where needed, the carcass should be donated to SANBI. • Speed restrictions (40 km per hour is recommended) must be implemented to reduce the chance of road kills, as well as to reduce the amount of dust caused by vehicle movement along the roads. • The construction of turbine handstands on rocky outcrops and/or permanent waterbodies must be avoided. • All reasonable and feasible measures should be implemented to reduce noise in ecologically sensitive areas.
DISTURBANCE AND/OR LOSS OF HERPETOFAUNA SPECIES OF CONSERVATION CONCERN	During the construction phase, construction activities associated with the proposed development (e.g., vegetation clearance, excavation of soil and the movement of construction vehicles) could result in the loss of herpetofauna SCC through increased road kills or accidental killing, and/or cause the displacement of Coppery Grass Lizard. Neither have been recorded nor observed within study area, but both species are expected to have a high chance of occurrence within the study area (refer to Section 3.5.2). As such, this impact is rated as moderate negative.	• A Search and Rescue Operation must be undertaken for protected amphibian and reptile species. • The relevant permit must be acquired for the removal of any amphibians and reptiles within the study area that are listed as ether Schedule I or II on the PNCO. • Not all areas can be avoided, but it is recommended that construction staff must be educated with regards to wildlife conservation and that all staff employed by the developer ensure that any amphibians or reptiles encountered are not harmed or killed. • Amphibians or reptiles encountered must be allowed to move away from the construction area. In the event they need to be translocated, amphibians must be released in the same catchment area while reptiles must be relocated to directly adjacent areas of the

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
		proposed development. No amphibians or reptiles may be removed off site without proper authorisation from the relevant authority. • Where possible, amphibian or reptile SCC observed on site must be recorded (photographed, GPS coordinates taken) and loaded onto iNaturalist by the appointed ECO. • The construction of turbine handstands on permanent waterbodies must be avoided
DISTURBANCE AND/OR LOSS OF MAMMAL SPECIES OF CONSERVATION CONCERN	During the construction phase, construction activities associated with the proposed development (e.g., vegetation clearance, excavation of soil and the movement of construction vehicles) could result in the disturbance and/or loss of mammal SCC through increased road kills or accidental killing, and/or cause the displacement of mammal SCC via increased noise or air pollution. Several mammal SCC, including antelope, have been identified as possibly occurring within the study area (refer to Section 3.5.1). Additionally, some mammal SCC may face the risk of being hunted, baited, or trapped by construction staff. However, many of the mammal SCC identified in this report, if not all, are able to move away from construction areas to more suitable habitats. As such, this impact is rated as low negative.	• Mammal SCC encountered must be allowed to move away from the construction area. No mammal SCC may be removed from site without authorisation from the relevant authority. • The relevant permit must be acquired for the removal of any of the mammals within the study area that are listed as ether Schedule I or II on the PNCO. • Not all areas can be avoided, but it is recommended that construction staff must be educated with regards to wildlife conservation and that all staff employed by the developer ensure that any mammals encountered are not harmed or killed. • The hunting, baiting, or trapping of mammals by construction staff must be strictly prohibited. • The appointed ECO should inquire and undertake an overview inspection of the site for the evidence of snares during the construction phase. • Where possible, mammal SCC observed on site must be recorded (photographed, GPS coordinates taken) and loaded onto iNaturalist by the appointed ECO.
HERITAGE IMPACT ASSESSMENT		
LOSS OF HERITAGE RESOURCES: ARCHAEOLOGY	The study identified an Iron Age site of heritage significance. The sites are situated in the vicinity WTG 25 and its associated access roads but impact on the sites seem unlikely. Mitigation measure will nonetheless apply.	• Fixed Mitigation Procedure (required): Site Monitoring: Regular examination of trenches and excavations. • Monitor as frequently as practically possible. Preferred Mitigation Procedure: Avoidance: Implement a heritage conservation buffer of at least 100m around the heritage resource, redesign infrastructure to avoid the heritage resource and the proposed conservation buffer. • Alterative Mitigation Procedure (if preferred mitigation procedure is not feasible): Documentation of sites if features are to be impacted on by development (mapping, desktop study Phase 2 site sampling). Permitting if and when required. • Site Monitoring: Regular examination of trenches and excavations in order to detect and preserve previously undocumented heritage receptors.
LOSS OF HERITAGE RESOURCES: BUILT ENVIRONMENT	The study noted the remains of the poorly preserved dwellings, buildings and enclosures dating to Historical Period settlement in the area but no notable heritage or historical association to the sites could be established and the sites are of medium-low heritage significance. Some of the features and sites occur around and within areas demarcated for development of WTG 36 and its associated access roads, associated access roads, the OHL Alternative 1 and OHL Alternative 2 as well as one of the proposed BESS sites and potential impact on the sites should be closely monitored to avoid the destruction of previously undetected heritage remains. As for the rest of the project area, the general	

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	landscape holds varied significance in terms of the built environment as the area comprises historical farming remnants and relatively newly established settlements and townlands.	• Social Consultation: It is suggested that local communities be consulted with regards to the religious and social meaning of the site and possible impacts / management of the site. • Avoidance: Implement a heritage conservation buffer of at least 50m from all burials / graves. Where digging / construction encroaches on this buffer, erect a temporary construction barricade around burials to clearly indicate the location of burials. Implement a site management plan detailing strict site management conservation measures. • Grave Relocation: Relocation of burials and documentation of site, full social consultation with affected parties, possible conservation management and protection measures. Subject to authorisations and relevant permitting from heritage authorities and affected parties.
LOSS OF HERITAGE RESOURCES: CULTURAL LANDSCAPE	The larger area comprises a rich cultural horizon and the natural landscape surrounding the proposed project encompasses open grasslands and river valleys, typical of the rural areas of the Eastern Cape. The cultural landscape holds Herder sites, Iron Age remains, Colonial Period farmsteads and Historical towns. Of note is a ceremonial rock in the larger project area which has heritage significance. The feature will not be impacted on by the development. Further away from the project area, the landscape is typical of the Eastern Cape with large flat parcels with occasional undulating hills and mountainous regions.	
LOSS OF HERITAGE RESOURCES: HUMAN BURIAL SITES	A number of burial sites were located in the larger project area. These receptors are of high significance for their social and cultural value but no direct impact on the resources is anticipated. However, some of the burial site occurs in close proximity of areas demarcated for development of WTG 36 and its associated access roads and potential impact on the site should be monitored to avoid damage to the site and potential other undetected heritage remains. It should be noted that graves and cemeteries often occur within settlements or around homesteads in the rural areas of the Eastern Cape, and they are also randomly scattered around archaeological and historical settlements. The probability of informal human burials encountered during development should thus not be excluded. In addition, human remains and burials are commonly found close to archaeological sites; they may be found in “lost” graveyards, or occur sporadically anywhere as a result of prehistoric activity, victims of conflict or crime. It is often difficult to detect the presence of archaeological human remains on the landscape as these burials, in most cases, are not marked at the surface. Human remains are usually observed when they are exposed through erosion. In some instances packed stones or rocks may indicate the presence of informal pre-colonial burials. If any human bones are found during the course of construction work then they should be reported to an archaeologist and work in the immediate vicinity should cease until the appropriate actions have been carried out by the archaeologist. Where human remains are	

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	part of a burial they would need to be exhumed under a permit from SAHRA (for pre-colonial burials as well as burials later than about AD 1500). Should any unmarked human burials/remains be found during the course of construction, work in the immediate vicinity should cease and the find must immediately be reported to the archaeologist, or the South African Heritage Resources Agency (SAHRA). Under no circumstances may burials be disturbed or removed until such time as necessary statutory procedures required for grave relocation have been met.	
NOISE IMPACT ASSESSMENT		
CONSTRUCTION NOISE: DAYTIME	Construction of the access roads during the day raising ambient sound levels in the area. Considering the ambient sound level measurements collected in the area, daytime sound levels could range between 22 and 76 dBA. Daytime construction activities should not change the existing ambient sound levels with more than 7 dB, nor should the construction activities result in noise levels exceeding the daytime noise limit (55 dBA) recommended by the WHO / IFC.	• The significance of the noise impact is Low, and additional mitigation measures are not required. It is however recommended that the applicant plan that access roads are not constructed at night.
CONSTRUCTION NOISE: NIGHTTIME	Various construction activities (likely limited to the pouring of concrete as well as erection of WTG components) taking place simultaneously at night will increase ambient sound levels due to air-borne noise. Considering the ambient sound level measurements collected in the area, daytime sound levels could range to less than 20 and 72 dBA. Night-time construction activities should not change the existing ambient sound levels with more than 7 dB, nor should the construction activities result in noise levels exceeding the night-time noise limit (45 dBA) recommended by the WHO / IFC.	• Significance of night-time construction noises may be medium for the scenario as conceptualized and additional mitigation measures are required and recommended as follows: ○ Plan construction schedule that such simultaneous activities are only required at one WTG location (located within 1,000 m from an NSR). Other simultaneous construction activities can continue, but should take place further than 1,000 m from NSR; and ○ Minimise active equipment at night, planning the completion of noisiest activities (though unlikely, could include activities such a pile driving, rock breaking and excavation) during the daytime period.
PALAENTOLOGICAL IMPACT ASSESSMENT		
NO IMPACTS IDENTIFIED | SITE VERIFIED AS HAVING VERY LOW SENSITIVITY		
SOCIAL IMPACT ASSESSMENT		
TEMPORARY STIMULATION OF THE NATIONAL AND LOCAL ECONOMY	As indicated in Table 4.1 [of the Socio-Economic Assessment Report], it is estimated that the project will increase the country's economic production (revenue generation) by R4.3 billion in 2021 prices, which will translate into an additional R1.6 billion of gross domestic product (GDP). These effects will take place over the course of the construction period which is estimated to last	• The wind energy facility developer, EDF Renewables, should prescribe that the EPC contractor prioritises local procurement of goods and services where possible from nearby sourcing hubs being Komani and Mthatha. This will be limited to more general construction related goods and services as well as generic machinery.

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	approximately two years. To put this investment into perspective, the total GDP impact over the two-year period is equivalent to approximately 64-65% of the IYLM's annual GVA output. The greatest effects on economic production and GDP stimulated during construction activities will be created through the multiplier effects, specifically through a combination of production and consumption induced effects. Production induced effects are those that result from an increase in the demand for goods and services from those businesses that are likely to provide inputs (i.e., cement, steel, etc.) to the construction company(ies) responsible for building the associated infrastructure. Consumption induced effects are those that arise from increased spending on goods and services by those individuals employed during the construction phase of the development. It is assumed that the majority of the direct spend will be spent within the primary and secondary study areas. It should be noted that actual final expenditure will depend on the choice of suppliers and contracts as well as their procurement strategies. Besides the value added that could be generated by local construction businesses through sub-contracting agreements and employment of free-lancers, the sectors that are expected to benefit the most from the production and consumption induced effects are tertiary services such as trade, accommodation, transport services, personal services, real estate, and insurance.	• The EPC should also be encouraged to raise awareness amongst local businesses as well as aspiring entrepreneurs within the study area prior to the construction taking place. Awareness should extend to catering companies as well as accommodation businesses in the nearby towns and generic construction businesses as mentioned above. • Sub-contract to local construction and transport companies particularly MSME's, B-BBEE compliant and women-owned enterprises where possible. • Use local suppliers where feasible and arrange with the local MSME's to provide transport, catering and other services to the construction crews.
TEMPORARY INCREASE IN EMPLOYMENT IN THE STUDY AREA, REGIONAL AND NATIONAL ECONOMIES	The proposed wind energy facility and its related infrastructure are anticipated to directly create approximately 203 Full Time Equivalent (FTE) employment positions over the course of the construction phase (see Table 4.2 of the Socio-Economic Assessment Report). To put these employment numbers into perspective, the direct employment of the project, if all captured within the IYLM area would represent a growth of 27% in the local construction sector's current employment. Beyond the direct employment opportunities that will be created by the project during the construction phase the development will also have a positive spin-off effect on the employment situation in other sectors of the national and local economies. Through the procurement of local goods and services (i.e.,	• Co-ordinate and arrange local community meetings through the Instika Yethu local municipality, labour unions and local traditional councils to advise the local labour force about the proposed project and the jobs that can potentially be applied for. • Establish numerous local skills desks to determine the potential skills that could be sourced from the area. Skills desks could be located at the stone quarry and the Lubisi conference centre found in the Mcambalala traditional council as well as the local clinic found within the proposed study area as well as in nearby towns such as Cofimvaba and Komani. • Recruit local labour as far as feasible. • Provide the local labour force with necessary training prior to the construction phase. • Employment of labour-intensive methods in construction where feasible.

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	consumption induced effects) the project will support an additional 1226 FTE employment positions during the construction phase. Based on these figures, the contribution of the proposed wind energy facility and its related infrastructure development towards employment creation in the broader South African economy is estimated to eventually amount to 4519 FTE employment positions over the two years of construction. Throughout the construction phase it is recommended that the developer encourages the contractor to fill as many local positions as possible using labour within the Instika Yethu local municipality and where possible from the four traditional council communities. In chapter three of the report, the socio-economic profile revealed the low education attainment levels amongst the population living in and around study area- this suggests that it is unlikely that there are going to be a significant number of people readily available to perform the necessary jobs right at the beginning of the construction phase. Even in terms of unskilled positions, locals without construction related experience will not be equipped with the requisite skills and know-how to complete required construction tasks. As such, lead time would need to be allocated to provide prospective local workers with the necessary on-the-job and on-site training prior to the construction of the wind energy facility.	
CONTRIBUTION TO SKILLS DEVELOPMENT IN THE STUDY AREA AND REGIONAL ECONOMY	The construction phase of the wind energy facility and its related infrastructure is likely to have a positive impact on the skills development in the study area and regional economy. During the establishment phase, it is likely that specialist technical experts will be involved. This will present an opportunity for skills and knowledge transfer between these technical experts and local labour. It is also expected that the construction crew involved in the project will gain knowledge and experience in respect of the development of electrical infrastructure related to the wind energy industry. This will be highly beneficial given South Africa's target of generating 20 000MW of renewable energy by 2030 (Department Energy, 2019). More skilled local construction crews would most likely also lower the cost of future renewable energy-related developments in the region. In general, one out of four construction workers	• Facilitate knowledge and skills transfer between highly specialised technical experts and South African professionals during the pre-establishment and construction phases. • Provide basic construction training to recruited local members before the construction phase takes place. • Set up apprenticeship programmes to build onto existing skill levels or develop new skills amongst construction workers especially those from the local communities. • Improved labour productivity and employability of construction workers for similar projects proposed in the province. • Possible development of provincial skills and expertise in R&D and manufacturing, specialist services and construction industries related to the wind energy industry through partnerships with Nelson Mandela University, Rhodes University, Walter Sisulu University and the University of Fort Hare.

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	are usually drawn from local communities, it is therefore highly probable that these workers will be able to utilise these new skills over the long run, in any future developments proposed within the eastern region of the province, specifically the Chris Hani District municipality. In addition to the direct effects of the project on skills development in the regional and the local economy, the project could contribute to the development of the local R&D and manufacturing industries associated directly and indirectly with the renewable wind energy industry. This could be achieved through partnerships with the Nelson Mandela University (NMU), Walter Sisulu University, Rhodes University and the University of Fort Hare. Partnerships of this nature could further enhance the development of new skills and expertise.	
TEMPORARY INCREASE IN HOUSEHOLD EARNINGS	The proposed wind energy facility and its associated infrastructure development will through the construction phase, generate R739.7 million worth of revenue for the affected households in the country through direct, indirect and induced effects. Based on Table 4.3 [of the Socio-Economic Assessment Report], R169.1 million will be paid out in the form of salaries and wages to those individuals directly employed during the two-year construction phase. The remaining value of R570.5 million in households' earnings will be generated through indirect and induced effects resulting from project expenditure. Although temporary, this increase in household earnings will have a positive effect on the standard of living within the households of the immediate study area as well as the regional area at large. This increase in household earnings however will vary significantly based on the respective skill levels and job specifications of the employee.	• Recruit local labour as far as feasible to increase the benefits to the local households. • Employ labour intensive methods in construction where feasible. • Sub-contract to generic local construction companies where possible. • Use local suppliers where feasible and arrange with local MSME's and B-BBEE compliant enterprises to provide transport, catering and other services to the construction crews. • Improved standard of living of provincial citizens around the Eastern Cape whose carrier now centre around the development, planning and construction of renewable energy projects.
TEMPORARY INCREASE IN GOVERNMENT REVENUE	During the construction phase of the Ngxwabangu wind energy facility, its related infrastructure will generate revenue for the government during the construction period through a combination of personal income tax, VAT, companies' tax, etc. Additional government revenue will also be earned through corporate income tax. Government earnings will be distributed by national government to cover public spending which includes amongst others the provision and	• None suggested.

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	maintenance of transport infrastructure, health and education services as well as other public goods.	
TEMPORARY INCREASE IN SOCIAL DISRUPTIONS ASSOCIATED WITH THE INFLUX OF LABOUR AND JOB SEEKERS	Based on the overall socio-economic profile of the immediate study and the Instika Yethu local municipality as a whole, it is highly unlikely that the workforce required for the construction period will be drawn primarily from the specific study area and surrounding communities. Non-local professionals and more specialised labourers involved in the construction phase will therefore be traveling to the site on a daily basis from neighbouring towns where they would be temporarily residing. The influx of construction workers into the area could result in social disruptions between the local population and the existing construction workers currently operating in the area and this new workforce through perceptions by the local population of these migrant workers "stealing" their employment opportunities. Likewise, the influx of jobseekers and opportunists from other communities in the greater Chris Hani District, could potentially lead to a temporary increase in the level of petty crime, illicit activity, litter and possibly a deterioration of the health of the local community through the spread of communicable diseases (e.g., flu, TB). There is also the possibility that semi-skilled and unskilled construction workers could also choose to remain in the area following the completion of the construction phase and without any form of alternative income these individuals run the risk of exacerbating the level of poverty within the study area and the local municipality at large. With the study area being part of the former Transkei, this suggests that the traditional land may have a high cultural significance and value attached to it as well as the local community members practicing their respective cultural traditions which may be connected to the land. Therefore, construction workers and companies who would be migrating to the study area for the purpose of constructing the proposed energy wind facility, need to be informed by the traditional leaders and community representatives prior to the construction phase of any key landmarks and cultural rituals being practiced within in specific areas in and surrounding the study area.	• Set up a recruitment office in the nearby towns (such as Cofimvaba and Komani) and adhere to strict labour recruitment practices that would reduce the desire of potential job seekers to loiter around the area in the hope of finding temporary employment. • Control the movement of workers between the site and areas of temporary residence to minimise loitering around the site. This should be achieved through the provision of scheduled transportation services between the construction site and area of residence. • Involve the traditional leaders from the four administrative areas of the study area to inform the EPC contractor and the proposed development team at large about the cultural and religious land practices that are followed in the study area. • The traditional leaders should be encouraged to assign a reliable person in their respective administration area to deal with complaints of their community members. • Employ locals as far as feasible through the creation of a local skills database. • Establish a management forum comprising of key stakeholders to monitor and identify potential problems that may arise due to the influx of job seekers to the area. • Ensure that any damages or losses to nearby buildings that can be linked to the conduct of construction workers are adequately reimbursed. • Assign a dedicated person to deal with complaints and concerns of affected parties.

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	Addressing the challenges related to potential social impacts is best done in partnership with all stakeholders in the area, specifically the affected interested parties, the traditional council leaders and their community representatives, ward councillors and municipality employees. This would promote transparency in information sharing and help build good relationships between all affected parties.	
IMPACT ON ECONOMIC AND SOCIAL INFRASTRUCTURE	The wind energy facility and associated infrastructure are anticipated to directly create 203 FTE positions during the construction phase. This means that there will be a relatively large number of people who will be on site over the course of the project. It is estimated that a sizeable portion of these construction workers will be coming from outside the study area and the local municipality and other parts of the Eastern Cape and South Africa. Given that these migrant workers will require accommodation and other services there is likely to be an increase in the demand for rental accommodation, social services and access to water and electricity. There are a number of clinics and hospitals located throughout the municipal area, including a small clinic in the immediate study area. Given the proximity of the development site to these settlements it is most likely that these health facilities will experience additional demand for medical services brought about by the influx of works and job seekers. It is also likely that construction workers coming from outside of the area may wish to be accommodated in rental accommodation establishments found in the nearby towns such as Cofimvaba, Komani and Mthatha which offer B&Bs, hotels and self-catering accommodation establishments. Water, sewerage, and electrical infrastructure in the Instika Yethu local municipality is noted to be aging and poorly maintained. Water for use by the site camp during construction will likely be obtained from the closest viable groundwater and/or surface water sources, to be determined and licensed through a Water User License Application process. Electricity for the site camp is likely to be provided through access to the closest Eskom off-take point with a backup generator in case of	• Provide adequate signage along relevant road networks to warn the motorists of the construction activities taking place on the site. • Engage with local authorities and inform them of the development as well as discuss with them their ability to meet the additional demands on social and basic services created by the in migration of workers. • Where feasible, assist the municipality in ensuring that the quality of the local social and economic infrastructure does not deteriorate through the use of social responsibility allocations. • The developer and EPC contractor should ensure prior to the construction phase that they make use of their own mobile social services and economic infrastructure as far as possible, i.e., the use of a mobile clinic on site for the construction team as well as a generator for their own electricity supply as well as water tanks and boreholes as suitable water sources

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	outages. Where no off-take point exists, a generator will be used exclusively. Water and electrical connections during the construction phase will therefore not adversely affect existing municipal infrastructure. Due to the aging infrastructure and the existing lack of access to water within the area, the developer and EPC contractor would need to ensure the site is well equipped and backed-up with the necessary infrastructure in order to avoid further damage of the infrastructure found in the area prior to the construction phase taking place. Ultimately, the aim before the construction phase commences should be to leave the site area in a better condition than what it was found. The effects of the development on road infrastructure should also be considered as it is highly likely that the development will lead to an increase in traffic volumes on the surrounding road network. This could lead to a deterioration of local road conditions, specifically which are already in a poor state of repair. The deterioration of the road network could place additional financial burdens on the municipality through additional maintenance costs. Based on the above discussion is expected that the housing and accommodation situation, basic service provision, health facilities and road infrastructure will be under additional pressure during the construction period as additional people will be working in the area. These impacts can however be mitigated if the developer engages with the local municipality and plans accordingly.	
CHANGES TO THE AREA'S SENSE OF PLACE	A community's 'sense of place' is developed over time as it embraces the surrounding environment, becomes familiar with its physical properties and creates its own history (Lynch, 1981). The sense of place is created through the interaction of a number of different factors such as the areas visual resources, its aesthetics, climate, culture and heritage as well as the lifestyle of individuals that live in and visit the area (Steele, 1981). Most importantly, it is a highly subjective matter and dependent on the demographics of the population that resides in the area and their perceptions regarding trade-offs. For example, a community living in poverty is generally more likely to be accepting of industrial development that promises	• The mitigation measures proposed by the visual and noise specialists should be adhered to. • Natural environments that are not affected and needed by the proposed development should remain untouched. Regulations of boundaries of such areas need to be made transparent between the local community's leaders, the developer and EPC contractor prior to the development's construction phase. • Efforts should also be made to avoid disturbing such sites during construction.

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	employment opportunities while a more affluent residential area is more likely to oppose such a development on the grounds that the development is likely to have an adverse impact on property values. The area proposed for the development as well as its surrounds is predominantly rural in nature. Accordingly, most properties that have a high degree of visual exposure to wind energy facilities and their related infrastructure already have a high degree of visual exposure to all existing structures and infrastructure present in the area. Any rapid changes that significantly alter the characteristics that define the area's sense of place could potentially have a negative impact. During the construction of the wind energy facility and it related infrastructure there are likely to be some minor temporary noise impacts caused by the movement of vehicles as well as construction activities on site. These impacts are anticipated to occur primarily	
VISUAL IMPACT ASSESSMENT		
VISUAL IMPACT OF CONSTRUCTION ACTIVITY	During the construction period, there will be an increase in heavy vehicles utilising the roads to the construction sites that may cause, at the very least, a visual nuisance to other road users and landowners in the area in close proximity (within 5km). Within the region, dust as a result of construction activities may also be visible, as such it will result in a visual impact occurring during construction.	• Ensure that vegetation is not unnecessarily removed during the construction period. • Reduce the construction period through careful logistical planning and productive implementation of resources. • Plan the placement of lay-down areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e., in already disturbed areas) wherever possible. • Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads. • Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities. • Reduce and control construction dust using approved dust suppression techniques as and when required (i.e., whenever dust becomes apparent). • Where possible, restrict construction activities to daylight hours in order to reduce lighting impacts as much as possible. • Rehabilitate all disturbed areas immediately after the completion of construction works.
VISUAL IMPACT OF CONSTRUCTION LIGHTING	During the construction period, there will be an increases light activity at night as a significant amount of construction activities will take place during the night since Turbine erection often has to be done at night when	• Reduce the construction period through careful logistical planning and productive implementation of resources. • Restrict the activities and movement of construction workers and vehicles to the

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	the wind speeds are lower. This will pose a visual nuisance to other road users and landowners in the area in close proximity (within 5km), as such it will result in a visual impact occurring during construction.	immediate construction site and existing access roads. • Where possible, restrict construction activities to daylight hours in order to reduce lighting impacts as much as possible.
OPERATIONAL PHASE		
AQUATIC IMPACT ASSESSMENT		
NONE IDENTIFIED BY SPECIALIST		
AVIFAUNAL IMPACT ASSESSMENT		
DISTURBANCE OF BIRDS DURING CONSTRUCTION	The indications from operational wind farms are that this impact may be of fairly low importance, although it is acknowledged that a longer term or more detailed means of measuring this impact may be required. We judge the significance of this impact to be MODERATE NEGATIVE pre mitigation and LOW NEGATIVE post mitigation.	• A post construction inspection must be conducted by an avifaunal specialist to confirm that all aspects have been appropriately handled and in particular that road and hard stand verges do not provide additional substrate for raptor prey species. It is essential that the new wind farm does not create favourable conditions for such mammals in high risk areas. We therefore recommend that within the first year of operations a full assessment of this aspect be made by the ornithologist contracted for post construction monitoring. If such conditions have been created case specific solutions will need to be developed and implemented by the wind farm. • A 'Cape Vulture Food Management Programme' must be implemented on site to ensure all dead livestock/wildlife on site are removed as soon as possible and made unavailable to vultures for feeding. This programme will reduce the amount of available vulture food on site and reduce vulture-turbine collision risk. This programme will require the deployment of a dedicated (i.e. no other tasks) and adequately resourced (transport, binoculars, GPS, cameras, training) team of staff to patrol the full site during all daylight hours. This team will need to have a vehicle and the appropriate equipment to be able to dispose of large dead animals off site. This programme must be operational by the time the first turbine blades are turning on site and should not wait for COD. A full detailed protocol for this programme is included as Appendix 10 and must be updated and included in the BMP/EMPr. This programme should, if possible, be combined with the initiation of a 'vulture restaurant' a suitable distance off site – where vultures are fed (and the above-mentioned carcasses are disposed of) in order to provide an attraction for vultures away from the turbines. • An observer or technology led turbine Shutdown on Demand (SDOD) programme must be implemented on site from COD. In South Africa, observer led SDOD has recently shown
DISPLACEMENT OF BIRDS DURING OPERATIONS	As for disturbance above, the indications from operational wind farms are that this impact may be of fairly low importance, although it is acknowledged that a longer term or more detailed means of measuring this impact may be required. We judge the significance of this impact to be MODERATE NEGATIVE pre mitigation and LOW NEGATIVE post mitigation.	
COLLISION OF BIRDS WITH TURBINE BLADES	Human caused fatalities of regionally Red listed or otherwise threatened bird species are always cause for concern and should be avoided as far as possible. The estimated fatalities we have predicted are therefore of concern for the relevant species, in particular Cape Vulture. There are currently no established thresholds for acceptable impacts on bird species in South Africa. However, our own work elsewhere in the country using the method known as 'Potential Biological Removal or PBR' has established that the Cape Vulture cannot sustain any fatalities from wind energy in South Africa. Other anthropogenic threats in existence prior to renewables (predominantly power line electrocution and collision) already take up any fatalities that the species' population can sustain annually. The fatality threshold for any wind farm in South Africa therefore emerges as zero. We conclude that the impact of bird collision with turbines pre-mitigation is of VERY HIGH NEGATIVE significance. This must be effectively mitigated if the project is to proceed. There are various mitigation measures described in Section 11 which could reduce the significance. The degree of this reduction is however uncertain as the mitigation measures are largely unproven in South Africa. Mitigation would	

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	need to be 100% effective, or very close to that in order for the risk to be acceptable. Even an efficacy of 80% would result in several Cape Vulture fatalities per year, which is not sustainable for the species. Based on current information we judge that the significance post mitigation will remain at HIGH NEGATIVE. It is conceivable that in the coming years mitigation will be proven to be effective enough to revise this finding, but at this point we do not have sufficient confidence in the mitigation. It is likely that the various available mitigation measures will be used at other wind farms in South Africa in the near and this could improve our confidence in these measures for the proposed project before construction.	promise at an operational wind farm in the Western Cape. It is likely that by the time of construction of the proposed project more experience on this mitigation will be available in country. This is required in order to mitigate the risk of turbine collision for Cape Vulture in particular, but will also address risk to other species. If an observer led programme is used, this programme must consist of a suitably qualified, trained and resourced team of observers present on site for all daylight hours 365 days of the year. This team must be stationed at vantage points with full visible coverage of all turbine locations. The observers must detect incoming priority bird species, track their flights, judge when they enter a turbine proximity threshold, and alert the control room to shut down the relevant turbine until the risk has reduced. A full detailed protocol is included in Appendix 11 of the Avifaunal Impact Assessment report and must be updated and included in the BMP/EMPr. If a technology led option is used, preference should be given to a system that has been independently reviewed for efficacy. We crudely estimated how many shutdowns could be expected based on pre-construction monitoring data. When Cape Vulture flight paths are clipped to a 500m proximity to the current turbine layout, 26 records were made in 360 hours of observation. This translates into a passage rate of 0.072birds/hr. Converting this to a year results in approximately 315 shutdown events per year. At an assumed 10 minutes shutdown at 1 turbine per event, this means 3 150 minutes of turbine downtime in a year. The facility of 36 turbines will operate for a total of 18 921 600 minutes per year (24hrs x 60 minutes x 365days x 36 turbines) this equates to 0.01% lost operating time. Even if the estimate is wrong and the real loss is ten times higher, it would be 0.1%. EDFR has confirmed that this is acceptable to them. • One blade on each turbine must be painted subject to Civil Aviation Authority and turbine manufacturer regulations. Provision must be made by the developer for the resolution of any technical, warranty, supplier challenges that this may present. If this cannot be resolved, the developer will be responsible for substituting this with a suitable alternate mitigation measure in consultation with the ornithologist. • Any residual impacts after all possible mitigation measures have been implemented will need to be mitigated off site. The facility will need to address other sources of mortality of
COLLISION OF BIRDS WITH OVERHEAD POWERLINES **ELECTROCUTION OF BIRDS PERCHED ON PYLONS/TOWERS**	Birds could perch on the pylons/towers of the overhead power line and be at risk of electrocution if the design is not bird friendly. Birds in flight could collide with the overhead cables, particularly the earth wire. Collision and electrocution of birds on overhead power lines on site is anticipated to be of HIGH NEGATIVE significance pre-mitigation. Both of these impacts can be mitigated successfully in our opinion to reduce the significance to LOW NEGATIVE. In both cases the first and foremost approach to mitigation should be the selection of the shortest and most sensible possible length of new overhead power line to be constructed and the optimal route for this line. To mitigate for collision of the relevant species, it is recommended that the conductors on the high bird collision risk sections of the line be fitted with the best available (at the time of construction) Eskom approved anti bird collision line marking device. This should preferably be a dynamic device, i.e. one that moves as it is believed that these are more effective in reducing collisions, especially for bustards (see Shaw 2013), which are one of the key species (Denham's Bustard) in this area. It is recommended that a durable device be used as this area is clearly prone to a lot of strong wind and dynamic devices may be susceptible to mechanical failure. It will be either EDFR or Eskom's responsibility to ensure that these line marking devices remain in working order for the full lifespan of the power line, as we cannot afford to have significant numbers of bird collisions on this new line. It is important that these devices are installed as soon as the conductors are strung, not only once the line is commissioned, as the conductors pose a collision risk as soon as they	

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	are strung. The devices should be installed alternating a light and a dark colour to provide contrast against dark and light backgrounds respectively. This will make the overhead cables more visible to birds flying in the area. Note that 100% of the length of each span needs to be marked (i.e. right up to each tower/pylon) and not the middle 60% as some guidelines recommend. This is based on a finding by Shaw (2013) that collisions still occur close to the towers or pylons. It is also recommended that the stay wires on the met masts on site be installed with these devices as soon as possible. In the case of bird electrocution, the power line must be built on an Eskom approved bird-friendly pole structure which provides ample clearance between phases and phase-earth to allow large birds such as vultures to perch on them in safety. This typically means a phase-phase and phase-earth typical clearance of at least 1800mm, and a Bird Perch on top of any monopoles.	priority species in a measurable way (according to best practice) so as to compensate for residual effects on the facility itself. An example of such off-site mitigation could be the retrofitting of insulation onto existing Eskom power lines in the project vicinity which pose an electrocution risk to vultures. This is a measurable impact which is not currently mitigated adequately by Eskom due to the cost. The project could contribute to the cost of such mitigation. Note: in April-May 2023 it was decided between the EAP, ecological specialist and avifaunal specialist that the presence of CBA1 areas on site triggered the need for an offset. Since the main trigger for this is Cape Vulture, a Cape Vulture offset plan was developed and will be implemented. • The monitoring programme compiled for construction and post construction, outlined in Appendix 9 [of the Avifaunal Assessment Report], should be implemented according to the latest available version of the best practice guidelines at the time. The findings from operational phase monitoring should inform an adaptive management programme to mitigate any impacts on avifauna to acceptable levels.
BAT IMPACT ASSESSMENT		
BAT FATALITIES FROM COLLISION WITH TURBINES, AND POTENTIAL POPULATION DECLINES	During operation of the WEF, there will be inevitable fatality of bats from their collision with turbines. As no turbines are proposed in High or Medium-High sensitive areas, this inevitable impact was rated with High significance. The significance of this impact could be reduced to Medium if all turbines in Medium sensitive areas are subject to curtailment below an initial cut-in speed of 5 m/s during temperatures of 12 °C or warmer for four hours after sunset from 1 June to 31 October, and from sunset to sunrise from 1 November to 31 May. The 5 m/s turbine cut-in wind speed represents the wind speed associated with approximately 50% of all bat activity recorded at 73-110 m above ground level in 2021/2022 by IWS. In addition to this proper bat fatality monitoring and adaptive management of bat fatalities must be performed during operation.	• Implement curtailment of turbines in Medium sensitive areas, as soon as the first turbine is operational, below an initial cut-in speed of 5 m/s during temperatures of 12 °C or warmer for four hours after sunset from 1 June to 31 October, and from sunset to sunrise from 1 November to 31 May. The 5 m/s turbine cut-in wind speed represents the wind speed associated with approximately 50% of all bat activity recorded at 73-110 m above ground level in 2021/2022 by IWS. • Minimize degradation of terrestrial habitat (potential bat foraging and roosting habitat). Implement and maintain effective invasive alien plant, stormwater, erosion, sediment, and dust control measures. • Ensure that turbines can be fitted with bat detectors and deterrent devices. Turbine engineers must consult with bat specialists to incorporate the necessary turbine adaptations for this during the design phase, so there are no unexpected surprises or concerns after the turbines are built. • Minimize artificial lighting on site. Apart from compulsory civil aviation lighting, minimize artificial lighting - especially high-intensity, steady-burning, sodium vapour, quartz, halogen, and other bright lights at sub-stations,
DECLINE OR LOSS OF BAT ECOSYSTEM SERVICES	If high bat fatalities lead to declines in certain species populations, the ecosystem services that these populations provide will be compromised. As many locally occurring bat species are insectivorous, their eco-services mainly relate to insect (including pest) species predation and population regulation. However, up to three fruit bat species may occur, which would provide plant pollination	

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	and seed dispersal services for various indigenous woody (forest) plant species. Without mitigation, a potential decline or loss of these services was rated with Medium significance. This could be reduced to Low significance by effectively mitigating the afore-mentioned impacts	offices, and turbines. All non-aviation lights should be hooded downward and directed to minimise horizontal and skyward illumination. Where possible, solar-powered motion-sensitive lights should be used. • Perform operational bat monitoring as soon as the first turbine is operational - as per the latest SABAA guideline for this (Aronson et al. 2020 or later). 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. • Adaptively manage bat fatalities by consulting the latest SABAA guideline for this (Aronson et al. 2020 or later), and the best available relevant scientific information. 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 adaptive management and mitigation of bat fatalities. • If the operational bat monitoring and data analysis are not conducted properly as per Aronson et al. 2020 (or later), and/or if the bat fatality threshold is exceeded (determined as per MacEwan et al. 2018 or later), improved bat fatality mitigation must be promptly implemented. Unless the WEF's operational bat monitoring data suggest otherwise, and/or unless there are other measures that have been proven to effectively mitigate bat fatalities at WEFs, turbine curtailment should be implemented below an initial cut-in speed of 7 m/s during temperatures of 12 °C or warmer for four hours after sunset from 1 June to 31 October, and from sunset to sunrise from 1 November to 31 May. The 7m/s turbine cut-in wind speed represents the wind speed associated with approximately 80% of all bat activity recorded at 73-110 m above ground level in 2021/2022 by IWS. • Submit quarterly and annual bat fatality monitoring reports to SABAAP (the South African Bat Assessment Association Panel), EWT (the Endangered Wildlife Trust), and the DFFE (the national Department of Forestry, Fisheries and the Environment). • Forward all (live and fatality) bat monitoring data to the database recommended by SABAA to expand the scientific knowledge base for more informed decision making and mitigation. • Rehabilitate disturbed terrestrial habitat and water resources (bat foraging habitat). Implement effective rehabilitation of disturbed
CUMULATIVE IMPACT (100KM)	The potential cumulative impact on bats from the proposed Ngxwabangu WEF and some other proposed renewable developments in the immediate surrounds is an additional concern. Shown in Figure 16 [of the Bat Assessment Report] is, within a 100 km radius of the proposed Ngxwabangu WEF site, the location and extent of renewable energy projects for which environmental impact assessment applications have been received by the Department of Forestry, Fisheries and the Environment (Renewable Energy EIA Application Map, February 2022). Existing wind farms in the broader surrounds include, but may not be limited to, the Chaba, Amakhala Emoyeni, Dorper, and Noupoort facilities. Without very diligent monitoring and mitigation of bat fatalities and other impacts (e.g. roost disturbance) at all WEFs in the region, their potential cumulative impact on bat habitats, populations, and ecosystem services was rated with Medium significance. Only with proper bat fatality monitoring and adaptive management of bat fatalities using turbine curtailment and other secondary mitigation measures, may the cumulative impact of these WEFs on bats be reduced to Low significance.	

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
		terrestrial habitat and water resources based on consultation with an appropriate experienced specialist(s). Carefully manage alien vegetation, livestock grazing, and water points.
ECOLOGICAL IMPACT ASSESSMENT		
DISTURBANCE AND/OR DEATH OF FAUNAL SPECIES	During the operational phase, noise and light pollution associated with the operation and maintenance of the proposed development is likely to disturb faunal populations utilising the project area. WEFs release low frequency sound (or infrasound), inaudible by humans but which can interrupt communication between faunal species. Additionally, operational activities such as vehicular movement and noise are likely to disturb faunal species and could result in the movement of faunal species away from the affected areas and/or the loss of faunal species. Slow-moving species such as tortoises and snakes are particularly susceptible to road kills. As such, this impact is rated moderate negative.	• Regular maintenance and checks of the infrastructure must be undertaken. • External lighting should be avoided where possible. However, if required, lighting should be down lighting and low wattage. • Access to the site should be minimised. • All individuals must sign a register prior to accessing the proposed development site. • Speed restrictions (40 km per hour is recommended) must be implemented to reduce the chance of road kills, as well as to reduce the amount of dust caused by vehicle movement along the roads.
DISRUPTION OF ECOSYSTEM FUNCTION AND PROCESS / HABITAT FRAGMENTATION	The establishment and operation of roads, turbine hard stands, fences, and other associated infrastructure within the landscape is likely to cause habitat fragmentation. Habitat fragmentation disrupts ecosystem function and processes such as pollination and dispersal, and causes population fragmentation and isolation, reducing variations in the gene pool and a decrease in species richness and diversity and ultimately, biodiversity.	• All areas disturbed during construction that do not form part of the proposed development must be rehabilitated. Topsoil from nearby areas of the same vegetation type must be spread over impacted area and planted with indigenous plant species. • The layout and design of the proposed WEF must allow for connectivity within the landscape. • A Fire Management Plan must be drafted by a suitably qualified specialist and implemented during the operation of the proposed Ngxwabangu WEF.
INFESTATION OF ALIEN PLANT SPECIES	Failure to rehabilitate and monitor the establishment of alien plant species during the Construction (and Operation Phase) could lead to the spread and infestation of Alien Plant Species during the Operational Phase. Alien plant species often outcompete indigenous vegetation. Therefore, their establishment and spread could result in the loss of indigenous plant species.	• The site must be checked regularly for the presence of alien invasive species. When alien invasive species are found, immediate action must be taken to remove them. • The ECO must create a list with accompanying photographs of possible alien invasive species that could occur on site prior to construction. This photo guide must be used to determine if any alien invasive species are present. • An Alien Invasive Management Plan must be compiled and implemented during the Construction and Operational Phase of the proposed Ngxwabangu WEF.
HERITAGE IMPACT ASSESSMENT		
NONE IDENTIFIED BY SPECIALIST		
NOISE IMPACT ASSESSMENT		
OPERATIONAL NOISE OF WIND TURBINES: DAYTIME	Noise levels generated by operating WTG (using maximum worst-case SPL). Considering potential effect of wind-induced	• The applicant must confirm the status of the structures where noise levels exceed 42 dBA (during the operational phase), confirming

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	noises on ambient sound levels as illustrated in Figure 4-30 [of the Noise Assessment Report] as well as the noise limits as motivated in section 6.4 and defined in Table 6-2 of the Noise Impact Assessment, this assessment will assume an ambient sound level of 45.5 dBA (at a wind speed of 12 m/s). Operational noise levels from the WTG should not result in noise levels exceeding the 45 dBA (as motivated in Table 6-2 of the NIA).	whether it is used for residential purposes. People staying in structures where calculated noise levels exceed 45 dBA could be relocated, or the applicant can select appropriate mitigation measures to ensure that the total noise levels are less than 45 dBA at the closest NSR, which could include (one or a combination of): ○ The applicant can select a WTG with a lower SPL (e.g., a WTG with a SPL less than 106.5 dBA re 1 pw); or ○ The layout must be changed to locate WTG further from NSR, considering the potential cumulative effect of all WTG located within 2,000 m from NSR; or ○ The applicant can develop a noise abatement program to reduce the noise emission levels (when using a WTG that offer such an option) at certain wind speeds, and/or if the wind blows in a certain direction.
OPERATIONAL NOISE OF WIND TURBINES: NIGHTTIME	Noise levels generated by operating WTG (using maximum worst-case SPL). Considering potential effect of wind-induced noises on ambient sound levels as illustrated in Figure 4-30 [of the Noise Assessment Report] as well as the noise limits as motivated in section 6.4 and defined in Table 6-2, of the Noise Impact Assessment, this assessment will assume an ambient sound level of 45.5 dBA (at a wind speed of 12 m/s). Operational noise levels from the WTG should not result in noise levels exceeding the 45 dBA (as motivated in Table 6-2 of the NIA).	
PALAEONTOLOGICAL IMPACT ASSESSMENT		
None identified by specialist		
SOCIO-ECONOMIC IMPACT ASSESSMENT		
SUSTAINABLE INCREASE IN PRODUCTION AND GDP IN THE STUDY AREA, REGIONAL AREA AND NATIONALLY	The total impact on production in the country as a result of the wind energy facility and its related infrastructure's operations will equate to R110.7 million in 2021 prices per annum. Aside from the utilities sector, industries that will experience the greatest stimulus from the project will include electrical machinery and apparatus, insurance, and transport service. Due to the annual spending on labour and procurement of local goods and services required to operate and maintain the wind energy facility and related infrastructure (i.e., utilities, sundries, certain electrical components, security etc.). A large proportion of OPEX is expected to be related to highly specialised technical maintenance and off-site operation and monitoring of the WEF while only a smaller proportion of this direct spend will be circulated within the study area in the form of site maintenance and clearing, road maintenance as well as security. Although attributed as direct spend impacts on production and GDP is likely to be experienced more at a provincial and national level. It is estimated that the project will directly generate R29.5 millions of value-added per	• The operator of the wind energy facility and its related infrastructure should be encouraged to, as far as possible, procure materials, goods and products required for the operation and maintenance of the facility from local suppliers to increase the positive impact in the local economy. • Aspiring entrepreneurs from the local communities should be encouraged to formally register their MSMEs in order to do business with the IPP- this would specifically apply to MSMEs within the security and cleaning/cleansing sub-industries. • Improved energy supply in the country. • Reduced carbon emissions in generation of electricity. • Sufficient economies of scale could be created to establish new businesses in the provincial economy. These businesses could then supply the goods and services required for the operation and maintenance of the facility that cannot currently be procured in the area. This would contribute to the local economies' growth and development. Given that this project would be the first of its kind within the region, these cumulative impacts will only materialise over time.

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	annum. Through indirect and induced effects, an additional R28.3 millions of GDP will be generated per annum, which means that the total impact of the project on the national GDP will equate to R57.8 million per annum in 2021 prices. In addition to the operational expenditure required to operate and maintain the WEF, the applicant (developer) is required to demonstrate certain commitments to empowerment and economic development within the designated local area as required by the National Energy Regulator of South Africa in relation to an Application for an Electricity Generation Licence in terms of the Electricity Generation Act (No. 4 of 2006). The developer of the proposed WEF has communicated that their total forecasted ED and SED spend for the fully operational WEF will be in order of 2.5% of the Gross Annual Revenue generated. The proposed wind energy facility intends to empower the immediately affected communities by delivering on various development-type initiatives and establishment of small businesses. As per previous research carried out by the developer in the area, the following business types have been identified for support given the community's existing experience and aptitude: ▪ Farming (vegetables, crops and livestock) ▪ Carpentry enterprises ▪ Plant-hire businesses ▪ Construction businesses ▪ Artisanal enterprises ▪ Tourism (product development) The contribution aims to assist aspiring entrepreneurs including women-owned enterprises and the youth with mentorship, skills transfer and development capital. The skills development initiative proposed by the developer will be suited to the needs to the community and would require close collaboration with representatives of the community members as well as businesses owners from the immediate study area for all the affected parties to benefit and be appropriately empowered. In addition to the planned commitment of ED	

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	and SED spend within local communities, The Ngxwabangu WEF will be entering into a rental commitment with the Mtshanyane, Ncora Flats, Mcambalaleni and Ncuncuzo administrative area/traditional councils. This will see approximately 2% of the total WEF's turnover committed towards rental payments split pro-rata according to the number of turbines and associated infrastructure located on the land of each community.	
CREATION OF SUSTAINABLE EMPLOYMENT POSITIONS NATIONALLY AND LOCALLY	The ongoing operation, maintenance and monitoring of the wind energy facility and its associated infrastructure will directly create 17 FTE employment positions all of which will be retained for the lifespan of the development. Aside from the direct employment opportunities, the wind energy facility and the associated infrastructure will support a further estimated 32 FTE employment positions created through production and consumption induced effects. Due to the spatial allocation of procurement spending and direct employment created, most of the indirect and induced positions will also be created within the broader Eastern Cape and national economies, with only a portion being created in the primary and secondary study areas. The trade, utilities and community and personal services sectors will benefit the most from these new employment opportunities. **Employment of local birdwatchers as a mitigation strategy for Cape Vulture conservation in the study area:** The Cape vulture is considered an endangered species within South Africa. According to Birdlife South Africa, there has been a decline in reported fatalities of Cape vultures around the country, however, wind energy farms have been recognised as a potential threat to the conservation of remaining Cape vultures in the country (Birdlife,2018). The developer has indicated that it is a major priority to mitigate against the potential loss of Cape vultures as a result of the proposed development. A means of mitigating against the loss of birdlife in the area, the proposed wind energy facility's developers planning to implement a bird monitoring programme in and around the site location. The implementation of the programme will not only protect the birdlife, but it is also expected to be a major contributor to employment and skills development and provide a gateway for	• Where possible, local labour should be considered for employment to increase the positive impact on the local economy. • Only source Cape Vulture and other live birds and animal spotters from the immediate study area. • As far as possible, local small and medium enterprises should be approached to investigate the opportunities for supply inputs required for the maintenance and operation of the wind energy facility and related infrastructure. • Improved living standards of the directly and indirectly affected households.

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	further education within the environmental conservation space for local community members particularly the youth. The aforementioned mitigation process requires certain skills at three different levels and is summarised in the Figure here within. ▪ Level one: The bird monitoring programme requires no specific skill set at level one but does offer on-the job training prior to the operational phase taking place. The nature of this level would expect prospective community members work in pairs with each pair operating on five to six turbines, in search of carcasses around and within the site below the turbines. The nature of employment at this level would be full-time and is expected to have a time period of two years once the wind energy facility has started operating. On-going monitoring could potentially extend periodically after the two year period. ▪ Level two: This particular level is similar to the first level in terms of its skills requirements. At this level, workers would need to search and seize for dead livestock around the site either by foot or by means of a suitable vehicle before the vultures are attracted to the decaying animal bodies on the site and near the wind turbines. By foot, it would be done in groups of six to eight workers who would be expected to report findings of the dead animals. The dead animals would then be dropped off at an allocated site away from the wind energy facility which will serve as a "vulture restaurant" and steer the direction of the vultures away from the turbines. At this level, employees would be managed and receive refresher training and would be employed for the duration of the lifespan of the proposed wind energy facility. ▪ Level three: This level is regarded as the most critical level of the birdwatching programme and vital to its intended success. Here, workers would be expected to be on site and communicate regularly with the wind turbine controllers in the operating room off-site. This communication would potentially lead to the shutting	

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	down of certain turbines on demand. This would occur in instances where vultures are spotted on site in close proximity to the wind turbines. Individual turbines closest to the vulture/s in question can then be immediately shutdown until the respective vulture/s have cleared the area. These workers would operate in a shift system where eight to 10 workers will operate during one shift and each worker would have the responsibility of monitoring four to five turbines. The workers would need binoculars and radios for spotting vultures and contacting the control room in an efficient manner. This level offers a unique accreditation opportunity with Birdlife South Africa for workers at this level. Each of the levels from the bird monitoring programme would have a team leader and offer appropriate guidance and training for the respective tasks required at each specific level. The nature of this particular job may subjectively come across as demotivating to individuals but the work experience does however offer career elevation within the environmental conservation and tourism spheres for prospective students in the study area as well as for unemployed graduates seeking formal employment in the environmental or tourism industries. As part of the developers future SED obligations within the local community it is proposed that dedicated workers from the birdwatching programme should be identified for selection and awarding of bursaries in order to obtain a formal tertiary education in a related field in which they would have already gained practical experience.	

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	 • Carcass searching in pairs • No skills required • Compensation of about R6000- • Receive on-the-job training • Employed full-time for approxin  • Dead livestock searching in p for collection of dead animals • Done in groups of 6-8 without t • Take dead animals to "vulture r • Managed and receive refresher • Employed for the full life span o  • Shutdown of turbines on demar • Spot vultures on site and conta room to shut down turbines • Done in a shift system with 8-1 per shift • Opportunity for accreditation wi	
SKILLS DEVELOPMENT OF PERMANENTLY EMPLOYED WORKERS	South Africa has serval wind energy facilities with a significant number of these wind farms being located in the western regions of the Eastern Cape. As such, it is assumed that the skills base for operating and maintain such facilities should be easily accessible. It is likely that highly skilled personnel would need to be recruited from outside of the study area and the Intsika Yethu local municipality. These employees would include skilled "mechatronics" engineers (specialised in both electrical and mechanical engineering) likely to be recruited from the other parts of the Eastern Cape such as Nelson Mandela Bay Municipality and trained by the manufacturer, as well as less skilled services such as safety and security and mechatronic assistants. Maintenance will be carried out throughout the lifetime of the wind energy facility. A maintenance schedule usually involves an initial inspection after commissioning, semi-annual inspections, an annual inspection and two- and five-year inspections but this varies according to the wind energy facility. The aforementioned birdwatching programme would not only contribute to employment but also skills development in the primary study area. Provided the fact that there are three distinct levels attached to the programme, it should be noted that the programme offers further career development opportunities for the respective community members. The universities within the Eastern	• The developer should consider establishing vocational training programmes for the local labour force to promote the development of skills required by the wind energy facility and their related infrastructure and thus provide for the opportunities for these people to be employed in other similar facilities elsewhere. • Development of new skills and expertise in the country to support the development of the renewable wind energy industry.

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	Cape province offer various environmental conservation and tourism courses that workers could enrol for in the future through bursary opportunities or other sources of funding. The universities in the Eastern Cape namely; Nelson Mandela University, Rhodes University, Walter Sisulu University and The University of Fort Hare, have several nature conservation and tourism courses available that the workers could take on should they feel the need to further their skills and education development in the nature conservation and tourism fields. Table 4.6 of the SEIA provides information on the courses on offer at the four different tertiary institutions. In addition to the above tertiary education options, the developer should also be encouraged to support promising candidates from the said programme to obtain accredited trade-orientated vocational skills. These skills programmes could assist respective workers to move into formal careers such as: ▪ Game ranging ▪ Environmental field monitoring ▪ Site clearing and cleansing ▪ Waste collection and recycling	
IMPROVED STANDARDS OF LIVING FOR BENEFITING HOUSEHOLDS	The creation of 90 FTE employment positions throughout the country will generate an estimated R19.4 million of additional household income (2021 prices), which will be sustained for the entire duration of the wind energy facility and its related infrastructure's lifespan. The sustainable income generated as a result of the project's operation will positively affect the standard of living of all benefitting households.	• Where possible, the local labour supply should be considered for employment opportunities to increase the positive impact on the area's economy. • As far as feasible, local small and medium enterprises should be approached to investigate the opportunities for supply inputs required for the maintenance and operation of the wind energy facility and their related infrastructure. • Improved productivity of workers. • Improved health and living conditions of the affected households.
PROVISION OF ELECTRICITY NECESSARY FOR ECONOMIC GROWTH	The increasing of the electricity supply will benefit both residents and businesses owners across South Africa including in the Instika Yethu local municipality. The associated infrastructure linked to the wind energy facility will also enhance the reliability of the current supply, help contribute to a reduction in loadshedding, and could permit residences and businesses to have additional access to electricity. The wind energy facility coupled with its associated infrastructure will help to unlock further development in South Africa and to a lesser extent in the Instika Yethu local	• None suggested.

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	municipality and study area.	
LOCAL SOCIO-ECONOMIC DEVELOPMENT AND ECONOMIC DIVERSIFICATION BENEFITS DERIVED FROM THE PROJECT'S OPERATIONS	The proposed wind energy facility will make a notable contribution to economic, social and community development in the area. Communities living within close proximity to the development will benefit from the existence of the development over its 20-year life span as government regulations requires these types of developments to engage in programmes that seek to address the local communities social and economic needs. The current regulations prescribes that a minimum of 1% of the revenue derived by a project should be allocated towards the socio-economic development of the community and a further 0.4% to enterprise development. These contributions are verified by the Department of Energy via quarterly audits to ensure that the figures are achieved. In addition to the proposed project's required contribution towards social and economic enterprise development, the construction as well as the operational phase of the project is expected to contribute towards the local tourism industry, specifically business tourism and educational tourism. Specific mention here is made of Lubisi Lodge and Conference Centre previously mentioned in Chapter 3. During both the construction and operational phase, the Lubisi Lodge and Conference Centre will make for a suitable location for accommodation for project developers, construction managers and facility operation managers. The conference centre would also be a suitable and convenient place to host monthly, quarterly or annual meetings related to the proposed facility. This would be highly beneficial to the facility from both an employment and tourism attraction perspective. As stated in the Chris Hani District municipality IDP, the district municipality aims to increase awareness of environmental sustainability within the district. This includes implementing educational programmes within schools and local communities. The proposed wind energy facility, once it has been completed, will be able to serve as a visitor site for educational purposes by local schools and even TVET College enrolees within the region. Schools may be taken through the process of renewable energy and functioning of wind turbines by operation specialists and learn the	• An innovative and site-specific ED and SED programme should be devised by the developer and regularly updated throughout the project's lifespan. • Recommend and advertise accommodation at the Lubisi Lodge and Conference centre for overnight stays and hosting meetings and conferences related to the proposed development or for other business ventures and educational tourism expeditions. • The developer should encourage the operational manager and team to be open to hosting safe site visits for local schools and colleges for educational purposes. • The plan should be developed in consultation with local authorities and local communities to identify community projects that would result in the greatest social benefits. • These plans should be reviewed on an annual basis and, where necessary, updated. • When identifying enterprise development initiatives, the focus should be on creating sustainable and self-sufficient enterprises. • In devising the programmes to be implemented, the developer should take into account the priorities set out in the local IDP. • Declining levels of poverty in Instika Yethu local municipality and the Eastern Cape. • Improved standards of living of the members of the community and households that benefit from the various programmes. • Possible improvements in access to services and status of local infrastructure.

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	importance and significance thereof in relation to the climate change crisis as well as South Africa's current energy supply challenges.	
NEGATIVE CHANGES TO THE SENSE OF PLACE	The effects on the community's sense of place will initially be felt during the construction period and will continue into the operational phase. The assessment of the negative change in the sense of place provided for the construction phase will be almost identical to that of the operational phase.	• The mitigation measures proposed by the visual and noise specialists should be adhered to. • Efforts should also be made to avoid disturbing such sites during construction.
VISUAL IMPACT ASSESSMENT		
POTENTIAL VISUAL IMPACT OF FACILITY OPERATIONS ON SENSITIVE VISUAL RECEPTORS IN CLOSE PROXIMITY (< 5KM) TO THE PROPOSED DEVELOPMENT	The visual impacts of facility operations on sensitive visual receptors (i.e., residents of villages / settlements, as well as, observers travelling along the various secondary roads) in close proximity to the proposed Ngxwabangu WEF (within 5km) is expected to be of very high significance. No mitigation is possible for a facility of this scale, but measures have been included as best practice guidelines.	• During Operations, monitor the general appearance of the facility as a whole, as well as, all rehabilitated areas. • The maintenance of the turbines and ancillary structures and infrastructure will ensure that the facility does not degrade, thus aggravating visual impact. Implement remedial action where required. • Where sensitive visual receptors are likely to be affected, it is recommended that the developer enter into negotiations regarding the potential screening of visual impacts at the receptor site. This may entail the planting of vegetation, trees or even the construction of screens. Ultimately, visual screening is most effective when placed at the receptor itself. • Roads must be maintained to forego erosion and to suppress dust, and rehabilitated areas must be monitored for rehabilitation failure. Remedial actions must be implemented as a when required.
POTENTIAL VISUAL IMPACT OF FACILITY OPERATIONS ON SENSITIVE VISUAL RECEPTORS WITHIN THE LOCAL AREA (BETWEEN 5 - 10KM) SURROUNDING THE PROPOSED DEVELOPMENT	The visual impact of facility operations on sensitive visual receptors (i.e. users of the various secondary road, visitors to region, and residents of villages / settlements) within the local area (between 5 - 10km offset) is expected to be of high significance. No mitigation is possible within this environment and for a facility of this scale, but measures have been included as best practice guidelines.	
POTENTIAL VISUAL IMPACT OF FACILITY OPERATIONS ON SENSITIVE VISUAL RECEPTORS WITHIN THE DISTRICT (BETWEEN 10 - 20KM) SURROUNDING THE PROPOSED DEVELOPMENT	The visual impact of facility operations on sensitive visual receptors (i.e. users of the various secondary road, arterial R61 road, visitors to region, and residents of villages / settlements) within the district (between 10 - 20km offset) is expected to be of moderate significance. No mitigation is possible within this environment and for a facility of this scale, but measures have been included as best practice guidelines.	
POTENTIAL VISUAL IMPACT OF FACILITY OPERATIONS ON SENSITIVE VISUAL RECEPTORS WITHIN THE REGION (> 20KM)	The visual impact of facility operations on sensitive visual receptors (i.e., users of the various secondary roads, arterial roads R61 and R359, visitors to the region, and residents of villages / settlements) within the region (beyond the 20km offset) is expected to be of low significance. No mitigation is possible within this environment and for a facility of this scale, but measures have been included as best practice guidelines.	

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
POTENTIAL VISUAL IMPACT OF OPERATIONAL LIGHTING AT NIGHT ON SENSITIVE VISUAL RECEPTORS IN THE REGION	The receiving environment has a relatively small number of populated places, and it can be expected that any light trespass and glare from the security and after-hours operational lighting for the facility will have some significance. In addition, the remote sense of place and rural ambiance of the local area increases its sensitivity to such lighting intrusions. Another source of glare light is the aircraft warning lights mounted on top of the hub of the wind turbines. While these lights are less aggravating due to the toned-down red colour, they do have the potential to be visible from a greater distance then general operational lighting, especially due to the strobing effect of the lights, a function specially designed to attract the viewers' attention. The Civil Aviation Authority (CAA) prescribes these warning lights and the potential to mitigate their visual impacts is low. The possibility of limiting aircraft warning lights to the turbines on the perimeter according to CAA requirements, thereby reducing the overall impact, is recommended to be investigated. Some ground-breaking new technology in the development of strobing lights that only activate when an aircraft is detected nearby. This may aid in restricting light pollution at night and should be investigated and implemented by the project proponent, if available and permissible by the CAA. This new technology is referred to as needs-based night lights, which basically deactivates the wind turbine's night lights when there is no flying object within the airspace of the WEF. The system relies on the active detection of aircraft by radar sensors, which relays a switch-on signal to the central wind farm control to activate the obstacle lights. Last is the potential lighting impact is known as sky glow. Sky glow is the condition where the night sky is illuminated when light reflects off particles in the atmosphere such as moisture, dust or smog. The sky glow intensifies with the increase in the number of light sources. Each new light source, especially upwardly directed lighting, contributes to the increase in sky glow. The general lighting of the facility may contribute to the effect of sky glow in an otherwise dark environment. The visual impacts as a result of operational	• Aviation standards and CAA Regulations for turbine lighting must be followed. • The possibility of limiting aircraft warning lights to the turbines on the perimeter according to CAA requirements, thereby reducing the overall impact, must be investigated. • Install aircraft warning lights that only activate when the presence of an aircraft is detected, if permitted by CAA. • Shield the sources of light by physical barriers (walls, vegetation, or the structure itself). • Limit mounting heights of lighting fixtures, or alternatively use foot-lights or bollard level lights. • Make use of minimum lumen or wattage in fixtures. • Make use of down-lighters, or shielded fixtures. • Make use of Low-Pressure Sodium lighting or other types of low impact lighting. • Make use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	lighting at night on sensitive visual receptors in the regions is likely to be of high significance and may be mitigated to moderate should the required CAA lighting be approved to be installed on the perimeter and/or the installation of needs-based night lights be allowed. Best practice guidelines for other general site lighting that may occur on the site have also been taken into consideration.	
POTENTIAL VISUAL IMPACT OF SHADOW FLICKER ON SENSITIVE VISUAL RECEPTORS IN CLOSE PROXIMITY TO THE PROPOSED DEVELOPMENT	This Impact is described above. Shadow flicker only occurs when the sky is clear, and when the turbine rotor blades are between the sun and the receptor (i.e. when the sun is low). De Gryse in Scenic Landscape Architecture (2006) found that "most shadow impact is associated with 3-4 times the height of the object". Based on this research, a 1km buffer along the edge of the outer most turbines is identified as the zone within which there is a risk of shadow flicker occurring. Residents on the outskirts of a few villages/ settlements and portions of various secondary roads are located within the 1km buffer. It is however expected that the shadow flicker experienced by motorist traveling along roads will be fleeting and not constitute a shadow flicker visual impact of concern. The significance of shadow flicker is therefore anticipated to be High.	• None are available.
ANCILLARY INFRASTRUCTURE	On-site ancillary infrastructure associated with the Ngxwabangu WEF includes a 132kV collector substation, 132kV overhead powerline, underground 33kV cabling between the wind turbines, internal access roads, operations and maintenance buildings and a Battery Energy Storage System (BESS). No dedicated viewshed analyses have been generated for the ancillary infrastructure, as the range of visual exposure will fall within (and be overshadowed by) that of the turbines. The anticipated visual impact resulting from this infrastructure is likely to be of moderate significance both before and after mitigation.	• None are available.
POTENTIAL VISUAL IMPACT OF FACILITY OPERATIONS ON THE VISUAL CHARACTER OF THE LANDSCAPE AND SENSE OF	Sense of place refers to a unique experience of an environment by a user, based on his or her cognitive experience of the place. Visual criteria and specifically the visual character of an area (informed by a combination of aspects such as topography, level of development, vegetation, noteworthy features, cultural/ historical features, etc.) play a significant role.	• Maintain the general appearance of the facility as a whole. • Monitor rehabilitated areas, and implement remedial action as and when required.

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
PLACE OF THE REGION	A visual impact on the sense of place is one that alters the visual landscape to such an extent that the user experiences the environment differently, and more specifically, in a less appealing or less positive light. In general, the landscape character of the greater study area and site itself presents as rural in character. The visual quality of the region is generally high with tracts of intact vegetation, numerous perennial rivers and dams, as well as, mountainous vistas characterising most of the visual environment. As such, the entire study area is considered sensitive to visual impacts due to its generally low levels of transformation. The key visual experience is linked to the use of the road network and associated views of the surrounding landscape. The anticipated visual impact on the visual character and sense of place of the study area is expected to be of high significance. No mitigation is possible within this environment and for a facility of this scale, but measures have been included as best practice guidelines.	
POTENTIAL CUMULATIVE VISUAL IMPACT OF WIND ENERGY FACILITIES WITHIN THE REGION	It is a requirement that a visual specialist identify and quantify the cumulative visual impacts of a proposed development, propose potential mitigating measures, and conclude if the proposed development will result in any acceptable loss of visual resources taking into consideration the other proposed and operational projects in the area. A cumulative visual impact can be defined as the combined or incremental effects resulting from changes caused by a proposed development in conjunction with other existing or proposed activities. The cumulative impact will consist of the combined impact of the proposed Ngxwabangu WEF and the authorised Ncora WEF (which have been amalgamated into the proposed Ngxwabangu WEF), as well as, the Thomas WEF & PV (which have expired). Cumulative visual impacts may be experienced as a result of where a combination of several WEF's turbines is within a receptors line of sight at the same time, where the receptor has to turn their head to see several of the WTGs of the different WEF's or when the receptor has to move from one viewpoint to another to either see different developments or different views of the same development (such as when travelling along a road).	• None are available.

ISSUE	DESCRIPTION OF IMPACT	MITIGATION MEASURES
	The cumulative visual impact is not just the totality of the impacts of two developments. The combined impact may be greater than the sum of the two individual developments, or in rare cases even less. The cumulative visual impact is assessed as the product of the distance between the individual WEFs (or WTG), the total distance over which the WTG are visible, the general character of the landscape and its sensitivity to that specific typology of development, the location and design of the WEFs themselves and lastly the way in which the landscape is experienced by the sensitive receptors. The cumulative visual impacts are likely to be of high significance when the proposed Ngxwabangu WEF is taken into consideration with the other authorised Renewable Energy Facilities within the study area.	
DECOMMISSIONING PHASE **DUE TO THE FACT THAT NO WIND ENERGY FACILITIES HAVE BEEN DECOMMISSIONED IN SOUTH AFRICA, CES BELIEVES IT IS RESPONSIBLE TO STIPULATE THAT FURTHER ASSESSMENT IN THE FORM OF A DECOMISSIONING ENVIRONMENTAL MANAGEMENT PROGRAMME BE DRAFTED, IN CONSULTATION WITH SPECIALISTS, WHEN THIS PHASE BECOMES RELEVANT.**		
AQUATIC IMPACT ASSESSMENT		
The aquatic impacts associated with the decommissioning phase will be similar to those listed in the construction phase and the associated mitigations measures must be updated and implemented to reduce potential adverse impacts.		
AVIFAUNAL IMPACT ASSESSMENT		
The avifaunal impacts associated with the decommissioning phase will be similar to those listed in the construction phase and the associated mitigations measures must be updated and implemented to reduce potential adverse impacts.		
BAT IMPACT ASSESSMENT		
The bat impacts associated with the decommissioning phase will be similar to those listed in the construction phase and the associated mitigations measures must be updated and implemented to reduce potential adverse impacts.		
ECOLOGICAL IMPACT ASSESSMENT		
The ecological impacts associated with the decommissioning phase will be similar to those listed in the construction phase and the associated mitigations measures must be updated and implemented to reduce potential adverse impacts.		
HERITAGE IMPACT ASSESSMENT		
None identified by specialist.		
NOISE IMPACT ASSESSMENT		
The noise impacts associated with the decommissioning phase will be similar to those listed in the construction phase and the associated mitigations measures must be updated and implemented to reduce potential adverse impacts.		
PALAEONTOLOGICAL IMPACT ASSESSMENT		
None identified by specialist.		
SOCIAL IMPACT ASSESSMENT		
The socio-economic impacts associated with the decommissioning phase will be similar to those listed in the construction phase and the associated mitigations measures must be updated and implemented to reduce potential adverse impacts.		
VISUAL IMPACT ASSESSMENT		
The visual impacts associated with the decommissioning phase will be similar to those listed in the construction phase and the associated mitigations measures must be updated and implemented to reduce potential adverse impacts.		

6 ADMINISTRATION AND REGULATION OF ENVIRONMENTAL OBLIGATIONS

6.1 MANAGEMENT STRUCTURE

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

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

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

6.2 ROLES AND RESPONSIBILITIES

6.2.1 The Applicant/Developer

Ngxwabangu Wind Power (Pty) Ltd (hereafter referred to as the Developer) is a Special Purpose Vehicle (SPV) established for the sole purpose of developing, owning and operating the proposed Ngxwabangu WEF. The Developer is the responsible entity for monitoring the implementation of the EMPr and compliance with the EA. However, if the Developer appoints a Contractor to implement the project and hence implement the recommended mitigation measures documented in this EMPr on their behalf, then the successful Contractor's responsibilities are outlined as per the section that follows.

The Developer will also be responsible for stipulating and enforcing fines and penalties to the Contractor for contravention or any non-compliances against the EMPrs, the EA and other approved plans.

6.2.2 The Contractor

The successful Contractor will:

- Be responsible for any updates or amendment to the EMPr in terms of methodologies which are required to be implemented to achieve the environmental specifications contained herein and the relevant requirements contained in the EA;
- Be responsible for the overall implementation of the EMPr in accordance with the requirements of the Developer and the EA;
- Ensure that all third parties, who carry out all or part of the Contractor's obligations under the contract, comply with the requirements of this EMPr;
- Be responsible for obtaining any outstanding permits and licenses which are required for the construction of the Ngxwabangu WEF; and
- Ensure that the appointment(s) of the ECO and the ESO are subject to the approval of Ngxwabangu Wind Power (Pty) Ltd.

6.2.3 The Resident Engineer

The Resident Engineer (RE) should be appointed by the Developer and will be required to oversee the construction programme and construction activities performed by the Contractor. The RE is expected to liaise

with the Contractor and ECO on environmental matters, as well as any pertinent engineering matters where these may have environmental consequences. The RE will oversee the general compliance of the Contractor with the EMPr and other pertinent site specifications. The RE should also be familiar with the EMPr specifications and further monitor the Contractor's compliance with the environmental specifications daily, through a Site Diary, and enforce compliance.

6.2.4 The Environmental Site Officer (ESO)

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

The appointed ESO must be onsite daily.

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

- Ensuring that all the environmental authorisations, licenses and permits, required in terms of the applicable legislation, are available on site;
- Assisting the Contractor in finding environmentally responsible solutions to problems;
- Keeping accurate and detailed records of all activities on site;
- Keeping a register of complaints onsite and recording community comments and issues, and the actions taken in response to these complaints or working alongside the CLO to undertake these tasks;
- Ensuring that the required actions are undertaken to mitigate the impacts resulting from non-compliance;
- Reporting all incidences of non-compliance to the ECO and RE; and
- The ESO must submit regular written reports to the ECO, not less frequently than once a month, during the construction phase of the Ngxwabangu WEF.

The ESO must have:

- The ability to manage public communication and complaints unless a suitably qualified CLO is appointed to undertake public liaison;
- The ability to think holistically about the structure, functioning and performance of environmental systems;
- The ESO must be fully conversant with the BAR, EMPrs, EA, relevant environmental legislation and any other relevant documents relating to the Ngxwabangu WEF; and
- The ESO and/or CLO must have received professional training, including training in the skills necessary to be able to amicably and diplomatically deal with the public as outlined in the first bullet point above.

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

6.2.5 Environmental Control Officer (ECO)

For the purpose of implementing the conditions contained herein, Ngxwabangu Wind Power (Pty) Ltd must appoint an ECO for the contract. The ECO must be the responsible person for ensuring that the provisions of the EMPrs as well as the EA are complied with during the construction phase. The ECO will be responsible for

issuing instructions to the Contractor, where environmental considerations call for action to be taken. The ECO must submit regular written reports, at least once a month, to the Developer and, when required and/or requested, to the environmental authority (national DFFE). The ECO will be responsible for the monitoring, reviewing and verifying of compliance with the EMPr and conditions of the EA by the Contractor.

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

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

The ECO must have:

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

The ECO must be fully conversant with the BA Process, the Ngxwabangu WEF and Associated Infrastructure Final BAR, EA (if/when issued), this EMPr, the Generic EMPrs and all relevant environmental legislation for the project. The Developer will have the authority to replace the ECO if, in their opinion, the appointed officer is not fulfilling their duties in terms of the requirements of the EMPrs or this specification. Such instruction must be in writing and must be clearly set out with reasons why a replacement is required and within what timeframe.

6.3 COMPLIANCE MONITORING AND CORRECTIVE ACTION

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

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

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

6.4 REPORTING AND REVIEW

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

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

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

6.5 MONITORING

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

1. Air quality (such as dust);
2. Hydrocarbon pollution;

3. Success of local labour employment;
4. Success of local procurement policies;
5. Ambient and workplace noise;
6. Health and safety incidents;
7. Success of traffic management measures; and
8. Contamination and soil erosion.

6.6 EMERGENCY PREPAREDNESS

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

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

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

6.7 ENVIRONMENTAL INCIDENT MANAGEMENT

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

6.8 MANAGEMENT REVIEW

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

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

7 REPORTING

7.1 METHOD STATEMENTS

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

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

The Method Statement must include details of the:

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

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

As a minimum, the Contractor should produce the following method statements:

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

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

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

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

An example of a Method Statement layout is provided in Appendix C.

7.2 GOOD HOUSEKEEPING

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

7.3 RECORD KEEPING

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

7.4 DOCUMENT CONTROL

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

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

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

8 ENVIRONMENTAL AWARENESS

8.1 ENVIRONMENTAL TRAINING

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

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

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

The ECO must ensure that records of all training interventions are kept in accordance with the record keeping and documentation control requirements as set out in this EMPr. The training records must verify each of the targeted personnel's training experience.

The Contractor must ensure that adequate environmental training takes place. All employees must be given an induction presentation on environmental awareness and the content of this EMPr as well as the Generic EMPrs. The presentation should be conducted in the language of the employees to ensure it is understood. The environmental training must, as a minimum, include the following:

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

Recommended Environmental Education Material is provided in Appendix A.

8.2 MONITORING OF ENVIRONMENTAL TRAINING

The Contractor must monitor the performance of construction workers to ensure that the points relayed during their induction have been properly understood and are being followed. If necessary, the ECO and/or

a translator should be called to the site to further explain aspects of environmental or social behaviour that are unclear. Toolbox talks are recommended.

9 ENVIRONMENTAL MONITORING

9.1 GENERAL ENVIRONMENTAL MONITORING

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

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

9.2 AVIFAUNAL AND BAT MONITORING

Prior to construction, an avifaunal specialist and bat specialist must be consulted in order to determine the requirements for monitoring of the avifauna and bats present in the vicinity of the Ngxwabangu WEF; pre- and post-construction. The monitoring programmes must be kept with the approved Final EMPr. These monitoring programmes must be designed as part of the EMPr and Layout finalisation process and must be based on the most recent version of the best practice guidelines.

10 MANAGEMENT PLANS AND MONITORING RECOMMENDATIONS

The following management plans have been included as part of the BA Process. These are high level which will require finer details prior to being implemented:

- Alien Invasive Management Plan (Section 10.1);
- Plant Rescue and Protection Plan (Section 10.1);
- Avifauna Monitoring and Management Plan (Section 10.3);
- Re-vegetation and Habitat Rehabilitation Plan (Section 10.1);
- Open Space Management Plan (Section 10.2);
- Traffic Management Plan (Section 10.4);
- Transportation Plan (Section 10.4);
- Stormwater Management Plan (Section 10.5);
- Fire Management Plan (Section 10.7);
- Erosion Management Plan (Section 10.5);
- Monitoring System to detect any leakage or spillage of all hazardous substances (Section 10.6); and
- Measures to protect hydrological features (Section 10.2, Section 10.5).
- Biodiversity Offset Strategy (Appendix E of the BAR);
- Chance Fossil Finds Protocol (Appendix 2 of the Palaeontology Impact Statement)

The following additional management plans must be included prior to finalisation of the Draft EMPr/prior to commencement of construction:

- Cape Vulture Food Management Programme (Avifaunal)
- Biodiversity Management Plan (Avifaunal/Ecological/Biodiversity Offset)
- Aquatic Rehabilitation and Monitoring Plan (Aquatic)
- Emergency Response Action Plan (Generic EMPrs)

10.1 SEARCH AND RESCUE, REHABILITATION AND ALIEN INVASION MANAGEMENT PLAN

The Search and Rescue, Rehabilitation and Alien Invasion Management Plan includes specialist input from Dr Greer Hawley.

10.1.1 Relevant Definitions

- **Composition** refers to the identity, and in some cases the abundance, of the species which occur in an assemblage.
- **Environmental Control Officer (ECO)** refers to independent Environmental Specialist(s) tasked with monitoring the environmental performance and compliance of Contractors involved in the construction of the Ngxwabangu WEF.
- **Framework Species** typically refers to a tree, herb or liana species occurring in established natural vegetation, and which is structural in the vegetation complex.
- **Pioneer species** are typically r-selection species which colonise a disturbed habitat in the initial stages of restoration and they are typically a highly abundant, widespread species with high growth rates.
- **Re-vegetation** refers to the process of establishing vegetative cover, which is typically required in areas which need to be restored without the objective of reinstating a native ecosystem. In re-vegetation, any plant species would do (for instance, sowing a mixture of commercially available grasses on mine tailings for soil rehabilitation) although a commercial crop or timber producing trees are often used.
- **Replacement** refers to the establishment of a different type of vegetation on the degraded environment following the vegetation clearance associated with construction activities.
- **Restoration** is the process of reconstituting a degraded system to its original state.
- **Rehabilitation** is a general term which includes the replacement, restoration and re-vegetation, and is the process or programme implemented to achieve restoration or replacement.
- **Succession** is the directional development in the species composition of a community after disturbance, from the so-called pioneer stages to an end-state or climax that tends to persist.
- **Topsoil** refers to the top 100 mm of the soil which often includes organic material such as stem and leaf litter.
- **Weed** refers to an undesirable plant, typically an alien or non-native species, which exhibits robust growth and may provide competition for resources with the desired vegetation.

10.1.2 Vegetation Clearing Procedure

Vegetation clearance may only occur once the relevant permits have been secured.

A) <u>Vegetation Clearing</u>

The following activities must be undertaken prior to the commencement of the construction activities:

- All trees and identified plant Species of Conservation Concern (SCC) which need to be transplanted should be demarcated, using a suitable demarcation material which will not damage the trees and/or plant SCC.
- Herbaceous and geophytic plant species which need to be transplanted (bulbs and seedlings), slipped, or have their seed collected must be identified and marked.
- Obtain permits from the Eastern Cape provincial Department of Economic Development, Environmental Affairs and Tourism (DEDEAT) and the Department of Agriculture, Forestry and Fisheries (DAFF) for the transplantation, removal, damage or destruction of protected plant species.

- Establish a nursery within the site or make use of a suitable nursery in proximity to the site to ensure that the plants are stored in suitable potting bags or pots, watered as often as required, sheltered from the weather, etc.
- All geophytic (bulbous) plants and tree samplings, which are visible, should be removed from the construction footprint and stored in nursery conditions.
- Grass sods from a variety of naturally occurring grasses should be collected from the site and kept in nursery conditions. At least ten (10) sods or runners per species should be collected. Where possible, the grass should be mowed during seeding season and the seed should be collected and stored for reseeding.

The following activities must be undertaken during the construction activities:

- Ensure that the plants which are housed in the nursery are cared for by a suitably qualified/experienced individual.
- Any geophytic (bulbous) plants which are observed in the topsoil during vegetation clearance must be removed and stored in nursery conditions.

Please note: If any unusual plant species are encountered, the Contractor and/or the ECO should contact a suitably qualified specialist and provide photographic depictions of the unknown plant species for rapid species identification by the specialist.

B) Disposal of Vegetation Material

In sections where the site is covered by grasses, the grasses and topsoil should be removed, no disposal mechanism is required. However, where woody vegetation has been cleared, all material should be chipped, shredded and utilised on the site for mulching and composting during rehabilitation.

10.1.3 Search and Rescue Plan (Plant Stockpiling)

The plant Search and Rescue Plan aims to establish which plants should be harvested from the turbine laydown areas, access roads and associated WEF infrastructure, in order to:

- Collect important pioneer plants which can be transplanted, kept under nursery conditions and utilised for re-vegetation after construction as part of rehabilitation activities; and to
- Collect and transplant plant SCC which have a high conservation value or apply for destruction permits, where transplanting will not be possible.

A nursery should be established within the site, in an area where minimal construction disturbance will occur, or a suitable existing nursery in proximity to the site should be used. Please note that if the latter is chosen, all necessary permits and conditions must be in place to ensure that the plant species are suitably transported to the nursery. If the former is chosen, the following minimum requirements must be implemented during the operation of the nursery within the site:

- Establish a nursery within the site, in an area where minimal construction disturbance will occur.
- Bush clumps within the site could be utilised in the nursery because of the shelter and micro-climate which is provided by the bush clumps/vegetative cover.
- Make use of fencing of at least 1.2 m in height to fence-off the nursery for protection from livestock, which are likely to continue grazing within the site and surrounds. A gate should be constructed to ensure access to the nursery for the maintenance of the plants, as well as for vehicle access and deliveries.
- Where necessary, equip the nursery with a water tank for irrigation purposes.
- Install hose-lines in the nursery, if required.

- Procured plants should be transported with care to ensure that they arrive at the nursery in a condition which is suitable for successful growth.
- All harvested seeds and seedlings, as well as plants removed for transplanting, are the responsibility of the Contractor and must be kept under approved nursery conditions. Additional measures and/or remedial action should be taken if the nursery is not functioning successfully under the approved nursery conditions.
- Plants which are to be stored in containers in the nursery should be planted in two (2) parts of topsoil which has been excavated from the site (to emulate site conditions) and one (1) part of compost (produced from mulching the cleared vegetation).
- Ensure that the nursery is properly equipped with the necessary implements, containers, fertilisers and other equipment required to function efficiently.
- All plants must be fully maintained by staff from the date of receipt until rehabilitation has concluded. This includes watering, weeding, fertilising, etc. as required.
- All plants must be protected against wind, frost and direct sunlight, until such time as they are fully acclimatised. If necessary, shade net or a shade house should be installed for this purpose.
- Plants which are held in the nursery for more than one (1) year, must be replanted into larger containers. Any plants which outgrow their current containers must be replanted in larger containers when required.
- The Contractor will be held liable for the replacement of plants lost due to negligence or mismanagement.

10.1.4 Rehabilitation Plan

Rehabilitation of disturbed and heavily impacted environments is closely linked to ecological successional theory (van Ardel & Aronson, 2005). Succession can be described as a change of species, or patterns of species abundance, over time. Directional, continuous and sequential patterns of colonisation by various species are indicators of successional stages of an environment.

The first sequence of succession (after a disturbance) is the initial colonisation of an area of fast-growing, aggressive *pioneering* species, which are often short-lived, perennial species and grasses. These plant species are responsible for changing soil properties and creating micro-niches for further colonisation.

The initial sequence of pioneer species is followed by early and late successional species migrating into the area, resulting in a *climax community*.

The “4 R” Approach should be employed for the rehabilitation of the disturbed environment. This includes:

- Restoration;
- Rehabilitation;
- Replacement/re-vegetation; and
- Reservation/conservation.

Ensure that these activities start with soil stabilisation and soil preparation or remediation. Soil remediation includes activities to improve soil stabilisation, soil structure and soil fertility.

The success of rehabilitating the community/population within a designated area is dependent on the satisfactory establishment of the chosen plant species. To ensure that the process is optimised, the correct plant species in the correct densities and combinations should be utilised. Monitoring of the rehabilitation process is imperative to ensure that aggressive plant species and herbivores are controlled, and slopes/banks remain stable.

The general aim of a rehabilitation programme is to recreate a natural ecosystem. The rehabilitation will therefore be outlined in three (3) phases, which are required, namely:

I. Take measures to stabilise the soil and remedy the soil, when required, through the monitoring and management of the soil composition, pH levels, nutrients, etc.;
II. Re-vegetate disturbed areas using appropriate natural successional species;
III. Monitor and manage the success of the rehabilitation by controlling aggressive indigenous plants, removing alien invasive plant species as soon as they are observed, and maintaining the re-vegetated areas to ensure the successful establishment of these re-vegetated areas.

A) Soil Stabilisation and Remediation

Topsoil, which is removed during construction, must be utilised in the nursery and stored on site for rehabilitation and re-vegetation. Once construction is complete, the topsoil must be spread over the disturbed site and covered with mulch. Where necessary, the soil must be stabilised using suitable materials, such as netting or geotextiles. The plant material (grasses and herbs), which has been removed from the site, should be mixed into the topsoil to supplement the organic nutrient content of the soil. No further soil conditioning in terms of fertilising is deemed necessary at this stage.

B) Re-vegetation Procedure

The species which are to be used for re-vegetation should be based on the ability of the species to:

- Successfully grow from the indigenous seeds, sods and/or slips which have been collected from the site; and
- All Red Listed species, SCC and protected species which have been removed from the site.

The Table below consists of the steps which should be followed during out-planting for the re-vegetation procedure.

PLOT PREPARATION	The plots should be prepared as follows: • Prior to rehabilitation of the site, all remnants of foreign debris should be removed from the site. • Compacted soil should be ripped to a depth of more than 250 mm. • The final prepared surface should not be smooth but furrowed to follow the natural contours of the land. • All plots must be covered with topsoil. Topsoil should be manually spread evenly over the surface. Topsoil must be spread to the original depth and deeper where sufficient topsoil is available. • All the plots should be mulched. The vegetation stripped, chipped and stockpiled during site preparation must be spread in a single layer across the plots as mulch. • All plots should be treated with nitrogen-fixing bacteria which is important for legumes, *Trichoderma sp.* and mycorrhizal products as a natural form of soil remediation.
PLANT PREPARATION	Plants should undergo a period of 'hardening-off' during which they have been exposed to full, direct sunlight and been under a reduced watering regime. The individual plants destined for each plot should be grouped into plot-specific, marked baskets or containers, before they leave the nursery. Each plant should be labelled with an aluminium label, giving species code, and a specific numeral identifying the plot. Before out-planting commences, the equipment necessary for the proper handling and placing of all required materials must be on hand, in good condition and to acceptable approved standards. Shrubs and trees • Planting should preferably be done during the rainy season (summer). • Unless otherwise specified by the ECO, excavate square holes of approximately 800 mm x 800 mm x 800 mm for trees and approximately 500 mm x 500 mm x 500 mm for shrubs.

	• Backfill planting holes with excavated material/approved topsoil, thoroughly mixed with weed-free manure or compost (per volume, approximately one quarter of the plant hole), one cup of 2:3:2 fertiliser and an approved ant and termite poison (if required). • As much of the soil from container plants as possible must be retained around the roots of the plant during planting. • The soil must cover all the roots and be gently pressed down to a level equal to that of the surrounding *in situ* material. • After planting, each plant must be well watered and additional soils should be added once the soil has settled, if necessary. • Add mulch to the surface area of the bermed basin in order to sustain soil moisture • Stake all trees using at least three (3) weather resistant wooden or steel stakes anchored firmly into the ground. Two (2) of the three (3) stakes should be located on the windward side of the plant. Galvanised wire binding, 3 mm thick, covered with a 20 mm diameter plastic hosepipe must be tied tightly to the stakes, half- to two thirds the height of the tree above the ground and looped around the trunk of the tree. • Place stakes at least 500 mm apart and away from the stem and roots of the tree, so as not to damage the tree or its roots. • Thoroughly water plants as required until the plants are able to survive independently, i.e. until they are able to survive when receiving water from rainfall only. • A raised circular 200 mm high subsoil berm placed 500 mm (shrubs) to 750 mm (trees) from the plant stem must be provided for the watering. Do not simply leave the excavated plant hole partially backfilled for this purpose, the berm must be raised above the natural soil level. • Water aloes and bulbs once directly after transplanting to settle the soil. • Remove stakes and wire binds over time as required, as plants become established.
GRASSING USING SODS	• "Sodding" is defined as the laying of grass sods. • Sodding may be done at any time of the year. • The soil should be uniformly wet to a depth of at least 150 mm before grass sods are planted. • Protect sods against drying out by keeping them moist from the time of harvesting until final placement. • Rake or spike the plot area to create a loose surface to a depth of approximately 100 mm. • Lay two (2) rows of sods in a straight line or following a contour, starting at the bottom of a slope, where possible. • Place the next two (2) rows of sods in the same direction, 5 m away, until the full area is covered with rows of sods. • Tightly push sods together, taking care not to stretch or overlap sods. • Where a good fit cannot be obtained, the intervening spaces should be filled with parts of sods or topsoil. • After planting, water sods to prevent drying out. • Irrigate as required until the grass is able to survive independently, i.e. until it is able to survive when receiving water from rainfall only.
GRASSING USING RUNNERS	• Plant grass runners evenly by hand or by mechanical means at a rate of at least 400 runners per hectare (i.e. at 250 mm centres). • Only use fresh runners, avoiding grass runners which have dried out. • Rake or spike the area to create a loose surface to a depth of approximately 100 mm. • The soil should be uniformly wet to a depth of at least 150 mm before planting of grass runners. • After planting, the runners must be given copious amounts of water and, when sufficiently dry, must be rolled with a light agricultural roller and re-watered. • Irrigate as required until the grass is able to survive independently, i.e. until it is able to survive when receiving water from rainfall only.
GRASSING USING SEEDS	• All seed should be collected from the site during vegetation clearing or from the neighbouring veld. • Seeding must be done during the summer months, when the germination rate is better. • The soil should be loose and uniformly wet to a depth specified by the ECO, before any seeding commences.

	• Halve the seed and fertiliser mixture as specified and apply evenly in two (2) successive applications perpendicular to each other. • The seeded area must be raked over after seed application and well-watered. • Irrigate as required until the grass is able to survive independently, i.e. until it is able to survive when receiving water from rainfall only.
MAINTENANCE	• Cordon-off areas which are under rehabilitation as temporary no-go areas using danger tape and steel droppers. If necessary, these areas should be fenced-off to prevent vehicular, pedestrian and livestock access. • Delay the re-introduction of livestock to all rehabilitated areas until an acceptable level of re-vegetation has been reached. Fencing may be used, or the area may be covered by suitable branches. • Re-vegetation should be the same as the vegetation type which previously existed, unless otherwise indicated in the Contract or specified by the ECO. • Water all transplanted, planted and grassed areas as specified. • Watering must commence and continue immediately after the seeds have germinated and growth begins. • Mow lawns regularly to a height of 50 mm above ground level. This promotes adequate coverage. • Mowing of veld grass is to take place once a year after the grass has shed its seed and not before the grass has fully grown - fire breaks are important. • Check all plants for pests and diseases on a regular basis and treat the plants, when required, using approved methods and products as per the manufacturers' specifications. • Control weeds by means of extraction, cutting or other approved methods. • In planted areas which have failed to establish, replace plants with the same species as originally specified. The same species must be used unless otherwise specified by the ECO. • A minimum grass cover of approximately 80% is required. Individual plants must be strong and healthy growers by the end of the maintenance period. • Acceptable cover, in the case of sodding, is attaining 100% cover by the specified vegetation.

C) Rehabilitation Monitoring

It is recommended that the success of the rehabilitation is monitored from the commencement date of rehabilitation activities, which should be recorded in the Environmental File, and for a period of twelve (12) months after the rehabilitation procedure has been completed. Should any issues arise, which are not resolved through the implementation of the recommended measures, a suitably qualified horticulturist or botanist should be contacted to provide further rehabilitation/remedial measures.

The ECO should monitor the rehabilitation process and record the progress in the monthly audit reports using photographic evidence. This should include monitoring:

- Establishment success (presence, percentage cover or absence) of plant cover per plot; and
- Water used for irrigation.

Monitoring must be undertaken once a month for the first three (3) months and then quarterly thereafter for twelve (12) months or until rehabilitation has been deemed successful. Rehabilitation will be deemed successful once primary grass cover has been established, and there is no further requirement for frequent monitoring and management of the growth of alien species.

10.1.5 Alien Plant Species Management

The Ecological Specialists describe the current state of the proposed Ngxwabangu WEF site vegetation as follows:

An Alien Plant Species is "(a) a species that is not an indigenous species; or (b) an indigenous species translocated or intended to be translocated to a place outside of its natural distribution range in nature, but not an indigenous species that has extended its natural distribution range by natural means of migration or dispersal without human intervention" (SANBI, 2020).

It should be noted that not all introduced alien species are invasive and not all invasive species are necessarily alien.

South Africa's National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA) has defined 'Invasive Alien Plant Species' to mean any species whose establishment and spread outside of its natural distribution range:
(a) Threatens ecosystems, habitats or other species or has a demonstrable potential to threaten ecosystems, habitats or other species; and
(b) May result in economic or environmental harm or harm to human health. Invasive alien plant species are globally considered as one of the greatest threats to the environment, biodiversity, ecosystem integrity and the economy.

According to the Conservation of Agricultural Resources Act (No. 43 of 1983 - Regulation 15, 30 March 2001) (CARA), for agricultural land, and the National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA), for natural areas, invasive alien plant species should be controlled and eradicated with an emphasis on urgent action in biodiversity priority areas. NEM:BA published a list of Alien and Invasive Species (No 599) in 2014/1 which regulates the management of alien and invasive plants in natural environments.

During the site visit, the following alien plant species were recorded:

FAMILY	SPECIES	COMMON NAME	CARA (Act No. 43 of 1983)	NEMBA NATIONAL LIST OF INVASIVE SPECIES IN TERMS SECTIONS 70(1), 71(3) and 71A
Asteraceae	*Campuloclinium macrocephalum*	Pompom weed	1	1b
Asteraceae	*Hypochaeris albiflora*	Hypochaeris albiflora	-	-
Asteraceae	*Hypochaeris radicata*	Common Cat's-Ear	-	-
Asteraceae	*Cirsium vulgare*	Bull Thistle	1	1b
Asteraceae	*Oedera pungens*	-	-	-
Brassicaceae	*Coronopus didymus*	Lesser Swine-Cress	-	-
Fabaceae	*Acacia mearnsii*	Black wattle	2	2
Fabaceae	*Acacia melanoxylon*	Australian blackwood	2	2
Fabaceae	*Robinia pseudoacacia*	Black locust	2	-
Malvaceae	*Hibiscus trionum*	Flower-of-An-Hour	-	-
Onagraceae	*Oenothera rosea*	Rose Evening Primrose	-	-
Onagraceae	*Oenothera sp.*		-	-
Proteaceae	*Hakea salicifolia*	Willow-leaved Hakea	-	-
Rubiaceae	*Richardia brasiliensis*	Tropical Mexican Clover	-	-
Polygonaceae	*Rumex occidentalis*	Western Dock	-	-
Pinaceae	*Pinus sp.*	Pine	2	2

FAMILY	SPECIES	COMMON NAME	CARA (Act No. 43 of 1983)	NEMBA NATIONAL LIST OF INVASIVE SPECIES IN TERMS SECTIONS 70(1), 71(3) and 71A
Poaceae	*Paspalum dilatatum*	Dallis Grass	-	-
Poaceae	*Cymbopogon pospischilii*	Narrowleaf Turpentine Grass	-	-
Solanaceae	*Solanum sisymbriifolium*	Wild tomato,Dense - thorned bitter apple	2	-
Solanaceae	*Solanum chrysotrichum*	Giant devil's fig	-	1b
Solanaceae	*Solanum viarum*	Tropical Soda-Apple	-	-
Zingiberaceae	*Hedychium gardnerianum*	Kahili ginger lily	1	1b

A) Working for Water (WfW) Methods to Control Invasive Alien Plants

The following methods for the control of invasive alien plants are deemed acceptable, in accordance with the Working for Water (WfW) programme which was launched in 1995 and initially administered by the Department of Water Affairs and Forestry (DWAF) and now it is administered by the national DFFE. These include:

- **Mechanical methods** of invasive alien plant removal, such as tree felling, removing or burning.
- **Chemical methods** of invasive alien plant removal through the careful us of environmentally safe herbicides in accordance with the manufacturers' instructions.
- **Biological control** using species-specific insects and/or diseases from the alien plant's country of origin, this method should only be used with extreme caution. Biological control is not a feasible option for the Ngxwabangu WEF site and is therefore not recommended.
- **Integrated control** which consists of a combination of at least two (2) of these methods.

The WfW programme aims to improve the integrity of natural resources by:

- Preventing new and emerging invasive alien plant problems;
- Reducing the impact of existing priority invasive alien plants; and
- Enhancing capacity and commitment to solve invasive alien plant problems.

B) Recommended Guidelines for the Removal and Control of Invasive Alien Plants within the Ngxwabangu WEF Development Site

Please note: The Developer and/or Contractor will not be responsible for the removal of all the current alien invasive plants which occur within the affected properties, but the Contractor will be responsible for using suitable methods to remove the alien invasive plants from the proposed Ngxwabangu WEF development footprint and controlling alien invasive plant growth within the areas which have been disturbed by the construction activities.

The following general requirements are recommended for the removal of invasive alien plants within the site:

- All staff involved in the removal and management of invasive alien plans must receive suitable training prior to the removal of plants and tree cutting.
- Large trees should be cut with chainsaws or axes and the open stems should be poisoned to ensure that the plant dies and does not re-sprout.
- All cuttings and vegetative material should be removed from the site and disposed of at a suitably registered waste disposal site.

- Cleared sites should receive follow up inspections, as frequently as required, to remove upcoming seedlings.
- In areas in which large-scale alien plant removal has been conducted, measures to stabilise the soil from wind and water erosion must be taken. Soils can be mulched and planted with indigenous pioneer species.
- Continued monitoring throughout the life of the project will be required as the risk of alien plant species invasion is never eliminated.

The following mechanical methods for alien plant removal are recommended:

- Hand-pulling seedlings and/or young plants by gripping them low down with a gloved hand and pull the plant out. Ensure that the roots are removed from the soil and that the plant does not break-off above the root.
- Ringbark trees by removing bark from the bottom of the stem up to a height of between 0.75 and 1 m. Hatchets or bush-knives may be used for debarking.
- Cut stump treatment can be used by cutting stems as low as practical as stipulated on the herbicide label. Chemical herbicides are applied in diesel or water as recommended. Applications in diesel should be to the whole stump and exposed roots and in water to the cut area as recommended on the label.

The appointed ECO should monitor the mechanical methods used for the removal of invasive alien plants and provide additional recommendations if and/or when required.

Chemical methods for alien plant removal are also a feasible method which can be used within the Ngxwabangu WEF site to control alien invasive plants. The Contractor should submit a Method Statement, containing the details of the chosen environmentally safe herbicide(s) and the method(s) of application, to the ECO for approval prior to the use of chemical methods for alien plant removal. Once the Method Statement has been approved, the ECO should monitor the removal of the alien plants and ensure that it is being undertaken in accordance with the approved Method Statement.

10.2 OPEN SPACE MANAGEMENT PLAN

All mitigation measures relating to vegetation clearance in this EMPr as well as all recommendations in the management plans in Section 9.1, Section 9.5 and Section 9.8 are applicable to the management of open space areas. Please note that *"open space"*, in terms of the Ngxwabangu WEF site, includes areas directly adjacent to constructed and upgraded roads, the turbine footprints and the associated infrastructure.

10.2.1 Management of Potential Issues

The following potential issues should be addressed (if they arise) by the Contractor and to the satisfaction of the ECO:

- The construction (and operation where necessary) of the Ngxwabangu WEF must be confined to the approved development footprint.
- Open space areas should be kept as contiguous blocks of vegetation as far as possible and no additional barriers, except for approved roads and fences, should be constructed to avoid impeding faunal movement.
- Vehicles must remain within the approved roads and no off-road driving should be permitted without prior consent from the ECO.
- Alien plants and weeds should be removed from the open space areas and these areas should be monitored for the regrowth of such plants.
- Only indigenous species from a list approved by the ECO may be used for any rehabilitation work in open space areas.
- No waste should be disposed of in open space areas, including but not restricted to cigarette butts and uneaten foodstuffs (i.e. fruit cores and peels) which could attract scavengers. It is recommended that receptacles be placed strategically to minimise this, especially during the construction phase.
- No material stockpiling should occur within open space areas without approval from the ECO.
- A plant Search and Rescue operation must be undertaken by a qualified botanist/horticulturalist prior to construction commencing and SCC identified within the development footprints must be transplanted in accordance with the Search and Rescue Plan. The Search and Rescue Plan must be updated with input from the qualified botanist/horticulturist prior its implementation.
- Vegetation cleared from development footprints must not be piled onto adjacent intact vegetation outside of the designated footprint, not even for temporary storage.
- The collection of indigenous plants from the site must not be allowed, unless the individual(s) are authorised to do so.
- Employees should undergo environmental awareness training and be sensitized to the need to avoid disturbance to the indigenous vegetation outside the approved development footprints.
- Rehabilitation guidelines for the development must prioritise the use of indigenous grass, tree and shrub species for the soil stabilisation landscaping of the development site once construction has been completed, if required.

The ECO should report on the condition of the open space areas and keep photographic records during the construction phase of the Ngxwabangu WEF.

10.2.2 Protection of Watercourses and Wetlands

All relevant water use authorisations in terms of the National Water Act (NWA) (Act No. 36 of 1998 and subsequent amendments) must be obtained from the Department of Water and Sanitation (DWS) prior to the commencement of the construction of the Ngxwabangu WEF. All recommendations and conditions of approval must be incorporated into the audit checklist and appended to the EMPr. The ECO should audit the Contractor's compliance with the DWS recommendations and conditions during the construction phase.

The following general guidelines should be implemented to mitigate potential adverse impacts on surface water resources and associated riparian vegetation and habitats:

- Buffers of 32 m should be placed around watercourses and wetlands. These buffered areas should not contain structures or impermeable surfaces, except for the construction and upgrade of approved roads, road crossing structures and cabling.
- Stormwater management features must be suitably designed and constructed to maintain stormwater flow to acceptable levels and minimise the risk of erosion and scouring.
- No stormwater runoff should be discharged directly into the watercourses, where it could cause increased erosion.
- Alien invasive plants and weeds within the watercourse and wetland 32 m buffers and which form part of the Ngxwabangu WEF development footprint should be removed and regrowth should be monitored/controlled.

The ECO should report on the condition of the surface water within the development site and keep photographic records during the construction phase of the Ngxwabangu WEF.

10.3 TRAFFIC AND TRANSPORTATION MANAGEMENT PLAN

10.3.1 General Traffic Standards

The following general traffic standards must be adhered to during the phases of the Ngxwabangu WEF development:

- All drivers of vehicles which enter the site must comply with the site rules and regulations.
- Rotational lights must be operational and mounted on the most visible point of the vehicle.
- All traffic signage and/or flagmen instructions must be adhered to.
- All road traffic should keep to designated, approved, access routes and should not cause unnecessary damage to vegetation or features within the site.
- Only authorised vehicles should be permitted on the haulage roads.
- Construction vehicles and/or plant must not drive through any watercourses or wetlands.

10.4 STORMWATER MANAGEMENT, EROSION AND SEDIMENT CONTROL PLAN

This plan aims to:

- Provide appropriate guidelines for the conservation of soil to reduce the risk of erosion and sedimentation.
- Provide appropriate plans for the management of stormwater runoff.
- Minimise the potential for sediment loss.
- Minimise the risk of contamination of stormwater.
- Provide corrective measures to be implemented if erosion increases as a result of construction activities.

10.4.1 General Performance Criteria

The following general performance criteria will be applicable to the Ngxwabangu WEF site:

- Minimal soil erosion as a result of construction activities.
- Implementing reasonable and practical measures to manage and mitigate the impacts which could result in increased soil erosion during the construction phase.

- Minimal to no contaminants present within the site, including sediments and litter, which could result in adverse environmental impacts to surface water resources due to construction activities, including vehicle movements and spoil placement.
- Where applicable, the capture, containment and treatment of groundwater which has been collected in excavations as a result of construction activities.

10.4.2 Stormwater Management, Erosion and Sediment Control

In addition to the sections below, the Department of Water and Forestry Stormwater Management G1 Best Practice Guideline (2006) must be adhered to.

A) Planning

- The clearing of the development footprint must be planned prior to clearing and construction activities to ensure that clearing is undertaken in a controlled manner.
- The Contractor and all personnel must be made aware of site-specific stormwater management measures, erosion and sediment control measures, and the implementation and maintenance which is required.
- The risks associated with the management of stormwater, sedimentation and erosion must be identified and the mitigation measures stipulated in the approved EMPr must be implemented.
- The following factors must be considered when determining erosion and sediment control, as well as the effectiveness of the recommended measures:
    - Local climatic condition and seasonal variations;
    - The soil types present on site and the condition of the soils;
    - The surface water resources which are present within the site; and
    - Local drainage, including temporary and overland flow paths.

B) Recommended Actions

- All mitigation measures stipulated in the approved EMPr and the conditions of the EA relating to stormwater management, sedimentation and erosion must be implemented (see Section 9.5.3).
- Sediment controls, such as basins or catch drains, should be designed to provide adequate bunding of spoil placement areas to prevent surface runoff entering nearby stormwater drains and watercourses without treatment, where required. These should be implemented according to ECO's recommendations.
- Disturbances to the Ngxwabangu WEF site due to clearing must be limited to the approved development footprint(s). This should be achieved through the demarcation of the development footprint(s) prior to the commencement of vegetation clearance and construction activities.
- All restricted and/or "no-go" areas should be demarcated prior to the commencement of construction activities.
- Erosion and sediment control measures should be both reasonable and practical. These measures must consider the receiving environment, water quality objectives, quality and quantity of water, location and accessibility, and other necessary factors.
- The Contractor must submit a detailed Method Statement/(s) to the ECO for approval prior to the commencement of construction activities. This Method Statement should include, but not be limited to, the planned stormwater management measures, sediment control measures, and erosion management and corrective measures (should erosion occur as a result of construction activities). This Method Statement/(s) must align with the mitigation measures stipulated in the approved EMPr and the conditions of the EA.

- The ECO should monitor the site for erosion or increased erosion due to construction activities and recommend suitable corrective measures to the Contractor. Corrective action must be taken at the first signs of erosion or increased erosion (in areas which were eroded prior to the commencement of the construction activities).
- Construction activities within a watercourse or wetland, such as roads or cabling, must only take place once the necessary approvals and/or authorisations have been received. All relevant conditions, such as those in the EA, EMPr and Water Use Approval(s), must be adhered to during construction within a watercourse or wetland. A Method Statement should be submitted to the ECO for approval prior to the commencement of such activities. The ECO should monitor the construction within these sensitive areas and report on the Contractor's compliance with the relevant conditions and Method Statement(s) in the monthly ECO audit reports.
- All watercourse protection controls must be implemented and functional prior to the commencement of construction activities within watercourses and/or wetlands.
- Vehicles must remain within the approved roads and adhere to all traffic rules.
- Where applicable, uncontaminated sediment removed from erosion and sediment control devices should be stockpiled in a suitable and approved location for reuse in areas which require landscaping, or the sediment should be removed from the site and disposed of at a suitably registered facility.
- Access roads should be graded to a crossfall which allows water to naturally drain into the surrounding environment without slowing or cut-off berming across the roads. The effectiveness of the road drainage systems should be monitored and, should the current drainage systems not be sufficient or effective, additional drainage measures should be recommended by the ECO.
- In areas where the water table is high, the excavation areas should be dewatered. Should this be required, a Method Statement detailing the proposed dewatering process should be submitted to the ECO for approval prior to dewatering taking place.

C) Monitoring

The stormwater management as well as erosion and sediment control measures within the Ngxwabangu WEF site should be monitored, and additional measures should be put in place if/when necessary.

- The monitoring of the management of stormwater and erosion control should be undertaken using an environmental inspection checklist, which contains all the required conditions, recommendations and mitigation measures.
- All drainage facilities and systems should be inspected regularly and maintained whenever required.
- Should circumstances arise which result in the current drainage facilities and/or systems being inadequate, further measures should be implemented to ensure the adequate functioning of drainage facilities and/or systems.

D) Reporting

- The monitoring of the management of stormwater and erosion control should be undertaken using an environmental inspection checklist, which contains all the required conditions, recommendations and mitigation measures, on a weekly basis.
- Any complaints and/or incidents relating to stormwater management, erosion and sediment control must be reported to the ESO and the ECO.
- The ECO will be responsible for notifying the Contractor and the Developer of any complaints and/or incidents relating to stormwater management, erosion and sediment control.
- The ECO should investigate all incidents and report the findings to the Contractor and the Developer in an Environmental Incident Report.

10.4.3 Recommended Mitigation Measures

- Stormwater should be managed using suitable structures such as swales, gabions and rock rip-wrap so that any runoff from the development site is attenuated prior to discharge. Silt and sedimentation should be kept to a minimum, using the above-mentioned structures. Ensure that the structures do not create any form of erosion.
- Natural runoff must be diverted to stormwater drains, where these are available.
- Stormwater structures must be located at least 32m away from identified drainage lines.
- This Stormwater Management Plan must be updated prior to commencement of construction to include measures for maximum water seepage at the source of water flow, mitigation measures for water pollution, wastewater management and the management of surface erosion e.g. by considering the applicability of contouring, etc.
- Stormwater management features must be suitably designed and constructed to maintain stormwater flow to acceptable levels and minimise the risk of erosion and scouring.
- No stormwater runoff should be discharged directly into the watercourses, where it could cause increased erosion.

Please note that this Stormwater Management Plan must be updated prior to the commencement of construction. In addition to the recommendations listed above, it should include detailed design drawings of the proposed structures for watercourse crossings for approved roads and cables.

10.5 STORAGE AND HANDLING OF HAZARDOUS SUBSTANCES

All necessary equipment to handle hazardous substances must be available on the Ngxwabangu WEF site. Personnel responsible for the handling of hazardous substances must be suitably trained. The Developer's Site Supervisor or the Contractor should submit a Method Statement, detailing the storage and handling of hazardous substances, to the ECO for approval. In addition, the Method Statement should include a list of all potentially hazardous substances within the Ngxwabangu WEF site.

10.5.1 Legislation, Policy and Guidelines

The storage and handling of hazardous substance must be in accordance with the relevant legislation, policy and guidelines. This should include, but not be limited to, the following:

- Occupational Health and Safety Act (Act No. 85 of 1993),
- National Environmental Management: Waste Management Act (Act No. 59 of 2008),
- Hazardous Substances Act (Act No. 15 of 1973, as amended), and
- South African National Standards (SANS).

10.5.2 Responsibility

The Developer's Site Supervisor and/or the Contractor must be responsible for overseeing the storage and handling of hazardous substances in accordance with this plan and all relevant legislation. Should the Developer's Site Supervisor and/or the Contractor appoint a designated individual to undertake the tasks on their behalf, the designated individual (the Developer's Site Supervisor or the Contractor) will be responsible for the following:

- Assessing the hazardous properties and disposal requirements of the materials used on the Ngxwabangu WEF site.
- Monitoring the use and management of the inventory.
- Advising and assisting the personnel with the correct handling and storage of hazardous substances.
- Updating the chemical register when new chemicals are brought to the site.

- Preparing and maintaining the Material Safety Data Sheets (MSDSs).
- Maintaining a register of the consumption of oil, diesel, etc. and maintaining a spill register.

10.5.3 Registers

The Developer's Site Supervisor or the designated individual will be responsible for compiling and maintaining the chemical register, MSDSs and spill register.

The following should be included in the chemical register:

- Name and description of the substance,
- Supplier name and details,
- Quantity,
- MSDS,
- Validity of the MSDS,
- Storage location and storage requirements,
- Method of disposal, and
- Emergency equipment (firefighting equipment, first aid kits, emergency contact details, etc.).

10.5.4 Management of Hazardous Substances

The mitigation measures stipulated in the Ngxwabangu WEF EMPr must be implemented to manage hazardous substances, reduce the risk of accidental spillages and treat accidental spills.

- The transportation and handling of hazardous substances must comply with the provisions of the Hazardous Substances Act (Act No.187 of 1993) and associated regulations as well as SABS 0228 and SABS 0229.
- The Contractor must also comply with all other applicable regional and local legislation as well as regulations regarding the transport, use and disposal of hazardous substances. Hazardous chemical substances (as defined in the Regulations for Hazardous Chemical Substances) used during construction must be stored in secondary containers. The relevant MSDS should be available onsite.
- Procedures detailed in the MSDSs must be followed in the event of an emergency.
- The Contractor and/or the Developer's Site Supervisor should be responsible for the training and education of all personnel onsite that will be handling hazardous materials about their proper use, handling and disposal.
- If potentially hazardous substances are to be stored or used onsite, the Contractor and/or the Developer's Site Supervisor must submit a Method Statement to the ECO detailing the substances/materials to be used, together with the transport, storage, handling and disposal procedures for the substances.
- Used oil should be stored at a central location onsite prior to removal offsite for disposal at an approved disposal site.
- Old oil filters and oil, petrol and diesel-soaked material must be treated as hazardous waste. The Contractor should remove all oil, petrol, and diesel-soaked sand immediately and should dispose of it as hazardous waste or treat it onsite with material which breaks-down or encapsulates such spillages, as approved by the ECO.
- The storage of fuels and hazardous materials must be located away from sensitive water resources.
- All hazardous substances (e.g. diesel, oil drums, etc.) must be stored in a bunded area.
- The recommendations of the Stormwater Management Plan must be implemented during construction.

- All construction materials including fuels and oil should be stored in demarcated areas which are contained within berms/bunds. Washing and cleaning of equipment should also be done in berms or bunds, in order to trap any cement and prevent excessive soil erosion.
- All necessary approvals with respect to fuel storage and dispensing must be obtained from the appropriate authorities. Symbolic safety signs depicting “No Smoking” and “Danger”, conforming to the requirement of SABS 1186, must be prominently displayed in and around the fuel storage area. There must be adequate firefighting equipment at the fuel storage area.
- The Contractor and/or the Developer’s Site Supervisor must ensure that all liquid fuels and oils are stored in tanks with lids, which are always kept firmly shut and under lock and key. The capacity of the tank should be clearly displayed, and the product contained within the tank clearly identified using the emergency information system detailed in SABS 0232 Part 1. The capacity of fuel storage tanks should not exceed 9 000 litres and must be kept on site only for as long as fuel is needed for construction activities, on completion of which they must be removed.
- Fuel storage tanks onsite should not be linked or joined via any pipe work but should remain as separate entities. The tanks must be situated on a smooth impermeable base with a bund. The volume inside the bund should be 110% of the total capacity of the largest storage tank. The base may be constructed of concrete, or of plastic sheeting with impermeable joints with a layer of sand over to prevent perishing. The impermeable lining should extend to the crest of the bund. The floor of the bund should be sloped to enable any spilled fuel and/or fuel-contaminated water to be removed. Appropriate material, approved by the ECO that absorbs/breaks-down or encapsulates minor hydrocarbon spillage and which is effective in water, should be installed in the sump.
- The tanks and bunded areas should be covered by a roofed structure, taken offsite to a disposal site approved by the ECO and the material, which absorbs/breaks-down or encapsulates minor hydrocarbon spillages, should be replenished.
- Adequate precautions should be provided to prevent spillage during the filling of any tank and during the dispensing of the contents. The dispensing mechanism for the fuel storage tanks should be stored in a waterproof container when not in use.
- As part of the required site layout for the construction camp, a plan must be submitted to the ECO detailing the design, location and construction of the fuel storage area as well as for the filling and dispensing from storage tanks and for the type of absorbing/breaking-down or encapsulating material to be used.
- Where reasonable and practical, the plant should be refuelled at a designated re-fuelling area/depot or at a workshop as applicable. If this is not reasonable or practical, then the surface under the refuelling area must be protected and appropriately bunded against pollution to the reasonable satisfaction of the ECO prior to any refuelling activities.
- If fuel is dispensed from 200 litre drums, the proper dispensing equipment must be used, and the drum should not be tipped in order to dispense fuel. The Contractor should ensure that the appropriate firefighting equipment is present during refuelling operations.
- The Contractor must ensure that there is always a supply of absorbent material readily available to absorb/breakdown or, where possible, be designed to encapsulate minor hydrocarbon spillages. The quantities of such materials should be able to handle a minimum of 200 ℓ of hydrocarbon liquid spill. Prior to any refuelling or maintenance activities, the ECO must approve this material.
- Used oil should be stored at a central location onsite prior to removal offsite for disposal at an approved disposal site.
- Old oil filters and oil, petrol and diesel-soaked material must be treated as hazardous waste. The Contractor should remove all oil, petrol, and diesel-soaked sand immediately and should dispose of it as hazardous waste or treat it onsite with material which breaks-down or encapsulates such spillages, as approved by the ECO.

10.6 FIRE MANAGEMENT PLAN

10.6.1 Background

The Ngxwabangu WEF development must comply with the relevant sections of the following legislation, guidelines and policies with regards to fire management:

- National Veld and Forest Fire Act (Act No. 101 of 1998),
- Disaster Management Act (Act No. 57 of 2002, as amended),
- Fire Brigade Services Act (Act No. 99 of 1987, as amended),
- Local Government: Municipal Structures Act (Act No. 117 of 1998),
- Occupational Health and Safety Act (Act No. 85 of 1993),
- Municipal By-Laws, and the relevant
- South African National Standards (SANS).

10.6.2 Recommended Mitigation Measures

The following mitigation measures, as stipulated in the EMPr, should be implemented to reduce the risk of accidental fires and in response to accidental fires on the Ngxwabangu WEF site:

- A representative of the Ngxwabangu WEF should register as a member of the fire protection association in the area.
- Suitable firebreaks should be established at the Ngxwabangu WEF site, and all practical measures should be taken to ensure that firebreaks are prepared and maintained in accordance with the specifications in Sections 12 to 14 of the National Veld and Forest Fire Act.
- Appropriate firefighting equipment and protective clothing must always be available on the Ngxwabangu WEF site. Personnel should receive basic firefighting training, which includes guidelines for extinguishing fires and the correct method to use firefighting equipment.
- The Contractor must take all the necessary precautions to ensure that fires are not started as a result of site activities.
- No open fires must be permitted on the site, unless in designated areas.
- Smoking must not be permitted in areas where there is a fire hazard. Such areas include the workshop and fuel storage areas and any areas where vegetation or other material is such as to support the rapid spreading of an initial flame.
- The Contractor should appoint a Fire Officer who will be responsible for ensuring immediate and appropriate actions in the event of a fire and will ensure that employees are aware of the procedures to be followed. The Contractor must forward the name and contact details of the Fire Officer to the ECO for approval within seven (7) days of being on site.
- The Contractor must ensure that basic firefighting equipment is always available onsite. This should include at least rubber beaters, when working in urban open spaces and natural areas, and at least one (1) fire extinguisher of the appropriate type when welding or other “hot” activities are undertaken.
- The Contractor will be liable for any expenses incurred by any organisations called to assist with fighting fires which resulted due to their activities or the activities of their personnel, and for any cost relating to the rehabilitation of burnt areas, or consequential damages.
- Emergency procedures, including the names and contact details of responsible personnel and emergency services must be made available to all staff and should be clearly displayed at relevant locations at the site. The Contractor should advise the ECO of any emergencies onsite, together with a record of action taken, within 24 hours of the emergency occurring.
- The Contractor must submit a Method Statement which covers the procedures for emergencies, such as fire and accidental leaks and spillages.

- The Contractor should advise the relevant authority of a fire as soon as one (1) starts. It is crucial that this is done before the fire is out of control.
- The Contractor must ensure that all employees are aware of the procedures to be followed in the event of a fire.

In preparation for temporary site closure, the following should apply:

- The Contractor must ensure that fire extinguishers are serviced and accessible.
- Emergency and contact numbers are available and displayed.
- There is adequate ventilation in enclosed spaces.
- Ensure that the site safety checks have been carried out in accordance with the Occupational Health and Safety Act (Act No. 85 of 1993) prior to site closure.
- Fire hazards have been identified and the local authority notified of any potential threats e.g. large brush stockpiles, fuels etc.

10.6.3 Emergency Contact Signage

Emergency contact details should be displayed at visible locations at the Ngxwabangu WEF site.

11 CLOSURE PLANNING

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

11.1 POST-CONSTRUCTION AUDIT

A post-construction audit must be carried out and submitted to the national DFFE at the expense of the Developer. Objectives should be to audit compliances with the key components of the EMPr, to identify main areas requiring attention and recommend priority actions. The post-construction audit must be submitted to the national DFFE within three (3) months of completion of the development and prior to the operational phase.

Results of the audits should inform changes required to the specifications of the EMPr or additional specifications to deal with any environmental issues which arise on site and have not been dealt with in the current document.

11.2 GENERAL REVIEW OF EMPR

This EMPr must be reviewed by the ECO on an on-going basis. Based on observations during site inspections and issues raised at site meetings, the ECO will determine whether any procedures require modification to improve the efficiency and applicability of this EMPr on site.

Any such changes or updates will be registered in the ECO's record, as well as being included as an appendix to this document. Appendices of this nature must be distributed to all relevant parties.

12 CONCLUSIONS

12.1 IMPACT MANAGEMENT OUTCOMES

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

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

12.2 CONCLUDING STATEMENTS

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

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

13 APPENDIX A

PROPOSED ENVIRONMENTAL EDUCATION COURSE OUTLINE

www.webweaver.nu/clipart/environmental.shtml

Reasons why should we look after the environment

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

How to look after the environment

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

Tips and Guidelines

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

Tips and Guidelines

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

14 APPENDIX B

COPY OF THE ENVIRONMENTAL AUTHORISATION (ONCE RECEIVED)

15 APPENDIX C

EXAMPLE OF A METHOD STATEMENT

METHOD STATEMENT

CONTRACT:…….. **DATE**:…….

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

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

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

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

Start Date:	End Date:

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

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

DECLARATIONS

1) ENVIRONMENTAL CONTROL OFFICER (ECO)

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

_____ _____
(Signed) (Print name)

Dated:_____

2) PERSON UNDERTAKING THE WORKS

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

_____ _____
(Signed) (Print name)

Dated: _____

16 APPENDIX D

Curriculum Vitae (CVs) of the environmental team, including the EAP:

- Dr Alan Carter (EAP)
- Ms Caroline Evans
- Ms Robyn Thomson

17 APPENDIX E