

**AMSTILITE (RF) PROPRIETARY LIMITED GOLDEN VALLEY I WIND  
ENERGY FACILITY**

**BLUE CRANE ROUTE LOCAL MUNICIPALITY, COOKHOUSE  
EASTERN CAPE PROVINCE OF SOUTH AFRICA**

**ENVIRONMENTAL IMPACT ASSESSMENT  
VOLUME 4: ENVIRONMENTAL MANAGEMENT PROGRAMME**

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<b>Volume 2:</b>	<b>Specialist Reports</b>
<b>Volume 3:</b>	<b>Environmental Impact Assessment Report</b>
<b>Volume 4:</b>	<b>Environmental Management Programme</b>

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## TABLE OF CONTENTS

<b>1</b>	<b>INTRODUCTION</b> .....	<b>1</b>
1.1	Environmental Management Programmes .....	1
1.2	Contents of the EMPR.....	2
<b>2</b>	<b>BACKGROUND INFORMATION</b> .....	<b>4</b>
2.1	Details and expertise of the Environmental Assessment Practitioner that conducted the EIA process and prepared this EMPR.....	4
2.2	Golden Valley Wind Energy Facility - Project/Part 1 .....	5
<b>3</b>	<b>OBJECTIVES AND DEFINITIONS</b> .....	<b>9</b>
3.1	Scope of the EMPR.....	9
3.2	Applicable Documentation.....	9
3.3	Definitions applicable to the environmental aspects of the project .....	10
<b>4</b>	<b>ENVIRONMENTAL POLICY</b> .....	<b>13</b>
4.1	Environmental Policies and Guidelines.....	13
4.1.1	<i>Environmental Policy</i> .....	13
4.1.2	<i>Environmental Objectives and Targets</i> .....	13
4.2	Legislative Framework .....	13
4.2.1	<i>Statutory and Other Applicable Legislation and Standards</i> .....	14
<b>5</b>	<b>ADMINISTRATION AND REGULATION OF ENVIRONMENTAL OBLIGATIONS</b> .....	<b>15</b>
5.1	Management Structure .....	15
5.2	Roles and Responsibilities .....	15
5.2.1	<i>Amstilite (RF) Proprietary Limited</i> .....	15
5.2.2	<i>Contractor</i> .....	15
5.2.3	<i>Environmental Site Officer</i> .....	15
5.2.4	<i>Environmental Control Officer</i> .....	16
5.2.5	<i>Traffic Safety Officer</i> .....	17
5.2.6	<i>Liaison Committee</i> .....	18
5.3	Reporting .....	18
5.3.1	<i>Administration</i> .....	18
5.3.2	<i>Good Housekeeping</i> .....	18
5.3.3	<i>Record Keeping</i> .....	18
5.3.4	<i>Document Control</i> .....	19
5.4	Environment and Health Training and Awareness.....	19
5.5	Emergency Preparedness .....	20
5.6	Checking and Corrective Action .....	21
5.6.1	<i>Performance Indicators and Targets</i> .....	21
5.6.2	<i>Non-Compliance</i> .....	21
5.6.3	<i>Monitoring</i> .....	21
5.7	Management Review.....	24
<b>6</b>	<b>POTENTIAL ENVIRONMENTAL IMPACTS</b> .....	<b>25</b>
<b>7</b>	<b>ENVIRONMENTAL SPECIFICATIONS</b> .....	<b>28</b>
7.1	Site Plan.....	28
7.1.1	<i>Water for Human Consumption</i> .....	28
7.1.2	<i>Heating and Cooking Fuel</i> .....	29
7.1.3	<i>Sewage Management</i> .....	29
7.2	Vegetation.....	29
7.3	Rehabilitation .....	30
7.4	Fauna.....	31
7.4.1	<i>Birds and Bats</i> .....	32
7.5	Waste Management .....	34
7.5.1	<i>Solid Waste and liquid wastes</i> .....	34
7.5.2	<i>Litter</i> .....	35
7.5.3	<i>Hazardous Waste</i> .....	35
7.6	Maintenance and Machinery .....	36
7.6.1	<i>Safety</i> .....	36
7.6.2	<i>Hazardous Material Storage</i> .....	36

7.6.3	Fuel and Gas Storage .....	36
7.6.4	Fires .....	37
7.7	Clearing of the Site .....	37
7.8	Soil Management .....	37
7.8.1	Topsoil .....	37
7.8.2	Subsoil .....	38
7.9	Drainage .....	38
7.10	Earthworks and Layerworks .....	38
7.10.1	Excavation, hauling and placement .....	39
7.10.2	Spoil sites .....	39
7.10.3	Stockpiles .....	39
7.10.4	Blasting activities .....	40
7.10.5	Concrete batching sites .....	40
7.11	Spillages .....	41
7.12	Areas of Specific Importance .....	42
7.12.1	Archaeological Sites .....	42
7.12.2	Graves and middens .....	42
7.12.3	Palaeontological sites .....	43
7.13	Noise Control .....	43
7.14	Dust Control .....	44
7.15	Control and Management of Alien Vegetation .....	45
7.16	Erosion Control Measures .....	45
7.17	Fencing of the Construction Site .....	47
7.18	Pedestrian and Traffic Safety .....	47
7.19	Health Risks and traffic generated pollutants .....	47
7.20	Access Requirements .....	47
7.21	Landscape and Visual .....	48
7.22	Employment .....	49
<b>8</b>	<b>CONCLUSIONS .....</b>	<b>50</b>
<b>ANNEXURE A: CONDITIONS OF ENVIRONMENTAL AUTHORISATION</b>		<b>51</b>
<b>ANNEXURE B: PROFORMA PROTECTION OF THE ENVIRONMENT</b>		<b>58</b>
<b>ANNEXURE C: PROPOSED ENVIRONMENTAL EDUCATION COURSE</b>		<b>59</b>
<b>ANNEXURE D: ENVIRONMENTAL COMPLAINTS REGISTER</b>		<b>68</b>
<b>ANNEXURE E: ENVIRONMENTAL INCIDENTS REGISTER</b>		<b>69</b>
<b>ANNEXURE F: DECOMMISSIONING AND CLOSURE MANAGEMENT PLAN</b>		<b>70</b>
<b>ANNEXURE G - GRIEVANCE MECHANISM</b>		<b>71</b>
<b>ANNEXURE H - REHABILITATION AND TOPSOIL MANAGEMENT PLAN</b>		<b>72</b>
<b>ANNEXURE I - STORM WATER MANAGEMENT PLAN</b>		<b>73</b>
<b>ANNEXURE J - TRAFFIC MANAGEMENT PLAN</b>		<b>74</b>
<b>ANNEXURE K - WASTE MANAGEMENT PLAN</b>		<b>75</b>

## LIST OF FIGURES

<b>FIGURE 2.1: PROJECT INFRASTRUCTURE LAYOUT</b>	<b>7</b>
<b>FIGURE 2.2: ENVIRONMENTALLY SENSITIVE AREAS</b>	<b>8</b>
<b>FIGURE 7.1: GOOGLE EARTH® SATELLITE IMAGE OF PART OF THE STUDY AREA SOUTHEAST OF COOKHOUSE SHOWING AREA (RED CIRCLE) WHERE GOOD SLOPE EXPOSURES OF MIDDLETON FORMATION MUDROCKS AND PALAEOOLS ON FARM SMOORSDRIFT 162 YIELDED SEVERAL WELL-PRESERVED THERAPSID (“MAMMAL-LIKE REPTILE”) SKULLS DURING THE PALAEOLOGICAL FIELD SCOPING STUDY.</b>	<b>43</b>

## **LIST OF TABLES**

<b>TABLE 2-1: THE SPECIALISTS INVOLVED IN THE EIA PHASE</b>	<b>5</b>
<b>TABLE 6-1: SIGNIFICANT ENVIRONMENTAL IMPACTS ASSOCIATED WITH THE PROJECT.</b>	<b>26</b>
<b>TABLE 7-1: OPERATIONS PHASE MITIGATION PROGRAM FOR BATS</b>	<b>33</b>
<b>TABLE A.1: ALL CONDITIONS OF THE ENVIRONMENTAL AUTHORISATION DATED 5 APRIL 2011</b>	<b>51</b>
<b>TABLE A.2: ALL CONDITIONS LISTED IN THE DECISION ON APPEAL, 29 NOVEMBER 2012</b>	<b>57</b>

## LIST OF ACRONYMS/ABBREVIATIONS

<b>BCRM:</b>	Blue Crane Route Municipality
<b>CES:</b>	Coastal and Environmental Services
<b>CITES</b>	Convention on International Trade in Endangered Species
<b>dB</b>	Decibels
<b>DEA</b>	Department of Environmental Affairs
<b>DWA</b>	Department of Water Affairs
<b>EAP:</b>	Environmental Assessment Practitioner
<b>ECO:</b>	Environmental Control Officer
<b>EIA:</b>	Environmental Impact Assessment
<b>EIR:</b>	Environmental Impact Report
<b>EMPr:</b>	Environmental Management Programme
<b>EMS</b>	Environmental Management System
<b>HIV/AIDS</b>	Human Immunodeficiency Virus / Acquired Immune Deficiency Syndrome
<b>I&amp;APs:</b>	Interested and Affected Parties
<b>MW:</b>	Mega Watts
<b>NEMA:</b>	National Environmental Management Act 107 of 1998
<b>PNCO</b>	Provincial Nature Conservation Ordinance
<b>SAHRA</b>	South African Heritage Resources Agency
<b>SSC:</b>	Species of Special Concern

# 1 INTRODUCTION

On the 5<sup>th</sup> of April 2011, the Department of Environmental Affairs approved the Final Environmental Impact Assessment Report for the Golden Valley Wind Farm. The Environmental Authorisation specified that the activities listed in Tables A.1 and A.2 (Annexure A) must be undertaken prior to and during the construction and operation of the wind farm. The specific conditions, and how they have been addressed, are provided in Table A.1. In the “Status” column, many conditions are labelled “Pending”, most of these are conditions that must be implemented by the ECO during the construction phase.

## 1.1 Environmental Management Programmes

The Bill of Rights – Chapter 2 of the Constitution Act (Act No. 108 of 1996), includes an environmental right (Section 24) according to which, *“everyone has the right to an environment that is not harmful to their health or wellbeing and to have the environment protected for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation and the sustainable use of natural resources while promoting justifiable economic and social development”*.

In addition, Section 28 of the National Environmental Management Act (Act No. 107 of 1998) (NEMA), requires, *“every person causing significant pollution or degradation of the environment, to take reasonable measures to prevent it from occurring, continuing or recurring”*. Therefore, in order to promote effective environmental management throughout the life-cycle of a project, it is important that management actions arising from Environmental Impact Assessments (EIAs) are clearly defined and translated into an Environmental Management Programme (EMPr) for the design, construction, operation and/or decommissioning phases of a project. According to the Western Cape Department of Water and Environmental Affairs and Development Planning (2005), an Environmental Management Plan (EMPR) can be defined as, *“an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the project are enhanced”*. The purpose of an EMPR is therefore to:-

- Encourage good management practices through planning and commitment to environmental issues;
- Define how the management of the environment is reported and performance evaluated;
- Provide rational and practical environmental guidelines to:
  - Minimise the extent of environmental impacts and to manage environmental impacts and where possible, to improve the condition of the environment;
  - Prevent long-term or permanent environmental degradation.
  - Comply with all applicable laws, regulations, standards and guidelines for the protection of the environment;
  - Provide guidance regarding method statements which are required to be implemented to achieve environmental specifications;
  - Define the corrective actions which must be taken in the event of non-compliance with the specifications of the EMPR;
  - Describe all monitoring procedures required to identify impacts on the environment, and;
  - Train employees and contractors with regard to environmental obligations.

EMPRs are important tools in the sound environmental management of projects, provided that the specifications are implemented and the user understands the contents of the report, and the reasons for the implementation of certain specifications. There are essentially four broad categories of EMPRs: Design EMPR, Construction EMPR, Operational EMPR and Decommissioning EMPR. The objectives of these EMPRs are all the same and include identifying the possible environmental impacts of the proposed activity, and developing measures to minimise, mitigate and manage the negative impacts while enhancing the positive ones. The difference between these EMPRs is related

to the different mitigation measures required for the different stages of the project lifecycle. Each category of EMPR is discussed in more detail below.

**Design EMPR:** The Design EMPR is an integral component of the project life cycle and requires interaction between the design engineers and environmental consultants to ensure that the engineers are aware of the environmental constraints that they must consider and incorporate these into the final design of the project. The format of the design EMPR is that of a checklist in nature, to ensure that all specifications are included in the design phase. The design EMPR phase requires ongoing and in-depth discussions between the contractor's final design team and the environmental officer. The engineer will have to cost for and be available for ongoing discussions with the environmental officer at all stages of final design.

**Construction EMPR:** The construction phase EMPR provides specific environmental guidance for the construction phase of a project where impacts range from those incurred during start-up (e.g. site clearing) to construction activities (e.g. erosion). The Construction EMPR consists of both a management system and environmental specifications which contain detailed specifications that need to be undertaken or adhered to by the contractor. Two types of specifications need to be complied with by the contractor namely; standard and specific. Standard specifications apply to all project components and specific specifications outline specific instructions for managing and minimising environmental impacts resulting from the actual activity. The Construction EMPR needs to be developed in parallel with 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 development. Although the contractor tenders on the EMPR that has been approved by the relevant authority, it must also be understood that the EMPR is a dynamic document that is subject to change.

**Operational EMPR:** The operational phase EMPR provides specific guidance related to operational activities associated with a particular development. Operational EMPRs are sometimes referred to as Environmental Management Systems (EMS).

**Decommissioning EMPR:** As the final phase in the project cycle, decommissioning may present positive environmental opportunities associated with the return of the land for alternative use and the cessation of impacts associated with operational activities. However, depending on the nature of the operational activity, the need to manage risks and potential residual impacts may remain well after operations have ceased. Examples of potential residual impacts and risks include contamination of soil and groundwater and old (unserviceable) structures. Decommissioning phase EMPRs are typically encountered within extractive industries such as minerals mining and oil and gas exploration and extraction.

It is widely recognised that there is no standard format for EMPRs. The format needs to fit the circumstances in which the EMPR is being developed and the requirements that it is designed to meet (World Bank, 1999; CSIR, 2002; DEAT 2004b). Additionally, the level of detail in an EMPR varies depending on the size of the project as well as the magnitude of environmental impacts. Section 1.2 below provides an overview of the information that needs to be included in the EMPR based on current South African legislative requirements.

## 1.2 Contents of the EMPR

The contents of the EMPR must be consistent with the requirements as set out in Appendix 4 of the EIA Regulations published as Government Notice No R. 982 in Government Gazette No 38282 of 4 December 2014 in terms of Chapter 5 of the National Environmental Management Act No 107 of 1998 (NEMA).

According to Appendix 4, an environmental management programme must include –

1. An EMPR must comply with section 24N of the Act and include-

- a. details of
  - i. the EAP who prepared the EMPr; and
  - ii. the expertise of that 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 objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including-
  - i. planning and design;
  - ii. pre-construction activities;
  - iii. construction activities;
  - iv. rehabilitation of the environment after construction and where applicable post closure; and
  - v. where relevant, operation activities;
- e. a description and identification of impact management outcomes required for the aspects contemplated in paragraph (d);
- f. a description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (d) and (e) will be achieved, and must, where applicable, include actions to -
  - i. avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;
  - ii. comply with any prescribed environmental management standards or practices;
  - iii. comply with any applicable provisions of the Act regarding closure, where applicable; and
  - 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 paragraph (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 requirements 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
  - iii. any specific information that may be required by the competent authority.

Provided in the Chapters that follow is the EMPr for the project, based on the requirements of Appendix 4 of the EIA Regulations (GNR 982) as detailed above.

## 2 BACKGROUND INFORMATION

Provided below is a brief description of the project. Should a more detailed project description be required, the reader should refer to Chapter 2 of *Volume 3: Environmental Impact Assessment Report* (CES, October 2010) of the suite of documents for this project.

### 2.1 Details and expertise of the Environmental Assessment Practitioner that conducted the EIA process and prepared this EMPr

**Coastal & Environmental Services** (CES) were commissioned by the applicant to prepare an Environmental Management Programme (EMPr) that seeks to comply with the EIA regulations. In fulfilment of this requirement, provided below are the details of CES:

Coastal and Environmental Services  
Physical Address: 67 African Street, Grahamstown, 6139  
Postal Address: P.O. Box 934, Grahamstown, 6140  
Telephone: +27 46 622 2364  
Email: info@cesnet.co.za

CES is a specialist environmental consulting firm. Established in 1990 we primarily specialise in assessing the impacts of development on the natural, social and economic environments. CES' core expertise lies in the fields of strategic environmental assessment, environmental management plans, environmental management systems, ecological/environmental water requirements, environmental risk assessment, environmental auditing and monitoring, integrated coastal zone management, social impact assessment and state of environment reporting. In addition to adhering to all relevant national legislative requirements, which we are often required to review and summarise for specific projects, acquisition of equity funding from the majority of financial institutions demands that developments must meet certain minimum standards that are generally benchmarked against the Policy and Performance Standards of the International Finance Corporation and the World Bank Operational Directives and Policies. The quality of our work has been acknowledged by international lenders such as the World Bank and the International Finance Corporation.

Provided below are short *curriculum vitae* (CVs) of each of the project team members involved in the preparation of the Environmental Management Programme (EMPr) for the project. Table 3-1 that follows provides the details of the specialists that provided input into this EMPr as per the specialist studies undertaken as part of the EIA Phase.

#### **Marc Hardy** (*Environmental Assessment Practitioner – EAP*)

Marc holds a M. Phil (Environmental Management) from the University of Stellenbosch's School of Public Management and Planning. His professional interests include environmental impact reporting for linear, energy and bulk infrastructure projects, strategic environmental policy development and reporting – mostly relating to Environmental Management Frameworks (EMFs) - compliance monitoring and environmental auditing. Marc has been in the private consulting industry for 2 years prior to joining CES (previously with Bohlweki-SSI Environmental, Johannesburg) and has, amongst others, been project manager for the Dinokeng EMF (Gauteng), the Milnerton Refinery to Ankerlig Power Station Liquid Fuels Transportation Infrastructure Project (on behalf of Eskom Generation – Cape Town), numerous Eskom Transmission and Distribution power line and substation EIAs countrywide, mining EMPr compliance audits, the Return-To-Service compliance audits for Camden, Grootvlei and Komati Power Stations (Mpumalanga Province) and the new high hazard waste management facility for the Coega Development Corporation (Coega IDZ). Before entering the consulting field he gained extensive experience in the EIA regulatory field whilst in the employ of the Gauteng Department of Agriculture, Conservation and Environment being responsible for the review of infrastructure projects like the Gautrain Rapid Rail Link and representing the Department on various EMF, SDF and IDP project steering committees. He is currently managing the EIA processes for numerous wind energy developments.

### Mr Thomas King

Thomas holds a BSc degree with specialisation in Zoology from the University of Pretoria and an Honours degree in Biodiversity and Conservation from Rhodes University. As part of his Honours degree, Thomas was trained in Geographical Information Systems (GIS) and Community Based Natural Resource Management (CBNRM) in addition to the required biological sciences courses. His honours thesis investigated the rate at which Subtropical Thicket recovers naturally after heavy grazing by ostriches (*Struthio camelus*). At CES he has been involved in EIAs for numerous wind energy developments, a chicken rearing facility, numerous mining developments and has fulfilled the role of Environmental Control Officer (ECO) at the Kenmare Heavy Minerals mine in northern Mozambique. Thomas is primarily responsible for GIS related work at CES.

**Table 2-1: The specialists involved in the EIA Phase**

Specialist Study	Affiliation	Name of Specialist(s)	Lead	Contact Details
Noise	Safetech	Mr. Brett Williams		P.O. Box 27607, Greenacres, Port Elizabeth 6056
Heritage	ACO Associates cc: Archaeology and Heritage Specialists	Mr Tim Hart and Dr Lita Webley		8 Jacob's Ladder, St James, 7945, Cape Town
	Albany Museum	Celeste Booth		5 Queens Terrace, 12 Chapel Street, Grahamstown, 6139
Avifauna	Endangered Wildlife Trust (EWT)	Mr. Luke Strugnell		Private bag X11, Parkview, 2122
Visual	MapThis	Mr. Henry Holland		8 Cathcart Street, Grahamstown 6139
Palaeontological	Natura Viva cc	Dr John Almond		PO Box 12410, Mill Street Cape Town
Ecological	Coastal and Environmental Services	Prof. Roy Lubke		67 African Street, Grahamstown 6139
		Ms. Leigh-Ann De Wet		

## 2.2 Golden Valley Wind Energy Facility - Project/Part 1

The proposed Golden Valley Project 1 is to be constructed on 8,100 hectares (ha) (total area of the development and not the actual physical footprint of the turbines) encompassing eight farms located in the Blue Crane Route Municipality (BCRM) in the Eastern Cape Province of South Africa (Figure 2-1). The details of the eight farm portions involved in Project 1 are as follows:

1. Farm 169 Portion 2 (Olive Woods)
2. Farm 166/RE (Olive Fonteyn)
3. Farm 167/RE (Klein Riet Fontein)
4. Farm 181 Portion 1(Cregus Kraal)
5. Farm 283
6. Farm 284
7. Farm 159/RE (Mullers Kraal)
8. Portion 1 of Farm Boschfonteyn 180

Forty-eight (48) turbines will be constructed, with maximum output capacity of 2.55 MW each. Ancillary supporting infrastructure will include:

- Access roads approximately 6 m wide;
- Hardstands;
- Laydown areas;
- Permanent masts;
- Maintenance buildings;

- Buried cables (with some sections of overhead) of 33 kV connecting the turbines and the project substation;
- A project substation;
- A 132 kV overhead line connecting the project substation with Kopleegte substation.

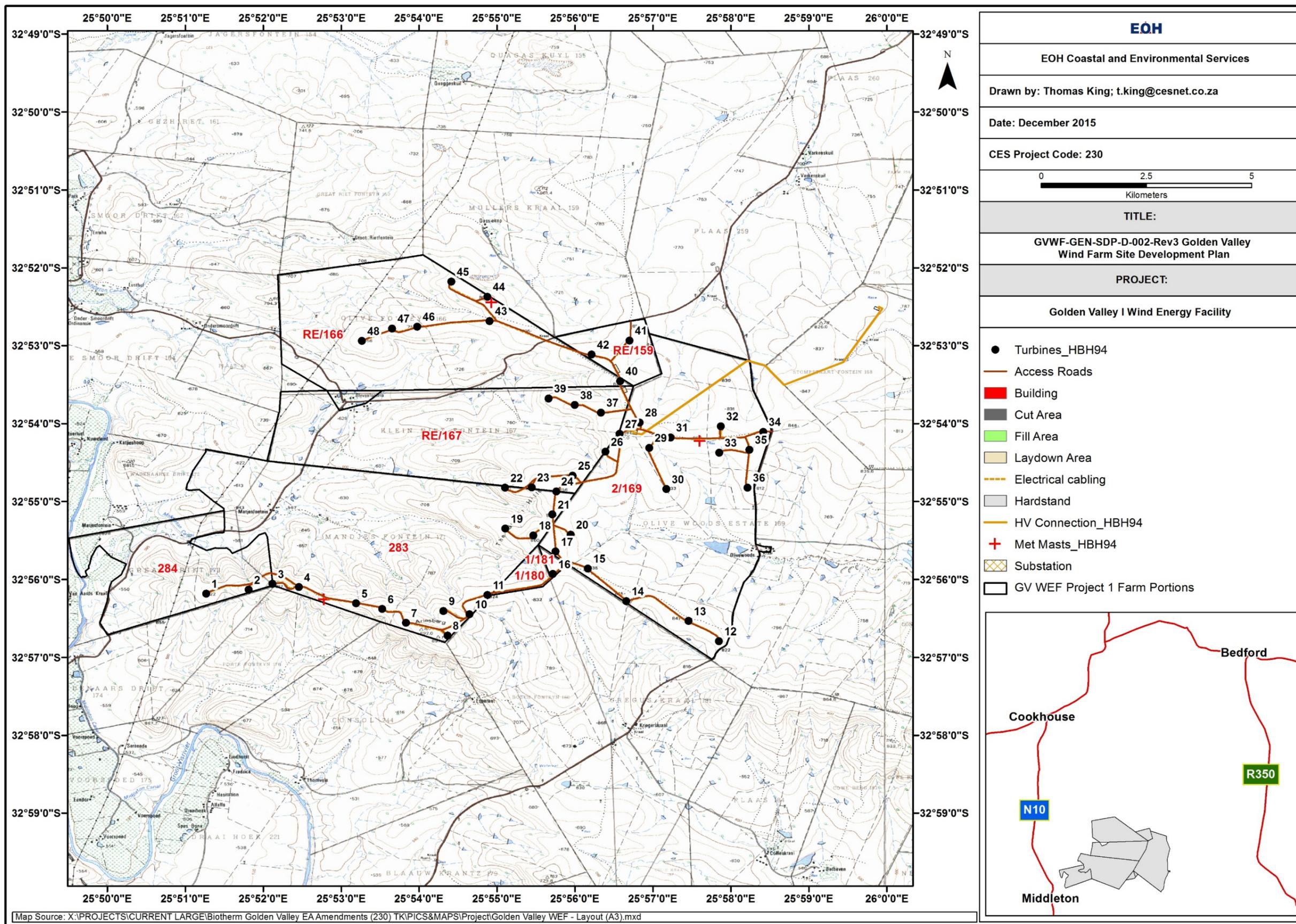


Figure 2.1: Project infrastructure layout

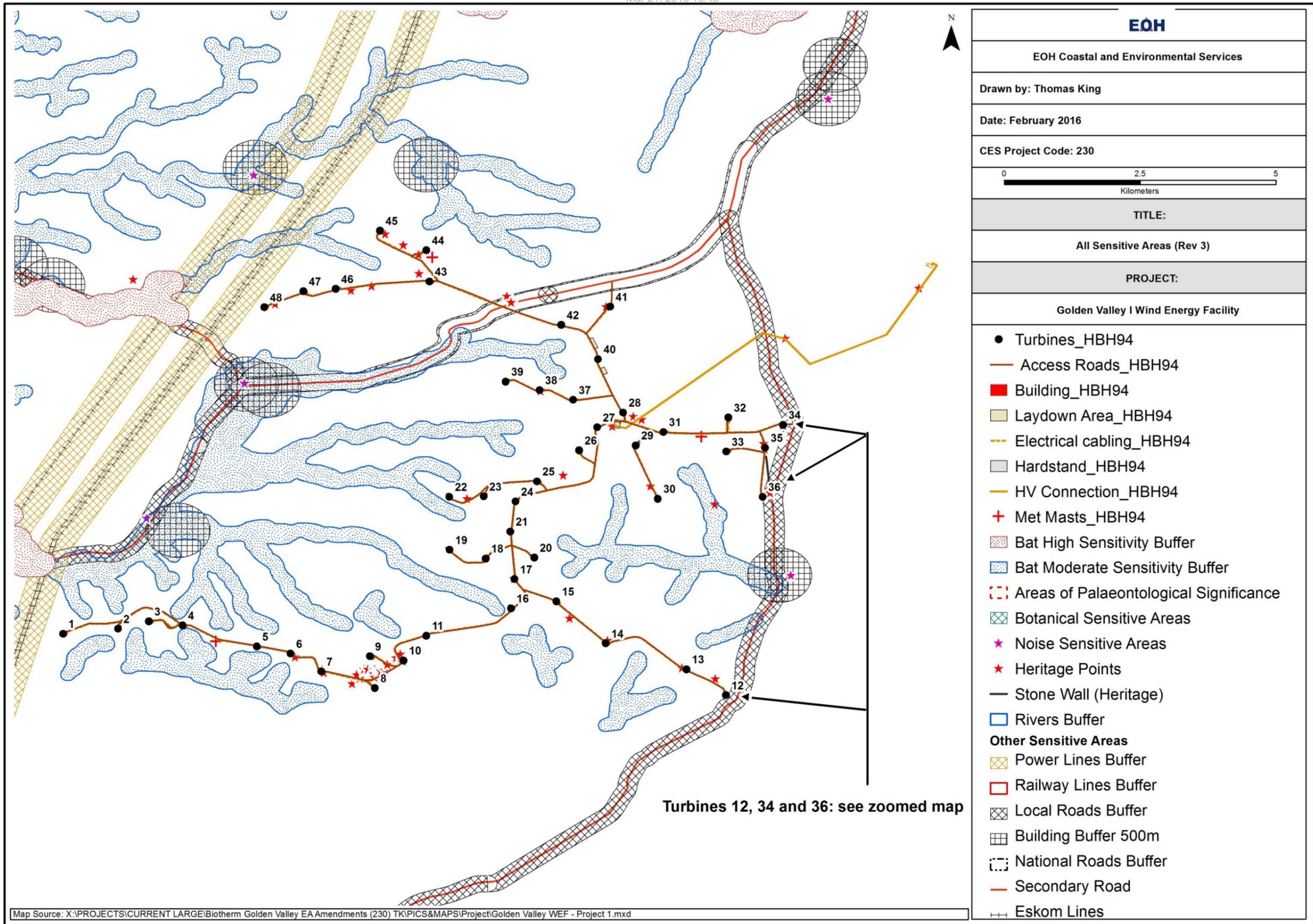


Figure 2.2: Environmentally sensitive areas

## 3 OBJECTIVES AND DEFINITIONS

### 3.1 Scope of the EMPR

The purpose of this EMPR is to ensure “good environmental practice” by taking a holistic approach to the management of environmental impacts during construction and operation. This EMPR therefore sets out the methods by which proper environmental controls are to be implemented by the applicant and his nominated contractor based largely on the mitigation measures recommended in the specialist reports and the EIR. However, where necessary, these methods have been expanded upon and additional issues addressed in order to ensure that all environmental aspects are appropriately considered and monitored. The duration over which the contractor’s controls shall be in place cover the construction period of the project as well as the limited time after contract completion defined by the General Conditions of Contract, and the project specifications, as the defects notification period. It is important to note that this EMPR will be focused primarily on the construction and operational phases of the proposed project. Design specifications from an environmental point of view were taken into consideration in the detailed EIR Phase during which, the Environmental Assessment Practitioner (EAP) and Specialist Consultants provided input with regards to possible mitigation measures to reduce environmental impacts.

The provisions of this EMPR are binding on the contractor during construction period. They are to be read in conjunction with all the documents that comprise the suite of documents for this contract (refer to Section 3.3). This EMPR has been designed to suite the particular activities and needs of the project, and incorporates the following:

- General construction mitigation measures;
- Specific project mitigation measures;

The EMPR therefore identifies the following:

- Construction activities that will impact on the environment;
- Operation activities that will impact on the environment;
- Specifications with which the contractor shall comply in order to protect the environment from the identified impacts;
- Actions that shall be taken in the event of non-compliance.

It is important to note that the EMPR is a dynamic document subject to similar influences and changes as are brought by variations to the provisions of the project specification. Any substantial changes shall be submitted to the Contractor, Site Manager acting for Amstilite, and relevant environmental authorities in writing for approval. It must be emphasised that some changes may have budget and timeframe implications.

### 3.2 Applicable Documentation

The following environmental documentation is applicable to this project, and should therefore be read in conjunction with this EMPR:

- Proposed Cookhouse Wind Energy Project Volume 1: Final Scoping Report (CES, December 2009).
- Proposed Cookhouse Wind Energy Project Volume 2: Specialist Reports (CES, October 2010).
- Proposed Cookhouse Wind Energy Project Volume 3: Environmental Impact Assessment Report (CES, October 2010).

Other documentation which should be considered includes all applicable commercial contracting documentation as it relates to contractor commitments to the EMPR’s implementation.

### 3.3 Definitions applicable to the environmental aspects of the project

The definitions contained within this document are for explanatory purposes only. In the event that any conflict occurs between the definitions herein and those contained within the final Contract, those within the Contract shall prevail.

**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.

**Construction Camp:** Construction camps (site camps) refer to all storage and stockpile sites, site offices, container sites, workshops and testing facilities, and other areas required to undertake construction activities.

**Environmental Site Officer (ESO):** An ESO is 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. The ESO shall be the designated responsible person, for implementing any remedial measures as required from time to time and for any authorisations/licences that are required in terms of the service contract. The ESO shall record and communicate environmental issues (as they occur) to the Contractor and maintain records thereof. The ESO shall report concurrently to the contractor and the ECO.

**Environmental Control Officer (ECO):** A suitably qualified and experienced person or entity appointed for the Construction Works, to perform the obligations specified in the environmental authorisation. The ECO's duties shall include *inter alia*:

- Confirming that all required environmental authorizations and permits, where necessary, have been obtained from the relevant authority(ies);
- Monitoring all activities relating to the project, on a daily basis (or as agreed), for compliance with the provisions of the environmental authorisation, environmental legislation and recommendations of the EMPR;
- Conducting annual environmental performance audits in respect of the activities undertaken relating to the project.

**Environment:** Environment means 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 (formerly known as, Record of Decision):** A written statement from the relevant environmental authority, with or without conditions, that records its approval of a planned undertaking and the mitigating measures required to prevent or reduce the effects of environmental impacts during the life of the project.

**Environmental Impact:** An impact or environmental impact is the change to the environment, whether desirable or undesirable, that will result due to the project's construction and operation. An impact may be a direct or indirect consequence.

**Environmental Impact Assessment:** The process of examining the environmental effects of a proposed development. The assessment requires detailed specialist studies of significant issues that have been identified during the environmental scoping phase.

**Environmental Management Programme** An environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the projects are enhanced.

**Environmental Management System:** 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 which includes organizational structure, planning activities, responsibilities, procedures, processes and resources for developing, implementing, reviewing and maintaining the environmental policy.”*

**Environmental Policy:** A statement 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.

**External Auditor:** A suitably qualified and experienced independent expert as per the required auditor qualifications (ISO 14012).

**Independent Environmental Consultant:** A suitably qualified and experienced independent environmental consultant (IEC) appointed by the Site Manager acting for Amstilite to perform the obligations specified in the Contract. The IEC shall provide reports to the regulatory authority, the Site Manager acting for Amstilite and any other parties as specified by the regulatory authority.

**Interested and Affected Party:** Refers to an interested and affected party contemplated in section 24(4)(d) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) and which in terms of that section includes –

- a) *Any person, groups of persons, organization interested in or affected by an activity, and*
- b) *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.

**Method Statement:** A written submission by the Contractor in response to the Specification or a request by the Engineer, setting out the plant, materials, labour and method the Contractor proposes using to carry out an activity, identified by the relevant specification or the IEC when requesting the Method Statement, in such detail that the IEC is enabled to assess whether the Contractor's proposal is in accordance with the EMPR and associated specifications.

**Mitigate:** The implementation of practical measures to reduce the adverse impacts, or to enhance beneficial impacts of a particular action.

**No-Go Area:** Areas where construction activities are prohibited.

**Pollution:** According to the National Environmental Management 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”*

**Rehabilitation:** To re-establish or restore to a healthy, sustainable capacity or state.

**Site:** The area in which construction is taking place.

**Species of Special Concern:** Those 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:** The top 100mm of soil and may include humus material e.g. vegetation and leaf litter.

## **4 ENVIRONMENTAL POLICY**

### **4.1 Environmental Policies and Guidelines**

#### **4.1.1 Environmental Policy**

The Contractor is required to compile an environmental management policy, which must consider the following:

- The Contractor's mission, vision and core values;
- Guiding principles;
- Requirements of, and communication with interested and affected parties (I&APs);
- The need to work towards continual improvement;
- The obligation to prevent pollution and ecological degradation;
- The importance of coordination with other organisational policies (e.g. quality, occupational health and safety, etc.);
- Reference to specific local and/or regional conditions; and
- A commitment to compliance with relevant environmental laws, regulations, by-laws and other criteria to which the Contractor subscribes.

The policy, once approved, must be communicated to all employees and contractors (and sub-contractors) of the Contractor, and made available to the public, if requested.

#### **4.1.2 Environmental Objectives and Targets**

In order to meet the commitments detailed within the environmental policy, as well as those included within the environmental specifications of this EMPR, the Contractor shall develop environmental objectives and targets. The objectives and targets shall conform to, and comply with, the following criteria:

- The objectives and targets shall constitute the overall goals for environmental performance identified in the environmental policy and strategy.
- When establishing objectives and targets, the Contractor shall take into account the identified environmental aspects and associated environmental impacts, as well as the relevant findings from environmental reviews and audits.
- The targets must be set to achieve objectives within a specified timeframe.
- Targets should be specific and measurable.
- When the objectives and targets are set, the Contractor must establish measurable Key Performance Indicators (KPIs). These KPIs will be used by the Contractor as the basis for an environmental performance evaluation system and can provide information on both the environmental management and the operational systems. Objectives and targets shall apply broadly across the Contractor's operations, as well as to site-specific and individual activities.
- Objectives and targets shall be reviewed from time to time in view of changed operational circumstances and/or changes in environmental legal requirements, and shall also take into consideration the views of interested and affected parties (I&APs).

All objectives and targets must be supplied to the Independent Environmental Consultant or ECO for review and use during audits.

### **4.2 Legislative Framework**

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 as to his duties in the fulfilment of the project objectives, with particular reference to the prevention and mitigation of environmental impacts caused by construction activities associated with the project. The Contractor should note that obligations imposed by the approved EMPR are legally binding in terms of environmental statutory legislation and in terms of the additional conditions to the general

conditions of contract that pertain to this project. In the event that any rights and obligations contained in this document contradict those specified in the standard or project specifications then the latter shall prevail.

#### **4.2.1 Statutory and Other Applicable Legislation and Standards**

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

- The Constitution of the Republic of South Africa Act 108 of 1996
- Environment Conservation Act 73 of 1989
- National Environmental Management Act 107 of 1998
- National Environmental Management: Protected Areas Act 57 of 2003
- National Environmental Management: Biodiversity Act 10 of 2004
- National Forests Act 43 of 1983
- National Water Act 36 of 1998
- Conservation of Agricultural Resources Act 43 of 1983
- National Veld and Forest Fire Act 101 of 1998
- Hazardous Substances Act 15 of 1973
- National Heritage Resources Act 25 of 1999
- Atmospheric Pollution Prevention Act 45 of 1965
- National Environmental Management: Air Quality Act 39 of 2004
- National Environmental Management: Waste Management Act 59 of 2008
- Mineral and Petroleum Resources Development Act 28 of 2002
- Health Act 63 of 1977
- Occupational Health and Safety Act 85 of 1993
- White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity
- All relevant provincial legislation, municipal by-laws and ordinances.

The following permit requirements could be relevant to the proposed project:

- Water Use Licence;
- Approval from the Civil Aviation Authority (CAA);
- Permit for the removal of protected plants on the site;
- Approval from the South African Heritage Resources Agency (SAHRA) on heritage issues;
- Health permits for sanitation (Provincial health authorities)
- Fuel storage permit (temporary and permanent) – obtained from DEA;
- Blasting permit – obtained from the Department of Mineral Resources (DMR), if required.

The Contractor shall establish and maintain procedures to keep track of, document and ensure compliance with environmental legislative changes.

## 5 ADMINISTRATION AND REGULATION OF ENVIRONMENTAL OBLIGATIONS

### 5.1 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 should 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.
- 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 shall be channelled according to the organisation structure.

### 5.2 Roles and Responsibilities

#### 5.2.1 Amstilite (RF) Proprietary Limited

Amstilite (RF) Proprietary Limited is the developer and shall therefore be the entity monitoring the implementation of the EMPR and compliance with the authorisation. However, if Amstilite (RF) Proprietary Limited appoints a Contractor to implement the project and hence implement the proposed mitigation measures documented in this EMPR on their behalf, then the successful contractor's responsibilities are outlined in Section 5.2.2 that follows.

#### 5.2.2 Contractor

The successful Contractor shall:

- Be responsible for the finalisation of the EMPR in terms of methodologies which are required to be implemented to achieve the environmental specifications contained herein;
- Be responsible for the overall implementation of the EMPR in accordance with the requirements of Amstilite (RF) Proprietary Limited and the environmental authorisation;
- 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;
- Sign the Pro-Forma: Protection of the Environment (attached as Annexure B).
- Be responsible for obtaining any environmental permits (refer to Section 4.2.1) which are required for the design, construction and operation of the project;
- Ensure that the appointment of the ECO is subject to the approval of Amstilite (RF) Proprietary Limited.

#### 5.2.3 Environmental Site Officer

The Contractor shall appoint a nominated representative of the contractor as the Environmental Site Officer (ESO) for the contract. The ESO will be site-based and shall be the responsible person for implementing the environmental provisions of the construction contract. There shall be an approved ESO on the site at all times. The ESO's duties will include, *inter alia*, the following:

- Ensuring that all the environmental authorisations and permits required in terms of the applicable legislation have been obtained prior to construction commencing.
- Reviewing and approving construction method statements with input from the ECO and Site

Manager acting for Amstilite, where necessary, in order to ensure that the environmental specifications contained within the construction contract are adhered to.

- Assisting the Contractor in finding environmentally responsible solutions to problems.
- Keeping accurate and detailed records of all activities on site.
- Keeping a register of complaints on site and recording community comments and issues, and the actions taken in response to these complaints.
- Ensuring that the required actions are undertaken to mitigate the impacts resulting from non-compliance.
- Reporting all incidences of non-compliance to the ECO and Contractor.

The ESO shall submit regular written reports to the ECO, but not less frequently than once a month. The ESO must have:

- The ability to manage public communication and complaints;
- The ability to think holistically about the structure, functioning and performance of environmental systems;
- The ESO must be fully conversant with the Environmental Impact Report and Environmental Management Programme for the project and all relevant environmental legislation;
- The ESO must have received professional training, including training in the skills necessary to be able to amicably and diplomatically deal with the public as outlined in bullet point one above.

The ECO shall be in the position to determine whether or not the ESO has adequately demonstrated his/her capabilities to carry out the tasks at hand and in a professional manner. The ECO shall therefore have the authority to instruct the contractor to replace the ESO if, in the ECO's opinion, the appointed officer is not fulfilling his/her duties in terms of the requirements of the construction contract. Such instruction will be in writing and shall clearly set out the reasons why a replacement is required and within what timeframe. The ECO shall visit the development site and in addition to the responsibilities listed in section 5.2.4 below, review the performance of the ESO and submit regular performance reviews to Amstilite (RF) Proprietary Limited, but not less frequently than once a month.

#### **5.2.4 Environmental Control Officer**

For the purposes of implementing the conditions contained herein, Amstilite (RF) Proprietary Limited shall appoint an Environmental Control Officer (ECO) for the contract. The ECO shall be the responsible person for ensuring that the provisions of the EMPR as well as the environmental authorisation are complied with during the construction period. The ECO will be responsible for issuing instructions to the contractor when environmental considerations call for action to be taken. The ECO shall submit regular written reports to Amstilite (RF) Proprietary Limited, but not less frequently than once a month.

The ECO will be responsible for the monitoring, reviewing and verifying the Contractor's compliance with the EMPR and conditions of the environmental authorisation. The ECO's duties in this regard will include, *inter alia*, the following:

- Confirming that all the environmental authorisations and permits required in terms of the applicable legislation have been obtained prior to construction commencing.
- Monitoring and verifying that the EMPR, Environmental Authorisation 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 Site Manager acting for Amstilite, where necessary, in order to ensure that the environmental specifications contained within this EMPR and environmental authorisation are adhered to.
- Inspecting the site and surrounding areas on a regular basis regarding compliance with the EMPR, Environmental Authorisation and Contract.

- Monitoring the undertaking by the Contractor of environmental awareness training for all new personnel on site.
- Ensuring that activities on site comply with all relevant environmental legislation.
- Ordering the removal of, or issuing spot fines for person/s and/or equipment not complying with the specifications of the EMPR and environmental authorisation.
- Undertaking a continual internal review of the EMPR and submitting any changes to Amstillite (RF) Proprietary Limited and/or DEA (in case of major changes) for review and approval.
- Checking the register of complaints kept on site and maintained by the ESO and ensuring that the correct actions are taken in response to these complaints.
- Checking that the required actions are undertaken to mitigate the impacts resulting from non-compliance.
- Reporting all incidences of non-compliance to Amstillite (RF) Proprietary Limited.
- Conducting annual environmental performance audits in respect of the activities undertaken relating to the project. The ECO shall also submit compliance audit reports to DEA, in accordance with the requirements of the environmental authorisation. Such reports shall be reviewed by Amstillite (RF) Proprietary Limited, prior to submission.
- Keeping a photographic record of progress on site from an environmental perspective. This can be conducted in conjunction with the ESO as the ESO will be the person that will be on site at all times and can therefore take photographs frequently.
- Recommending additional environmental protection measures, should this be necessary.
- Providing feedback on any environmental issues at 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 comprehensive 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.
  - \* Environmental Management Systems.

The ECO must be fully conversant with the Environmental Impact Assessment, Environmental Management Programme, Environmental Authorisation and all relevant environmental legislation. Amstillite (RF) Proprietary Limited shall have the authority to replace the ECO if, in their opinion, the appointed officer is not fulfilling his/her duties in terms of the requirements of the EMPR or this specification. Such instruction will be in writing and shall clearly set out the reasons why a replacement is required and within what timeframe.

### **5.2.5 Traffic Safety Officer**

The Contractor shall nominate knowledgeable members of staff on site who shall be the responsible persons for the arrangement and maintenance of all traffic accommodation measures required for the duration of the contract.

The Traffic Safety Officer shall liaise with the ESO and/or ECO in order to ensure adequate and appropriate traffic arrangements during the transportation of construction material.

### **5.2.6 Liaison Committee**

A liaison committee consisting of a representative from Amstilite (RF) Proprietary Limited, the Contractor, the Site Manager acting for Amstilite, and any other role-player deemed necessary by the members of the committee (the "Liaison Committee") will meet every month to review the progress of the Contract in implementing and complying with its obligations in terms of this EMPR.

## **5.3 Reporting**

### **5.3.1 Administration**

Before the contractor begins each construction activity, the Contractor shall give to the ECO and Site Manager acting for Amstilite a written method statement setting out the following:

- The type of construction activity.
- Where the activity will take place.
- Identification of impacts that might result from the activity.
- Identification of activities or aspects that may cause an impact.
- Methodology and/or specifications for impact prevention for each activity.
- Methodology and/or specifications for impact containment for each activity.
- Emergency/disaster incident and reaction procedures.

The contractor may provide such information in advance of any or all construction activities provided that new submissions shall be given to the ECO and/or Site Manager acting for Amstilite whenever there is a change or variation to the original.

The ECO and/or Site Manager acting for Amstilite may provide comment on the methodology and procedures proposed by the Contractor but he shall not be responsible for the contractor's chosen measures of impact mitigation and emergency/disaster management systems. However, the contractor shall demonstrate at inception and at least once during the contract that the approved measures and procedures function properly.

### **5.3.2 Good Housekeeping**

The contractor shall undertake "good housekeeping" practices during construction. This will help avoid disputes on responsibility and allow for the smooth implementation of the contract.

### **5.3.3 Record Keeping**

The Site Manager acting for Amstilite and the ECO will continuously monitor the contractor's adherence to the approved impact prevention procedures and the Site Manager acting for Amstilite shall issue to the contractor 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 action taken to discontinue the non-compliance, the action taken to mitigate its effects and the results of the actions. The non-compliance shall be documented and reported to the Site Manager acting for Amstilite in the monthly report. These reports shall be made available to DEA when requested.

The Contractor shall ensure that an electronic filing system identifying all documentation related to the EMPR is established. A list of reports likely to be generated during all phases of the project is provided below, and all applicable documentation must be included in the environmental filing system catalogue or document retrieval index:

- Final Environmental Impact Assessment Report.
- Environmental Management Programme.
- Final design documents and diagrams issued to and by the Contractor.

- All communications detailing changes of design/scope that may have environmental implications.
- Daily, weekly and monthly site monitoring reports.
- Complaints register.
- Medical reports.
- Training manual.
- Training attendance registers.
- Incident and accident reports.
- Emergency preparedness and response plans.
- Copies of all relevant environmental legislation.
- Permits and legal documents, including letters authorising specific personnel of their duties as part of emergency preparedness teams e.g. fire teams, etc.
- Crisis communication manual.
- Disciplinary procedures.
- Monthly site meeting minutes during construction.
- All relevant permits.
- Environmental Authorisation.
- All method statements from the Contractor for all phases of the project.

#### **5.3.4 Document Control**

The Contractor and Site Manager acting for Amstilite shall be 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 positions, who drafted and compiled the document, who reviewed and recommended approval, and who finally approved the document for distribution.
- All documents should be dated, provided with a revision number and reference number, filed systematically, and retained for a five year period.

The Contractor shall ensure that documents are periodically reviewed and revised, where necessary, and that current versions are available. All documents shall be made available to the independent external auditor.

#### **5.4 Environment and Health Training and Awareness**

The ESO and/or ECO must be conversant with all legislation pertaining to the environment applicable to this contract and must be appropriately trained in environmental management and must possess the skills necessary to impart environmental management skills to all personnel involved in the contract.

The contractor shall ensure that adequate environmental training takes place. All employees shall have been given an induction presentation on environmental awareness. Where possible, the presentation needs to be conducted in the language of the employees. The environmental training should, as a minimum, include the following:

- The importance of conformance with all environmental policies.
- The significant environmental impacts, actual or potential, as a result 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 requirements of Amstilite (RF) Proprietary Limited'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.
- The importance of not littering.
- 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.
- Details regarding archaeological and/or historical sites which may be unearthed during construction and the procedures to be followed should these be encountered.
- The procedures which should be followed should a grave be encountered, or unearthed during the construction phase.
- Details regarding fauna and flora of special concern, including protected/endangered plant and animal species, and the procedures to be followed should these be encountered during the construction phase.

In the case of permanent staff, the contractor shall provide evidence that such induction courses have been presented. In the case of new staff (including contract labour) the contractor shall inform the Site Manager acting for Amstilite when and how he intends conducting his environmental training obligations.

A training needs analysis shall be conducted by the ESO and/or ECO to identify the appropriate environmental and health training programmes, and the appropriate target groups amongst the employees of the Contractor. The results of the training needs analysis shall be filed with the environmental records and used to set objectives and targets. Recommended Basic Environmental Education Material is provided in Annexure C.

Environment and health awareness training programmes should be targeted at three 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.
- A schedule for the presentation of the training courses.

The Contractor shall 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 (refer to Sections 5.3.3 and 5.3.4 above). The training records shall verify each of the targeted personnel's training experience. The ECO shall monitor the records and listed and undertake regular follow ups.

## 5.5 Emergency Preparedness

The Contractor shall compile and maintain environmental emergency procedures to ensure that there will be an appropriate response to unexpected or accidental actions or incidents that will cause environmental impacts, throughout the life cycle of the project. Such activities may include:

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

These plans should include:

- Emergency organisation (manpower) and responsibilities, accountability and liability.
- A list of key personnel.
- Details of emergency services available along the route that turbine components will need to be transported and for the site itself (e.g. the fire department, spill clean-up services, etc.).
- Internal and external communication plans, including prescribed reporting procedures where

- required by legislation.
- Actions to be taken in the event of different types of emergencies.
- Incident recording, progress reporting and remediation measures to be implemented.
- Information on hazardous materials, including the potential impact associated with each, and measures to be taken in the event of accidental release.
- Training plans and testing.

The Contractor shall comply with the emergency preparedness and incident and accident-reporting requirements, as required by the Occupational Health and Safety Act, 1993 (Act No 85 of 1993), the National Environmental Management Act, 1998 (Act No 107 of 1998), the National Water Act, 1998 (Act No 36 of 1998) and the National Veld and Forest Fire Act, 1998 (Act No 101 of 1998) as amended and/or any other relevant legislation.

## **5.6 Checking and Corrective Action**

### **5.6.1 Performance Indicators and Targets**

Performance indicators and targets for compliance with the specifications of the EMPR should be agreed upon by Amstilite (RF) Proprietary Limited, the Site Manager acting for Amstilite and the Contractor, and included within the EMPR.

### **5.6.2 Non-Compliance**

Non-compliance with the specifications of the EMPR and/or conditions of the environmental authorisation, both of which will be present on-site at all times, constitutes a breach of Contract for which the Contractor may be liable to pay penalties (see Annexure B). The Contractor is deemed not to have complied with the EMPR if:

- There is evidence of contravention of the EMPR specifications within the boundaries of the construction site, site extensions and access roads;
- There is contravention of the EMPR specifications which relate to activities outside the boundaries of the construction site;
- Environmental damage ensues due to negligence;
- Construction activities take place outside the defined boundaries of the site; and
- The Contractor fails to comply with corrective or other instructions issued by the Site Manager acting for Amstilite and/or ECO within a specific time period.

The contractor shall act immediately when a notice of non-compliance is received and correct the non-compliance. Any non-compliance with the agreed procedures of the EMPR is a transgression of the various statutes and laws that define the manner by which the environment is managed therefore any avoidable non-compliance, dependant on severity, shall be reported to Amstilite (RF) Proprietary Limited for further action, prior to contacting the relevant provincial or national authorities. The ECO's decision with regard to what is considered a violation, its seriousness and the action to be taken against the contractor shall be final. Failure to redress the cause shall be reported to the relevant authority. The responsible provincial or national authorities shall ensure compliance and impose penalties relevant to the transgression as allowed for within its statutory powers.

### **5.6.3 Monitoring**

A monitoring programme will be implemented for the duration of the construction phase of the project. This programme will include:

- Performance Audits: Monthly inspection reports which are performance based compiled by the ECO. This must also incorporate monitoring of compliance issues as well as permits, licenses, the EMPR, Environmental Authorisation, and all contract documentation's conditions. These audits can be conducted randomly and do not require prior arrangement

with the project manager.

- Compliance Audits: The ECO will initially undertake compliance audits every 12 months. The audit report will provide a rating of the compliance with the EMPR and the environmental authorisation. This report will be submitted to the relevant authorities as and when required.

The following will also assist with monitoring:-

### **Complaints Register**

The Contractor will ensure that a dedicated Complaints Register is kept on site at all times (see Annexure D). The register will contain the details of the person who made the complaint, the nature of the complaint received, the date on which the complaint was made and the response noted with the date and action taken. The Complaints register will be kept in accordance with the requirements of the ECO. This record shall be submitted with the monthly reports and an oral report given at the monthly site meetings.

### **Inspections**

Ongoing visual inspections will be conducted daily by the ESO. The ESO will spend the bulk of his/her time on site monitoring for any activities that transgress the requirements as specified in the EMPR. The ESO compiles the site register and the ECO maintains the complaints register and any other records required in the environmental authorisation (the ESO would also have input into this as well, as he/she would be site-based).

### **Spot Fines**

The ECO shall be authorised to impose spot fines for any of the transgressions detailed below:

- Littering on site.
- Lighting of illegal fires on site.
- Any persons, vehicles or equipment related to the Contractor's operations found within the designated "no-go" areas.
- Excess dust or excess noise emanating from site.
- Possession or use of intoxicating substances on site.
- Any vehicles being driven in excess of designated speed limits.
- Unauthorised removal and/or damage to fauna, flora or cultural or heritage objects on site.
- Urination and defecation anywhere other than using the toilet facilities that have been provided.

These activities, along with the appropriate guidelines to determining the fines shall be agreed to by Amstilite (RF) Proprietary Limited, the Site Manager acting for Amstilite and the Contractor. Such fines will be issued in addition to any remedial costs incurred as a result of non-compliance with the Environmental Specifications and or legal obligations. Amstilite (RF) Proprietary Limited will inform the Contractor of the contravention and the amount of the fine.

### **Penalty Fines**

Where environmental damage is caused, a pollution incident occurs, or failure to comply with any of the environmental specifications contained in the EMPR, the Contractor shall be liable to pay a penalty fine if the transgression is not rectified or rehabilitated within a timeframe specified by the ECO and Amstilite. The following transgressions should be penalised:

- Hazardous chemical/oil spill.
- Damage to sensitive environments.
- Damage to cultural and historical sites.
- Unauthorised removal/damage to indigenous trees and other vegetation, particularly in

- identified sensitive areas.
- Uncontrolled/unmanaged erosion.
  - Unauthorised blasting activities.
  - Violation of environmental authorisation conditions.

These activities, along with the appropriate guidelines to determining fines shall be agreed to by Amstilite (RF) Proprietary Limited, the Site Manager acting for Amstilite and the Contractor. In addition to penalties, the Site Manager acting for Amstilite has the power to remove from site any person who is in contravention of the EMPR, and if necessary, the Site Manager acting for Amstilite can suspend part of or all of the works, as required.

### **Internal Audits**

Where the monitoring data and the inspections highlight any problems, an internal audit will be initiated by the ECO. The purpose of the audit is to ascertain the source of the problem and to define what action shall be taken to rectify the problem and prevent its reoccurrence.

### **External Audits**

External audits will be conducted by the independent ECO. The external ECO will conduct an in-depth audit so as to ascertain compliance with the EMPR as well as the conditions of the environmental authorisation.

### **Incident Reporting and Remedy**

If a leakage or spillage of hazardous substances occurs on site, the local emergency services must be immediately notified of the incident (within 24 hours). The following information must be provided:

- The location;
- Details of the incident; and
- The status of the accident site.

Written records must be kept on the corrective and remedial measures decided upon and the progress achieved therewith over time. Such progress reporting is important for monitoring and auditing purposes. The written reports may be used for training purposes in an effort to prevent similar future occurrences. Annexure E provides an example of an environmental incidents register.

### **Written instructions**

Written instructions will be given following an audit. The written instructions will indicate the source or sources of the problems identified on site and propose solutions to those problems. The implementation of solutions will be assessed in a follow-up audit and further written instructions issued if required. Maximum allowable response time: 4 working days.

### **Public Communication and Liaison with Interested and Affected Parties**

The Contractor shall comply with the requirements for public consultation as required by the Constitution Act, 1996 (Act No 108 of 1996) and the National Environmental Management Act, 1998 (Act No 107 of 1998). During the construction phase of the project, the Contractor shall be responsible for erecting information boards, in the position, quantity, design and dimensions approved by the Site Manager acting for Amstilite. The information boards shall contain relevant information regarding the construction activity and the relevant contact details to assist persons who wish to submit complaints regarding construction activities.

### **Information distribution**

A copy of the EMPR will be made available to I&APs by the most suitable means. Copies will also

be distributed to all senior contract personnel. All senior personnel on the construction site will be required to familiarize themselves with the contents of the document.

## **5.7 Management Review**

A formal management review needs to be conducted on a regular basis. The purpose of the review is to critically examine the effectiveness of the EMPr and its implementation and to decide on potential modifications to the EMPr as and when necessary. The process of management review is in keeping with the principle of continual improvement. Management review will take place when the liaison committee (refer to Section 5.2.7. above) consisting of a representative from Amstilite (RF) Proprietary Limited, the Contractor, the Site Manager acting for Amstilite, and any other role-player deemed necessary by the members of the committee (the "Liaison Committee") meet every 6 months to review the progress of the Contract in implementing and complying with its obligations in terms of this EMPr for the duration of the construction phase. An annual review is recommended during the operations phase.

## **6 POTENTIAL ENVIRONMENTAL IMPACTS**

Provided in Table 6-1 below, is a summary of the potentially significant environmental impacts that may occur as a result of the project based on the detailed specialist studies undertaken in the EIR Phase. It is important that the Contractor develop Method Statements to minimise potentially significant negative environmental impacts and to enhance positive impacts. Chapter 7 that follows provides the general and specific environmental specifications that must be implemented in order to achieve the above-mentioned objectives. It is also advisable that the reader refers to the EIR and the specialist volume for this project in order to obtain a more exhaustive list of the potential environmental impacts associated with the proposed project, irrespective of their ranking, as these will need to be considered and the mitigation or management measures associated with these impacts, implemented.

**Table 6-1: Significant environmental impacts associated with the project.**

CONSTRUCTION PHASE						
IMPACT	SIGNIFICANCE				CUMULATIVE IMPACT	
	WITHOUT MITIGATION		WITH MITIGATION		WITHOUT MITIGATION	WITH MITIGATION
		NO-GO		NO-GO		
Intrusion of large and highly visible construction activity on sensitive views (visual impact)	HIGH -	N/A	MOD -	N/A	The cumulative impacts for the construction phase are not considered due to the fact that it is highly unlikely that all four wind energy facilities will be constructed at the same time.	
Impact of the construction noise on the surrounding environment	LOW -	N/A	LOW -	N/A		
Disturbance of birds	LOW -	N/A	LOW -	N/A		
Loss of bird habitat due to habitat destruction	MOD -	N/A	MOD -	N/A		
Loss of Thicket	LOW -	MOD +	LOW -	N/A		
Loss of Bedford Dry Grassland	MOD -	MOD +	LOW -	N/A		
Loss of Karroid Thicket	MOD -	MOD +	LOW -	N/A		
Loss of Scrub Grassland	MOD -	MOD +	LOW -	N/A		
Loss of plant species of special concern	MOD -	MOD +	MOD -	N/A		
Introduction of alien plant species	MOD -	HIGH -	LOW -	LOW -		
Loss of faunal biodiversity	MOD -	HIGH +	LOW -	N/A		
Loss of faunal species of special concern	LOW -	HIGH +	N/A	N/A		
Disturbance displacement of bats	LOW -	LOW +	LOW -	N/A		
Loss of bat habitat due to vegetation clearing	LOW -	MOD +	LOW -	N/A		
Construction of the wind farm and its impact on heritage aspects	MOD -	N/A	LOW -	N/A		
Palaeontological Impacts	LOW -	LOW -	MOD +	N/A		
OPERATIONAL PHASE						
IMPACT	SIGNIFICANCE				CUMULATIVE IMPACT	
	WITHOUT MITIGATION		WITH MITIGATION		WITHOUT MITIGATION	WITH MITIGATION
		NO-GO		NO-GO		
Impact of a change in the agricultural landscape as a result of establishing a wind farm (visual impact)	MOD -	N/A	MOD -	N/A	HIGH -	N/A
Intrusion of large wind turbines on the existing views of sensitive visual receptors (visual impact)	HIGH -	N/A	HIGH -	N/A	HIGH -	N/A

**Volume 4 : Environmental Management Programme**

Mar 21, 2019 10:43

Impact of shadow flicker on residents in close proximity to wind turbines (visual impact)	MOD -	N/A	LOW -	N/A	HIGH -	N/A
Impact of the operational noise on the surrounding environment (NSA 1,5, 7,8,9,10,11,12 & 13)	LOW -	N/A	N/A	N/A	LOW -	LOW -
Impact of the operational noise on the surrounding environment (NSA 2,3,4 & 6)	HIGH -	N/A	LOW -	N/A	LOW -	LOW -
Disturbance of birds	MOD -	N/A	MOD -	N/A	HIGH -	HIGH -
Disruption in local bird movement patterns	MOD -	N/A	MOD -	N/A	HIGH -	MOD -
Bird mortalities from colliding with turbine blades, tower, and/or associated infrastructure	MOD -	N/A	MOD -	N/A	HIGH -	MOD -
Collisions and electrocutions of birds with power lines and substations	MOD -	N/A	MOD -	N/A	MOD -	MOD -
Loss of Thicket	MOD -	MOD +	LOW -	N/A	MOD -	MOD -
Loss of Bedford Dry Grassland	MOD -	MOD +	MOD -	N/A	HIGH -	MOD -
Loss of Karroid Thicket	MOD -	MOD +	MOD -	N/A	HIGH -	MOD -
Loss of Scrub Grassland	MOD -	MOD +	MOD -	N/A	HIGH -	MOD -
Introduction of alien plant species	HIGH -	HIGH -	LOW -	LOW -	HIGH -	MOD -
Disturbance of bats	MOD -	LOW -	MOD -	N/A	MOD -	MOD -
Loss of bat habitat due to vegetation clearing	MOD -	MOD +	MOD -	N/A	MOD -	MOD -
Bat mortalities from colliding with turbine blades, tower and/or associated infrastructure	MOD -	N/A	MOD -	N/A	MOD -	MOD -
Impacts of the operation of the wind farm on heritage aspects	HIGH -	N/A	HIGH -	N/A	HIGH -	HIGH -

## 7 ENVIRONMENTAL SPECIFICATIONS

This Chapter of the EMPR outlines the environmental specifications which are required to be implemented for the construction and operation phases of the project. The specifications contained here-in are based on the mitigation measures recommended in the Specialist Reports and ground-truthing surveys.

It is important to note that in addition to the above, specific environmental specifications for particularly sensitive/specific areas within the proposed development site have also been included in this section (*in boxes*).

Comprehensive environmental audits are to be undertaken periodically during the construction and operation phases, in order to verify compliance with the measures listed below. If compliance with any of these measures cannot be met, it will be the responsibility of the Contractor to motivate for this non-compliance.

### 7.1 Site Plan

The contractor shall establish his construction camps, offices, workshops, staff accommodation and testing facilities on the site in a manner that does not adversely affect the environment. However, before construction can begin, the contractor shall submit to the Site Manager acting for Amstilite for his approval a site layout plan detailing plans of the exact location, extent and construction details of these facilities and the impact mitigation measures the contractor proposes to put in place. In particular, this plan must include:-

- Site access (including entry and exit points).
- Access and haulage routes.
- All material and equipment storage areas (including storage areas for hazardous substances such as fuel and chemicals) - only designated areas may be used for the storage of materials, machinery, equipment and site offices.
- Construction offices and other structures (accommodation for staff, where required and considered appropriate). Preferred locations would be flat areas within the proposed project area. The ecological specialist should be consulted as to the positioning of temporary structures.
- Areas where construction vehicles will be serviced.
- Security requirements (including temporary and permanent fencing, and lighting) and accommodation areas for security staff.
- Areas where vegetation will be cleared.
- The locality as well as the layout of the temporary waste storage facilities for litter, kitchen refuse, sewage and workshop-derived effluents. Waste storage facilities for sewage, grey water and workshop-derived effluents, where no formal facilities exist.
- Storm water control measures.
- Provision of potable water and temporary ablution facilities.
- Potential pollution hazards and mechanisms to manage these.
- Intended mitigation measures regardless of the chosen site for approval by the ECO.

The site plan shall be submitted no later than the first site meeting. Photographs shall be taken of the proposed site before any clearing may commence. These records are to be kept by the Site Manager acting for Amstilite for consultation during rehabilitation of the site. Throughout the period of construction, the Contractor shall restrict all activities to within the designated areas on the approved construction layout plan. Any relaxation or modification of the construction layout plan is to be approved by the ECO.

#### 7.1.1 Water for Human Consumption

Water for human consumption should be available at the site offices and at other convenient

locations on site.

### **7.1.2 Heating and Cooking Fuel**

The Contractor shall provide adequate facilities for his staff so that they are not encouraged to supplement their comforts on site by accessing what can be taken from the natural surroundings. The Contractor shall ensure that energy sources are available at all times for construction and supervision personnel for heating and cooking purposes.

### **7.1.3 Sewage Management**

All effluent water from the camp/office sites shall be disposed of or stored in a properly designed and constructed system, situated so as not to adversely affect water sources (streams, rivers, pans dams, etc.). Only domestic type wastewater shall be allowed to enter this drain.

Particular reference in the site establishment plan shall be given to the management of sewage generated at the site offices, and on-site facilities for labour. Sanitary arrangements should be to the satisfaction of the ESO and ECO.

Safe and effective management will require the use of chemical toilets which are supplied and maintained. The type of sewage management will depend on the geology of the local area, the duration of the contract and proximity (availability) of providers of chemical toilets. Chemical toilets will be serviced and emptied on a regular basis and no overflow will be permitted. The positioning of the chemical toilets is to be done in consultation with the ESO and/or ECO.

### **Ablution Facilities**

- The Contractor must provide the necessary ablution facilities for all his employees. These must be easily accessible (within 500m of any point of work), transportable and there should be a minimum of 1 toilet per 15 persons.
- Performing ablutions outside the toilet facilities is strictly prohibited. Use of the veld for this purpose shall not, under any circumstances, be allowed.
- The toilets shall be secured, and provided with an external closing mechanism to prevent toilet paper from being blown out.
- The toilets must be sited more than 50m away from any identified environmentally sensitive areas, drainage lines and water resources.
- Only approved chemical toilets shall be used.
- The Contractor shall arrange for regular emptying of toilets (toilets must be emptied on a daily basis) and will be entirely responsible for enforcing their use and for maintaining these facilities in a clean, orderly and sanitary condition to the satisfaction of the ESO and ECO.

## **7.2 Vegetation**

Most of the study site is covered with low sensitivity scrub grassland with scattered rocky outcrops. Sensitivity of the site is primarily low, with most of the vegetation quite degraded due to alien invasion as well as sheep and cattle grazing.

### **Construction Phase**

The following mitigation measures must be implemented to ensure the least possible impact on the local vegetation:

- The Contractor has a responsibility to inform all staff of the need to be vigilant against any practice that will have a harmful effect on vegetation. This information shall form part of the Environmental Education Programme to be effected by the Contractor.
- The natural vegetation encountered on the site is to be conserved and left as intact as possible.

- Every effort should be made to rehabilitate the damaged vegetation and minimise the habitat losses to resident faunal species.
- Re-vegetation of disturbed areas must be undertaken with site indigenous species and in accordance with the instructions issued by the ECO.
- Only trees and shrubs directly affected by the works, and such others as may be indicated by the ECO in writing, may be felled or cleared.
- The ECO must undertake a targeted survey of protected trees to identify any individuals of protected species. These must be marked with red tape.
- A permit must be obtained from the Department of Agriculture, Forestry and Fisheries (DAFF) prior to the removal or damage of any protected tree species.
- A permit must be obtained from the Department of Economic Development Environmental Affairs and Tourism for the removal of Species of Special Concern (SCC).
- Sensitive areas adjacent to the construction area, including all potential habitats for threatened species, must be clearly demarcated and no construction activities or impacts must be permitted to occur across these demarcations. Demarcated areas must be fenced off or clearly demarcated with red tape and no personnel or equipment must be permitted to enter these areas.
- The project specification for the rehabilitation of grass cover should be strictly adhered to.
- Any proclaimed weed or alien species that germinates during the contract period shall be cleared by hand before flowering.
- A firebreak shall be cleared and maintained around the perimeter of the site camp and office site.
- A strict monitoring plan must be implemented to prevent the additional spread and the continued removal of alien species such as those of *Opuntia* species, which were already present on site or that become established on areas that were disturbed during construction. See specific details regarding alien vegetation management in Section 7.15 of this document.
- Thicket patches on site should not be disturbed.
- The rocky outcrops should be avoided as they provide suitable habitat for a number of SCC and may harbour more SCC. This area should be cordoned off by the ECO as a no-go area prior to construction activities.

## **Operation**

Management of the development area during the operational phase shall focus on maintaining biodiversity and managing alien invasion. Achieving these objectives will require the preparation of an Alien Eradication Plan, and a Biodiversity Protection Plan. The latter will need to determine, *inter alia*, frequency of burning and/or mowing, areas to be left undisturbed etc. The following applies with regards to vegetation during the operation phase:

- Continued monitoring of the site for potential alien plant invasion, especially of plant species that were already on site.
- Maintenance of areas set aside within the site for conservation must take place to ensure that these are not being impacted further in any way.

## **7.3 Rehabilitation**

The construction areas and areas where site offices were erected will require rehabilitation at the end of the contract. The area will require ripping and the re-spreading of topsoil to generate vegetation. In this regard, the following rehabilitation strategies apply:-

- Suitable plant species for re-vegetation must be determined early in the re-vegetation programme.
- Depending on the variation in soil types on the micro-scale, it shall be important to differentiate different soil characteristics during rehabilitation for the purpose of separating soil types. The correct soil types must be replaced in the areas from which they were originally removed. This is important as it relates to rehabilitated plants which may only grow in specific

soil types.

- Rehabilitation must be scheduled to take place as soon as possible after construction has been completed with acceptable cover being achieved after 3 months.
- Ongoing monitoring and maintenance of rehabilitation works should be undertaken, especially following construction of any roads or digging of trenches for cables.
- All construction material, including concrete slabs are to be removed from the site on completion of the contract.
- An indigenous re-vegetation strategy must be developed and implemented, especially of disturbed areas. This can provide a buffer to protect remaining indigenous vegetation from invasion by weeds and alien invader plants.

During the re-vegetation / rehabilitation programme, the following applies:

- Before the clearing of the site is authorised, the appropriate permission must be obtained from the Department of Agriculture, Fisheries and Forestry (DAFF) for plants listed in the National Forests Act and from the Department of Economic Development and Environmental Affairs and Tourism (DEDEAT) for the destruction of the Provincial Nature Conservation Ordinance (PNCO) Schedule 4 protected species.
- In order to acquire a permit to destroy or remove plant species that fall under the National Forest Act an application form will need to be submitted to DWAF. A letter needs to be drafted and sent to DEDEAT prior to the destruction\removal of any PNCO Schedule 4 species: This letter must list the species that will be removed or destroyed and the reason for their removal or destruction.
- These permits may be subject to certain conditions, for example allowing various nurseries to collect plants before vegetation clearance commences; the removal of certain species for rehabilitation purposes, etc.

## 7.4 Fauna

The following measures must be implemented:

- During construction, sensitive habitats must be avoided by construction vehicles and equipment, wherever possible. Only necessary damage may be caused and, for example, unnecessary driving around in the veld or bulldozing natural habitat must not take place.
- Construction activities must remain within defined construction areas. No construction / disturbance will occur outside these areas.
- The extent of lay down areas must be minimal and they should not be located in areas that provide habitat for any faunal SSC.
- The Contractor shall ensure that all identified highly sensitive habitats are protected as demarcated no-go areas through fencing or other suitable means.
- Buffer zones shall be provided around sensitive habitats.
- If any fencing is to be done; the fences should have enough space between wires for small animals to move across them uninhibited.
- The removal, damage or disturbance of fauna or avifauna will be forbidden in all demarcated no-go areas or specified environmentally sensitive areas.
- The ECO will make the Contractor aware of any Ordinances, Acts, by-laws, or regulations pertaining to the protection of fauna on the site. Where applicable, the Contractor will apply for the necessary permits prior to removing any animals listed in the relevant schedules promulgated in terms of any relevant legislation.
- The trapping of any animal is strictly prohibited. Any animal killed as a result of trapping or hunting or found in the possession of an employee of the Contractor will result in that employee being removed from site for the duration of the Contract.
- No domestic pets or livestock will be permitted on site during the construction period.

### 7.4.1 Birds

Due to the potential fatalities of birds and bats resulting from the proposed project, Amstilite (RF) Proprietary Limited shall take every precaution in reducing the number of these animals that die as a result of the wind turbines and associated infrastructure.

The following mitigation measures should be used to reduce the number of birds killed by the Amstilite (RF) Proprietary Limited Project:

- Wind turbines should have technology that reduces the amount of noise produced by their machines. This will especially reduce the disturbance to nesting birds.
- Associated infrastructure such as power lines also impact on birds. Where possible cabling and/or power lines should be buried, and not put on poles and run overland. Where this is not possible the power line must be marked with a suitable marking device for collision-prone species.
- Intermittent lighting must be used if possible (i.e. if it does not contradict aviation regulations), as well as red light which is less attractive than white light.
- A formal operational monitoring programme must be implemented under the Best Practice Guidelines available at the time by a suitably experienced avifaunal specialist for at least the first two years of the operational phase.
- As part of the monitoring programme, daily searches for carcasses must be undertaken.
- Depending on the results of the carcass searches, a range of mitigation measures will be considered which will be guided by a suitable experienced avifaunal specialist if mortality levels turn out to be significant.
- It is strongly recommended that the operational phase EMP for the Golden Valley WEF includes the objective of reducing Cape Vulture food availability on site as far as possible. This can be done by removing or covering dead animals on site as soon as they are detected by staff, so that they do not attract vultures onto the site. The bird and bat carcass search team that will likely be employed full time on site (as part of bird and bat operational phase monitoring) can assist in reporting such dead livestock. The site manager should then have a response plan in place, which will need to include collaboration with landowners. If the availability of dead animals can be kept to a minimum on site this may assist in reducing the risk of Cape Vulture – turbine fatalities.
- All spoil material (soil, rock, trees) should be removed from site, not piled on site as this results in additional areas of habitat removal.
- A systematic bird monitoring programme should be implemented at this facility (including the grid connection power line) once operational, as per the current best practice guidelines in this regard (Jenkins et al, 2015 update in prep).
- The proposed pole structure for the overhead power line on site should be sent to the specialist for approval. It is essential that this structure is safe for vultures and large eagles.

### 7.4.2 Bats

Mitigation measures to reduce bat fatalities are:

- A formal operational monitoring programme must be implemented under the Best Practice Guidelines available at the time by a suitably experienced bat specialist for at least the first two years of the operational phase.
- As part of the monitoring programme, daily searches for carcasses must be undertaken.
- Depending on the results of the carcass searches, a range of mitigation measures will be considered which will be guided by a suitably experienced bat specialist if mortality levels turn out to be significant.
- Wind turbine operating times should be restricted during times when bat activity is high as directed by the bat specialist. Bats are at higher risk of fatality on nights with low wind speeds.

- It is recommended that bat fatalities, and their causes at the wind farm are monitored, as there is little information available for wind farms in South Africa. More applicable mitigation measures can be applied when there is more information.

It is preliminarily recommended that no curtailment be applied at the start of the facility's operation, since the finalised turbine layout is respective of the bat sensitive areas and their buffers. However, the operational phase monitoring needs to ensure sufficient, and in some cases increased efforts for determining the impacts on local bat populations. An adaptive management approach needs to be followed where mitigation measures are implemented and adjusted according to levels of impacts on local bat populations, as determined by the results of the operational phase monitoring. The response time in adapting and implementing mitigation measures where needed, may not exceed 2 weeks but is recommended to be as short as possible. Different mitigation measures, apart from curtailment, will also be utilised and the effectiveness tested by means of the proposed adaptive management plan. The times and weather conditions outlined in the table below will be considered and used as an early warning system to aid in a short mitigation response time in the case of unacceptable bat mortalities.

High risk turbines will be identified during the operational phase bat monitoring program. High risk turbines may most likely be closer to the Great Fish River. High risk turbines will then require increased levels of monitoring effort during the operational phase and may be mitigated more intensely.

An initial mitigation schedule has been compiled and displayed in the below table. This mitigation schedule serves as a guide to mitigate significant impacts if any are identified in the early stages of the operational phase bat monitoring program. The schedule should be implemented at the onset of mitigation application, if the need for mitigation arises. Times and environmental conditions of implementation of mitigation measures are preliminarily recommended (considering more than 80% bat activity) as follows:

**Table 7-1: Operations phase mitigation program for bats**

	Olivewoods system (Approximately turbines 26 - 39)
Times of peak activity (times to implement mitigation)	March
	Sundown (<30 lux) – 20:30
Environmental conditions in which turbines are allowed to operate without any mitigation	Above 10m/s (40m height) wind speed; Below 16C°

	T2 Kwaggaskuil system (Approximately turbines 40 - 48)
Times of peak activity (times to implement mitigation)	March
	18:30 – 20:00
Environmental conditions in which turbines are allowed to operate without any mitigation	Above 8.5m/s (40m height) wind speed; Below 15.5C°

	T 63 Olivefontein system (Approximately turbines 15 - 25)
	May

Times of peak activity (times to implement mitigation)	18:00 – 21:30; 1:00-2:00
Environmental conditions in which turbines are allowed to operate without any mitigation	Above 14.5m/s (80m height) wind speed (non-normalised and 80m data used due to impractical parameters given by normalised data and 40m, due to probable outliers and anomalies in the data); Below 14C°

	T82 Matjiesfontein system (Approximately turbines 1 - 14)
Times of peak activity (times to implement mitigation)	March 18:30 – 21:00; 22:00-23:00
Environmental conditions in which turbines are allowed to operate without any mitigation	Above 6.5m/s (40m height) wind speed; Below 17C°

These proposed mitigation values are preliminary and to be implemented at the facility's start of operation. The values and/or applicable turbines may be adjusted/changed significantly during operational monitoring, based on actual bat mortality data.

## 7.5 Waste Management

The Contractor's intended methods for waste management and waste minimisation must be implemented at the outset of the contract, and approved by the ECO. All personnel shall be instructed to dispose of all waste in the proper manner. No waste from construction or otherwise, may be disposed of on site. All waste generated on site, must be removed from the site and disposed of at a licensed waste disposal site. In this regard, adequate litter drums or other suitable containers must be located on site to ensure that waste generated on site is disposed of in suitable and timeous manner.

Where possible, some of the construction waste should be recycled and used in construction.

### 7.5.1 Solid Waste and liquid wastes

#### Construction Phase

Solid waste shall be stored in a designated area within the site area in covered, tip proof drums for collection and disposal. All refuse containers must be free of any holes and in good condition. A refuse control system shall be established for the collection and removal of refuse to the satisfaction of the ESO and ECO. As far as possible, general waste (including paper, glass, plastics, aluminium, etc.) shall be sorted for recycling.

Disposal of solid waste shall be at a DEA licensed landfill site, or at a site approved by DEA in the event that an existing operating landfill site is not within reasonable distance from the site. No waste shall be burned.

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

### **7.5.2 Litter**

#### **Construction Phase**

No littering by construction workers must be allowed. During the construction period, the facilities shall be maintained in a neat and tidy condition, and the site is to be kept free of litter.

Measures shall be taken to reduce the potential for litter and negligent behaviour with regard to the disposal of all refuse. At all places of work, the Contractor shall provide litter collection facilities for later safe disposal at DEA approved waste disposal sites.

#### **Operation Phase**

During the operation phase, the area of the development should be cleared of litter on a regular basis. Once collected, this litter shall be disposed of at a DEA approved waste disposal site.

### **7.5.3 Hazardous Waste**

#### **Construction Phase**

Hazardous waste such as bitumen, oils, oily rags, paint tins etc. shall be disposed of at a DEA approved hazardous waste landfill site. Special care should be taken to avoid spillage of hazardous waste from entering the ground or contaminating water. In the event of the above occurring, the affected areas shall be promptly reinstated to the satisfaction of the ECO.

As far as possible, maintenance of machinery and vehicles on site should be avoided. Used oil, lubricants and cleaning materials from the maintenance of vehicles and machinery should be collected in a holding tank and returned to the supplier. Water and oil should be separated in an oil trap. Oils collected in this manner, should be retained in a safe holding tank and removed from site by a specialist oil recycling company for disposal at approved waste disposal sites for toxic/hazardous materials. Oil collected by a mobile servicing unit should be stored in the service unit's sludge tank and discharged into the safe holding tank for collection by the specialist oil recycling company. The Contractor shall ensure that an emergency preparedness plan is in place for implementation in the case of a spill or substances which can be harmful to an individual or the receiving environment.

All used filter materials should be stored in a secure bin for disposal off site. Hazardous waste shall not be stored or stockpiled in any area other than that designated on the construction site layout.

Any contaminated soil should be removed and replaced. Soils contaminated by oils and lubricants should be collected and disposed of at a facility designated by the local authority to accept contaminated materials.

Washing of vehicles on the construction site should not be permitted as this is likely to result in release of hydrocarbon-contaminated wash water into the environment.

#### **Operational Phase**

Hazardous materials (if any) which may be generated during the operation phase must be disposed of in a DEA approved hazardous waste landfill site. The Contractor shall ensure that an emergency preparedness plan is in place for implementation in the case of a spill or substances which can be harmful to an individual or the receiving environment.

Refer to the Waste Management Plan (Appendix K) for further details.

## **7.6 Maintenance and Machinery**

The contractor's management and maintenance of his plant and machinery will be strictly monitored according to the criteria given below, regardless whether it is serviced on the site (i.e. at the place of construction activity or at a formalised workshop).

### **7.6.1 Safety**

All the necessary handling and safety equipment required for the safe use of petrochemicals and oils shall be provided by the Contractor to, and used or worn by the staff whose duty it is to manage and maintain the supplier's plant, machinery and equipment.

### **7.6.2 Hazardous Material Storage**

Petrochemicals, oils and identified hazardous substances shall only be stored under controlled conditions. All hazardous materials (e.g. oils, lubricants, paints etc) will be stored in a secured, appointed area that is fenced and has restricted entry. The Contractor must keep a register of all hazardous material stored on site and there must be a Material Safety Data Sheet (MSDS) on file for each. Storage of hazardous products shall only take place using suitable containers approved by the ECO.

The Contractor shall provide proof to the Site Manager acting for Amstilite that relevant authorisation to store such substances has been obtained from the relevant authority. In addition, hazard signs indicating the nature of the stored materials shall be clearly displayed on the storage facility or containment structure. Before containment or storage facilities can be erected, the Contractor shall furnish the Site Manager acting for Amstilite with details of the preventative measures which are proposed to be installed in order to mitigate against pollution of the surrounding environment from leaks or spillage. The proposals shall also indicate the emergency procedures to be implemented in the event of misuse or spillage of substances that will negatively impact on an individual or the environment.

### **7.6.3 Fuel and Gas Storage**

- Fuel shall be stored in a secure area in a steel tank supplied and maintained by the fuel suppliers.
- Storage of fuel and gas will be confined to the demarcated secure area(s).
- Areas around fuel tanks are to be bunded or contained in an appropriate manner as per the requirements of SABS 089:1999 Part 1.
- Fuel tanks shall be located at least 3.5m from buildings, boundaries and any other combustible or flammable material.
- Leakage of fuel shall be avoided at all times and if found to occur shall be remedied immediately. Suitable and adequate supplies of absorbents shall be available at all times to control and absorb any spillages.
- The Contractor will ensure that an emergency preparedness plan is in place for implementation in case of leakage or spillage of fuel which can be harmful to an individual or the receiving environment.
- An adequate bund wall (110% volume) shall be provided for fuel and diesel areas to accommodate any spillage or overflow of these substances. The area inside the bund wall should be lined with an impervious lining to prevent infiltration of the fuel into the soil.
- Where provision is made for draining water from bunded area, such drains shall be so controlled as to prevent hazardous products from entering natural water courses, public sewers or public drains.
- No storage of any combustible materials (paper, cardboard, wood etc) shall be permitted in any bunded area.
- Generators and fuel supply needed during construction must be placed on trays, which can rest on clean sand.

- Once construction has been completed, this sand must be removed from the site and disposed of at a registered waste site.
- All storage tanks shall be removed after construction.
- Gas welding cylinders and LPG cylinders should be stored in a secure, well-ventilated area which is clearly marked with hazard signs.

#### **7.6.4 Fires**

#### **Construction Phase**

- Due to the frequent high winds at the site, no open fires will be permitted on the site.
- Where fires are unavoidable, the Contractor shall ensure the management of fires emanating from construction camps and that education of the work force concerning management of fires is undertaken.

### **7.7 Clearing of the Site**

In all areas where the contractor intends to, or is required to clear the natural vegetation and soil, either within the construction area, or at designated or instructed areas outside the construction area, a plan of action shall first be submitted to the Site Manager acting for Amstilite and ECO for approval. The record shall be comprehensive and clear, allowing for easy identification during subsequent inspections.

The contractor shall be responsible for the re-establishment of grass within the development boundaries for all areas disturbed during construction. This includes, for example, service roads, stockpile areas, stop/go facilities, windrows and wherever material generated from, construction has to be stored temporarily or otherwise within the construction area, or at designated or instructed areas outside the construction area. This responsibility shall extend until expiry of the defects notification period.

### **7.8 Soil Management**

#### **7.8.1 Topsoil**

Topsoil shall be removed from all areas where physical disturbance of the surface would occur and shall be stored and adequately protected. The contract will provide for the stripping and stockpiling of topsoil from the site for later re-use. Topsoil is considered to be the natural soil covering, and to include all organic matter. Depth may vary at each site, and must be determined on a site-specific basis and removed accordingly. The areas to be cleared of topsoil shall include the storage areas and site camps.

All topsoil stockpiles and windrows shall be maintained throughout the contract period in a weed-free condition. Weeds appearing on the stockpiled topsoil shall be removed by hand. The topsoil stockpiles shall be stored, shaped and sited in such a way that they do not interfere with the flow of water such that damming or erosion is caused, or itself be eroded through the action of water. Stockpiles of topsoil shall not exceed a height of 2m, and if they are to be left for longer than 6 months shall be analysed and, if necessary, nutrient levels replenished before replacement.

Soils contaminated by hazardous substances shall be disposed of at a DEA hazardous waste disposal site.

The Contractor shall ensure that minimal amounts of topsoil are lost due to erosion, either by wind or water. This can be facilitated through the grassing of topsoil stockpiles. Areas to be top-soiled and grassed shall be done so systematically to allow for quick cover and reduction in the chance of heavy topsoil losses due to unusual weather patterns.

The Contractor's programme shall clearly show the proposed rate of progress of the application of

topsoil and re-vegetation. The Contractor shall be held responsible for the replacement, at his own cost, for any unnecessary loss of topsoil due to his failure to work according to the progress plan approved by the ECO. The Contractor's responsibility shall also extend to the clearing of drainage or water systems that may have been affected by such negligence within and beyond the boundaries of the road reserve.

### **7.8.2 Subsoil**

The subsoil is the layer of soil immediately beneath the topsoil. This layer of soil shall be removed to a depth instructed by the ECO, and stored separately from the topsoil if not used for construction purposes. During rehabilitation, this subsoil shall be replaced in the excavation in the original order it was removed.

Refer to the Topsoil and Rehabilitation Plan (Appendix H) for further details.

## **7.9 Drainage**

The following general specifications apply to all storm water management and site drainage considerations:

- The quality, quantity and flow direction of any surface water runoff shall be established prior to disturbing any area for construction purposes. Cognisance shall be taken of these aspects and incorporated into the planning of all construction activities.
- Before a site is developed or expanded, the effect on the drainage pattern as a result of this development or expansion shall be established.
- Recognised water users/receivers must not be adversely affected by the development.
- No water source shall be polluted in any way due to proposed changes.
- Streams, rivers, pans, wetlands, dams, and their catchments shall be protected from erosion, direct or indirect spillage of pollutants such as refuse, garbage, cement, concrete, sewage, chemicals, fuels, oils, aggregate, tailings, wash water, organic materials and bituminous products.
- The Contractor shall submit in writing to the Site Manager acting for Amstilite and ECO his proposals for prevention, containment and rehabilitation measures against environmental damage of the identified water and drainage systems that occur on the site. Consideration shall be given to the placement of sedimentation ponds or barriers where the soils are of a dispersive nature, or where toxic fluids are used in the construction process. The sedimentation ponds must be large enough to contain runoff such that they function correctly under heavy rain conditions.
- Measures shall be put in place to protect the hill slopes in the catchment area against erosion as a precaution in areas affected by the exposing of unconsolidated soils during construction of the wind energy facility.
- Storage containers must be regularly inspected so as to prevent leaks into the aquatic system.
- Weather forecasts from the South African Weather Bureau of up to three days in advance must be monitored on a daily basis to avoid exposing soil or building works or materials during a storm event and appropriate action must be taken in advance to protect construction works should a storm event be forecasted.

Refer to the Storm Water Management Plan (Appendix I) for further details.

## **7.10 Earthworks and Layerworks**

This section includes all construction activities that involve the excavation of all materials, and their subsequent placement, stockpile, spoil, treatment or batching, for use in the permanent works, or temporary works in the case of deviations. The contractor shall take cognisance of the requirements set out below.

### **7.10.1 Excavation, hauling and placement**

The contractor shall provide the Site Manager acting for Amstilite and ECO with detailed plans of his intended construction processes prior to starting any excavations. The plans shall detail the number of personnel and plant to be used and the measures by which the impacts of pollution (noise, dust, litter, fuel, oil, sewage), erosion, vegetation destruction and deformation of landscape will be prevented, contained and rehabilitated. Particular attention shall also be given to the impact that such activities will have on the adjacent built environment, including nearby houses. The contractor shall demonstrate his “good housekeeping”, particularly with respect to closure at the end of every day so that the site is left in a safe condition from rainfall overnight or over periods when there is no construction activity.

### **7.10.2 Spoil sites**

The contractor shall be responsible for the safe siting, operation, maintenance and closure of any spoil site he uses during the contract period, including the defects notification period. This shall include existing spoil sites that are being re-entered. Before spoil sites may be used, proposals for their locality, intended method of operation, maintenance and rehabilitation shall be given to the Site Manager acting for Amstilite and ECO for his approval. The location of these spoil sites shall have signed approval from the affected landowner before submission to the Site Manager acting for Amstilite. No spoil site shall be located within 500m of any watercourse. A photographic record shall be kept of all spoil sites for monitoring purposes. This includes before the site is used and after revegetation.

The use of approved spoil sites for the disposal of hazardous or toxic wastes shall be prohibited unless special measures are taken to prevent leaching of the toxins into the surrounding environment. Such special measures shall require the approval of the relevant provincial or national authority. The same shall apply for the disposal of solid waste generated from the various camp establishments. The Site Manager acting for Amstilite will assist the contractor in obtaining the necessary approval if requested by the contractor.

Ideally, the storage of excavated material on site should be minimised to avoid unnecessary impacts to the local environment. As soon as practical after excavation, if not simultaneously, all excavated material that is not required for construction or rehabilitation shall be removed from the site for disposal at an appropriate location. This location must be agreed between the developer, Site Manager acting for Amstilite and local municipal officials prior to initiation of excavation.

### **7.10.3 Stockpiles**

The contractor shall plan his activities so that excavated materials, in so far as possible, can be transported direct to and placed at the point where it is to be used. However, should temporary stockpiling become necessary, the areas for the stockpiling of excavated and imported material shall be indicated and demarcated on the site plan submitted in writing to the Site Manager acting for Amstilite and ECO for their approval, together with the contractor’s proposed measures for prevention, containment and rehabilitation against environmental damage.

The areas chosen shall have no naturally occurring indigenous trees and shrubs present that may be damaged during operations. Care shall be taken to preserve all vegetation in the immediate area of these temporary stockpiles. During the life of the stockpiles the contractor shall at all times ensure that they are:

- Positioned and sloped to create the least visual impact;
- Constructed and maintained so as to avoid erosion of the material, generation of dust and contamination of surrounding environment; and
- Kept free from all alien/undesirable vegetation.

After the stockpiled material has been removed, the site shall be re-instated to its original condition. No foreign material generated / deposited during construction shall remain on site. Areas affected by stockpiling shall be landscaped, top soiled, grassed and maintained at the contractor's cost until clearance from the Site Manager acting for Amstilite and the relevant National Authority is received. In all cases, the Site Manager acting for Amstilite shall approve the areas for stockpiling and disposal of construction rubble before any operation commences and shall approve their clause only when they have been satisfactorily rehabilitated.

#### **7.10.4 Blasting activities**

Wherever blasting activity is required on the site the contractor shall rigorously adhere to the relevant statutes and regulations that control the use of explosives. In addition, the contractor shall, prior to any drilling of holes in preparation for blasting, supply the Site Manager acting for Amstilite with a locality plan of the blast site on which shall be shown the zones of influence of the ground and air shock-waves and expected limits of fly-rock. The plan shall show each dwelling, structure and service within the zones of influence and record all details of the dwellings/structures/services including existing positions, lengths and widths of cracks, as well as the condition of doors, windows, roofing, wells, boreholes etc.

The contractor, alone, shall be responsible for any costs that can be attributed to blasting activities, including the collection of fly-rock from adjacent lands and fields. The submission of such a plan shall not in any way absolve the contractor from his responsibilities in this regard. The contractor shall also indicate to the Site Manager acting for Amstilite the manner in which he intends to advertise to the adjacent communities and/or road users the times and delays to be expected for each individual blast. The Contractor shall be responsible for obtaining all necessary permits required for blasting activities.

#### **7.10.5 Concrete batching sites**

Asphalt plants are considered scheduled processes listed in the second schedule to the Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965). Should the use of an asphalt plant be considered on site, the contractor shall be responsible to obtain the necessary permit from the DEA, regardless of where they are sited.

Crushing plants and concrete batching plants shall be subject to the requirements of the applicable industrial legislation that governs gas and dust emissions into the atmosphere. Such sites will be the subject of regular inspections by the ECO and relative authorities during the life of the project. The contractor shall provide plans that take into account such additional measures as concrete floors, bundled storage facilities and linings to drainage channels. All sites shall adhere to the following requirements:

- The batching activity shall be located in an area of low environmental sensitivity to be identified and approved by the ECO.
- No batching activities shall occur on unprotected substratum of any kind (i.e. directly on the ground).
- All wastewater and runoff from batching areas shall be strictly controlled, and cement-contaminated water shall be collected, stored and disposed of at a site approved by the ECO. Mixing trays shall be used at all mixing and supply points.
- Contaminated water shall be disposed of at a waste disposal site approved by the ECO.
- Effluent from concrete batch plants and crusher plants should be treated in a suitable designated sedimentation dam to the legally required standards to prevent surface and groundwater pollution. The designs of such a facility should be submitted to the ECO for approval.
- Contaminated water storage facilities shall not be allowed to overflow and appropriate protection from rain and flooding shall be implemented.
- Unused cement bags are to be stored so as not to be affected by rain or runoff events.
- Used bags shall be disposed of by the Contractor in the appropriate manner.

- Care shall be taken to collect contaminated wash-water resulting from cleaning activities of equipment and flushing of mixers, and dispose of it in a manner approved by the ECO.
- Suitable screening and containment shall be in place to prevent wind-blown contamination associated with bulk cement silos, loading and batching.
- All visible remains of excess concrete shall be physically removed on completion of the plaster or concrete pour section and disposed of. All excess aggregate shall also be removed.

Ultimate approval of these measures shall be from the relevant national authority, as shall approval of closure. The Site Manager acting for Amstilite will assist the contractor in his submissions to the relevant authority.

The contractor shall invite the relevant department to inspect the site within 2 months after any plant is commissioned and at regular intervals thereafter.

## 7.11 Spillages

### Construction Phase

Streams, rivers and dams shall be protected from direct or indirect spillage of pollutants such as refuse, garbage, cement, concrete, sewage, chemicals, fuels, oils, aggregate, tailings, wash water, organic materials and tar or bituminous products. In the event of a spillage, the contractor shall be liable to arrange for professional service providers to clear the affected area.

Responsibility for spill treatment lies with the contractor. The individual responsible for, or who discovers a hazardous waste spill must report the incident to his/her ESO, ECO or to the Site Manager acting for Amstilite. The ESO will assess the situation in consultation with the Site Manager acting for Amstilite and act as required. In all cases, the immediate response shall be to contain the spill. The exact treatment of polluted soil / water shall be determined by the contractor in consultation with the ESO, ECO and the Site Manager acting for Amstilite. Areas cleared of hazardous waste shall be re-vegetated according to the Site Manager's instructions

Should water downstream of the spill be polluted, and fauna and flora show signs of deterioration or death, specialist hydrological or ecological advice will be sought for appropriate treatment and remedial procedures to be followed. The requirement for such input shall be agreed with the Site Manager acting for Amstilite. The costs of containment and rehabilitation shall be for the contractor's account, including the costs of specialist input.

### Operational Phase

The Contractor shall compile and maintain environmental emergency procedures to ensure that there will be an appropriate response to unexpected or accidental environment-related incidents throughout the life cycle of the project. These plans should include:

- Emergency organisation (manpower) and responsibilities, accountability and liability.
- A list of key personnel.
- Details of emergency services applicable to the various areas along the route that the turbine components will need to be transported as well as for the site itself (e.g. the fire department, spill clean-up services, etc.).
- Internal and external communication plans, including prescribed reporting procedures where required by legislation.
- Actions to be taken in the event of different types of emergencies.
- Incident management plans for the site.
- Incident recording, progress reporting and remediation measures required to be implemented.
- Information on hazardous materials, including the potential impact associated with each and measures to be taken in the event of accidental release.

- Training plans and testing exercises and schedules for effectiveness.

The Contractor shall comply with the emergency preparedness and incident and accident-reporting requirements, as required by the Occupational Health and Safety Act, 1993 (Act No 85 of 1993), the National Environmental Management Act, 1998 (Act No 107 of 1998), the National Water Act, 1998 (Act No 36 of 1998) and the National Veld and Forest Fire Act, 1998 (Act No 101 of 1998) as amended and/or any other relevant legislation.

## 7.12 Areas of Specific Importance

Any area, as determined and identified within the project document as sensitive or of special interest within the site shall be treated according to the express instructions contained in these specifications. The contractor may offer alternative solutions to the Site Manager acting for Amstilite in writing should he consider that construction will be affected in any way by the hindrance of the designated sensitive area or feature. However, the overriding principle is that such defined areas requiring protection shall not be changed. Every effort to identify such areas within the site will have been made prior to the project going out to tender. The discovery of other sites with archaeological or historical interest that have not been identified shall require *ad hoc* treatment.

### 7.12.1 Archaeological Sites

In terms of heritage impacts, several archaeological sites exist in the shelters below the top of the hills on which the turbines will be placed (within a 1km radius). The sites all occur along the slopes of the affected hills and will not be affected by the proposed project. Although the turbines will not affect these sites, it must be noted that servitudes must be placed in such a manner that they do not impede on these sites. If an artefact on site is uncovered, work in the immediate vicinity shall be stopped immediately. The contractor shall take reasonable precautions to prevent any person from removing or damaging any such article and shall immediately upon discovery thereof inform the Site Manager acting for Amstilite of such discovery. The South African Heritage Resources Agency (SAHRA) shall be contacted and they will appoint an archaeological consultant to record the site and excavate if necessary. Work may only resume once clearance is given in writing by the archaeologist.

Furthermore, the following specific mitigation measures are proposed:

- The group of boulders at the Ariesberg site should not be impacted upon;
- Apply for a destruction permit from the Eastern Cape Provincial Heritage Resources Agency (ECPHRA) for the isolated Middle Stone Age scatters that are distributed across the proposed development site. One permit for the isolated scatters may be applied for.
- A 50 m no-go development buffer should be established around the stone wall on the Stompstaart Fontein 168 (GVSW1).
- For any alteration or demolition of structures older than 60 years, a permit applied for with the Eastern Cape Provincial Heritage Resources Authority (attention Mr Zote, mlzote@ecphra.org.za), it is possible that a Conservation Architect may need to be contacted, but this can be further discussed with the PHRA.
- The rocky outcrops should be avoided as many of them are sites of heritage significance. This area should be cordoned off by the ECO as a no-go area prior to construction activities.

### 7.12.2 Graves and middens

If a grave or midden is uncovered on site, or discovered before the commencement of work, then all work in the immediate vicinity of the graves/middens shall be stopped and the Site Manager acting for Amstilite informed of the discovery. The National Monuments Council should be contacted and in the case of graves, arrangements made for an undertaker to carry out exhumation and reburial. The undertaker will, together with the National Monuments Council, be responsible for attempts to contact family of the deceased and for the site where the exhumed remains can be re-interred.

### 7.12.3 Palaeontological sites

It is recommended that specialist palaeontological mitigation be carried out at least within the two small areas demarcated in the satellite image below (These are only applicable to Project 2, not Project 1). The proposed specialist mitigation should involve the intense recording and judicious collection of fossil material within the designated two areas, as well as the recording of pertinent geological data (e.g. sedimentological information). Note that the palaeontologist involved will be required to obtain beforehand a palaeontological collection permit from SAHRA and to arrange a suitable repository for any fossils collected (e.g. Albany Museum, Grahamstown, or Iziko: South African Museums, Cape Town).



**Figure 7.1: Google Earth® satellite image of part of the study area southeast of Cookhouse showing area (red circle) where good slope exposures of Middleton Formation mudrocks and palaeosols on farm Smoorsdrift 162 yielded several well-preserved therapsid (“mammal-like reptile”) skulls during the palaeontological field scoping study.**

Should substantial fossil remains, such as vertebrate bones, teeth or petrified wood, be found or exposed anywhere within the study area during construction of the Golden Valley Wind Energy Facility, the responsible ECO should safeguard these – *in situ*, if feasible – and alert SAHRA as soon as possible so that appropriate mitigation can be undertaken by a professional palaeontologist.

### 7.13 Noise Control

#### Construction Phase

- Construction will be restricted to normal daytime working hours (08:00 – 17:00). No construction activities will take place during weekday evenings and night-time (after 17:00), on Saturdays after midday (12:00) and the entire day on Sundays unless prior arrangement with all landowners have been made.
- No construction piling should occur at night. Piling should only occur during the hottest part

- of the day to take advantage of unstable atmospheric conditions.
- All noise-making equipment shall be turned off when not in use.
  - All equipment shall be kept in good working order.
  - All equipment shall be operated within specifications and capacity (i.e. do not overload machines).
  - Compliance with the appropriate legislation with respect to noise is mandatory.
  - The Contractor will familiarise himself with, and adhere to, any local bylaws and regulations regarding the generation of noise.
  - Construction staff should be given “noise sensitivity” training.
  - The Contractor will endeavour to keep noise generating activities associated with construction activities to a minimum.
  - Modern low noise emission vehicles and equipment shall be favoured on site. The details of all construction machinery and vehicles must be determined prior to construction in order to identify potentially noisy machinery and to seek possible alternatives. These details will include the manufacturer, type and noise emission data of each machinery/vehicle and how many will be used at any time. Note that manufacturers of modern vehicles and machinery provided for the international market are obliged to provide noise emission data. Where this information is not available, noise measurements must be conducted prior to use of such machinery or vehicles.
  - A well planned and co-ordinated “fast track” procedure is implemented to complete the total construction process in the area in the shortest possible time.
  - The size of explosive charges used for blasting (if required) should be optimised so as to balance breaking capacity against minimising any vibration impact and fly-rock.

## **Operational Phase**

During operation of the wind energy facility, Amstilite (RF) Proprietary Limited shall ensure that the turbine infrastructure is maintained such that noise levels in identified noise sensitive areas associated with the project do not exceed the legally acceptable level of 45 dB for affected communities or households. Periodic monitoring should be undertaken.

### **7.14 Dust Control**

- Appropriate dust-suppression techniques as approved by the Site Manager acting for Amstilite and ECO shall be implemented on all exposed surfaces during periods of high wind. Such measures shall include: wet suppression, chemical stabilisation, use of wind fence covering surfaces with straw or chippings, and the re-vegetation of open areas.
- Water used for dust suppression must be applied in quantities small enough not to generate run-off and result in soil erosion.
- Mitigation actions such as the reduction of vehicle speed and proper signage shall also be implemented.
- Blasting must be restricted to periods of calm wind conditions to minimise the potential for dust dispersion.
- Vegetation cover should be maintained and vegetation cover only removed until such time as soil stripping is required.
- Exposed soil that has the potential for generating dust shall be re-vegetated or stabilised as soon as possible after construction work is completed, or kept damp until re-vegetation occurs.
- Excavation, handling and transport of topsoil and spoil shall be avoided during periods of excessive wind.
- Adequate water carts shall be available on site to meet demands throughout the duration of the contract.
- The Contractor shall ensure that loose building materials and excavated material stockpiles are adequately protected against the wind by a covering of some description, such as canvas.
- Stockpiles may also be dampened to minimise dust generation.
- Construction vehicles and machinery will be serviced on a monthly basis, with a major service

every six months.

- Construction vehicles and machinery shall be inspected for excessive emissions.

## 7.15 Control and Management of Alien Vegetation

### Construction Phase

- Mitigation measures to reduce the impact of the introduction of alien invaders, as well as mitigation against alien invaders that have already been recorded on the site should be actively maintained throughout both the construction and operation phases.
- The Contractor shall be held responsible for the removal of alien vegetation within the development area disturbed for the duration of the construction phase. This includes, for example, access roads, stockpile areas, and wherever material generated for or from construction has been stored temporarily or otherwise within the development area.
- Any proclaimed weed or alien species that germinates during the contract period shall be cleared by hand before flowering.
- Removal of existing alien species shall be consistently done.
- Alien plants must be removed as soon as they are detected.
- Only removed alien vegetation must be burned in an appropriate location (to be approved by the ECO), or should be disposed of in accordance with the appropriate methods developed by the Working for Water Programme, and advice from this organisation shall be obtained.
- A pest control operator registered for the industrial application of herbicides shall apply herbicides, or shall supervise the application of herbicides in compliance with the terms of the Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No 36 of 1947). The use of herbicides shall not be permitted within identified sensitive areas. Removal of alien vegetation within these areas must be undertaken by hand.
- Re-vegetation of disturbed areas must be undertaken with site indigenous species.
- The Contractor shall avoid translocating stockpiles of topsoil from one place to another in order to avoid translocating soil seed banks of alien species.
- Depending on the variation in soil types on the micro-scale, it shall be important to differentiate different soil characteristics during rehabilitation from the point of view of separating soil types. The correct soil types must be replaced in the areas from which they were originally removed. This is important as it relates to rehabilitated plants which may only grow in specific soil types. A horticultural specialist shall be brought in to over-see this task.
- A strict monitoring plan must be implemented to prevent the additional spread and the continued removal of alien species such as those of *Opuntia* species.

### Operational Phase

- The Contractor shall be held responsible for the removal of alien vegetation within the boundaries of the wind energy facility disturbed during construction in accordance with the appropriate methods developed by the Working for Water Programme, and advice from this organisation shall be obtained. This responsibility shall extend for the duration of the defects liability period.
- During operation, the clearing of alien plants within the area is required to control alien invasions. This is mandatory, according to current legislation.

## 7.16 Erosion Control Measures

### Particularly sensitive areas:

In all instances where the laying of electrical cables crosses watercourses, approval must be sought from Department of Water Affairs prior to commencing work.

According to the National Water Act, 1998 (Act 36 of 1998), the natural channels are regarded as watercourses. Therefore, the electric duct crossings (all of them) will constitute a water use in terms of this Act, for the following:

- Section 21 (c)- Impeding or diverting the flow of water in a watercourse; and
- Section 21 (i)-Altering the bed, banks, course or characteristics of a watercourse.

These crossings will have an impact on the watercourse (bed & banks) so an authorization is needed.

The following areas should also be regarded as being of high erosion risk:

- Slopes > 20°.
- Slopes with convergent sub-surface drainage (percolines).
- Road culverts.
- Cut and fill slopes in areas of slope instability or erodable geology.

The above areas, particularly steep cut and fill slopes in soft or erodable material, will require appropriate erosion control measures (e.g. use of gabions) and appropriate re-vegetation methods as listed below.

### **Construction Phase**

- The removal of the natural vegetation cover must be avoided and where this cannot be done, minimised.
- Agricultural drainage methods must be used in fill materials to remove water that could trigger slumping.
- Perched water tables must be identified early and adequate drainage for these trigger-points provided.
- The disturbance of the natural soil structure must be prevented and excavations planned carefully.
- The moving of heavy machinery into areas unnecessarily must be avoided.
- All fill material must be very well compacted and innovative use of geo-textile materials in the retention of soil fill areas made.
- Rainwater runoff from cut slopes must be prevented as far as possible.
- Sufficient storm water take off points must be created in such a way that water does not have an opportunity to gather momentum.
- Storm water ditches must contain structures that will reduce velocity of the run off.
- The use of vegetated swales must be investigated in less steep areas.
- Particular care must also be taken to ensure that no existing infrastructure such as water and sewerage reticulation lines is damaged during construction activities.
- Any cut surfaces must be vegetated as soon as possible using local indigenous materials.
- Only local indigenous vegetation shall be used for mulching.
- Submit method statement for approval regarding the trenching of electrical cables across water courses. Trenching only to occur once authorisation is granted from Department of Water Affairs.

### **Operational Phase**

The various protective measures that were installed during the construction phase must be properly maintained. Vegetation of road verges and cut faces must be inspected and maintained on a regular basis. This is particularly important on steep slopes.

Refer to the Topsoil and Rehabilitation Management Plan (Appendix H) for further details.

## 7.17 Fencing of the Construction Site

### Construction Phase

Appropriate fencing should be erected around the construction site during the construction process. The clearing of vegetation for fencing shall be limited to the removal of trees and shrubs within 1m of the fence line within the construction area. Where possible, the fence line must be aligned to retain indigenous trees or tree groups. There shall be no removal of grass or topsoil within this width except for rehabilitation purposes. Any existing fences damaged during construction activities shall be repaired immediately.

The Contractor shall ensure that all identified highly sensitive habitats are protected by demarcated no-go areas through fencing or other suitable means. In areas which need fencing; the fences should have enough space between wires for small animals to move across them uninhibited.

## 7.18 Pedestrian and Traffic Safety

### Construction Phase

- As mentioned in Section 7.17 above, during construction the site shall be fenced off to prevent access.
- Fencing shall be inspected weekly and maintained properly, by the Contractor, until construction is complete.
- The Contractor shall ensure that signage, which should be pictorial and in the vernacular, is erected on all boundary fences warning against entering the construction area.
- Public awareness programmes shall be developed by the Contractor with the community to identify areas of particular risk and approaches to reduce risk.
- Traffic calming and speed control measures for access to construction sites must be implemented in consultation with the local authorities.

Refer to the Traffic Management Plan (Appendix J) for further details.

## 7.19 Health Risks and traffic generated pollutants

### Construction Phase

- During construction all vehicles and construction machinery should be maintained to a standard that minimises pollutants.

### Operational Phase

- Levels of air pollution must be regularly monitored;

## 7.20 Access Requirements

### Construction Phase

No access/haul roads other than those required for construction purposes shall be developed. As far as possible, existing roads shall be used for access/haulage purposes. All new temporary access/haul roads as approved by DEA shall also be approved by the Contractor in consultation with the ESO and ECO. Prior to the construction of new access/haul roads, topsoil shall be stripped and stockpiled as discussed under Section 7.8 above. All temporary roads no longer required shall be decommissioned and the land rehabilitated as described under Section 7.3 above.

## Operational Phase

All access requirements must be identified and detailed by the Contractor. Communities, landowners and/or developers within the turbine site will be required to apply for access to the turbines from the Contractor. The Contractor must consider each application and consult with each applicant in this regard.

### 7.21 Landscape and Visual

#### **The development will be highly visible:**

- Residents of Cookhouse and its suburbs – Highly sensitive to changes in their views.
- Residents on surrounding farms – Highly sensitive
- Scenic viewpoints and protected areas – low/no sensitivity
- Motorists – low-medium sensitivity

- The Contractor shall ensure that construction camps are located inconspicuously in the landscape to reduce visual impact severity. This will include placing construction camps in already disturbed landscapes in close proximity to the construction area. In addition, construction camps shall be made of temporary structures that can be moved easily, and will not be placed on ridges, elevated slopes and open landscapes.
- The Contractor shall ensure that construction activities are expedited in the construction phase reducing the temporal scale thereby reducing the visual exposure time.
- The Contractor shall place construction camps, stock piles and associated activities within the construction site or on previously disturbed sites where-ever possible to reduce extensive landscape impacts that can lead to a general depletion of the overall landscape character.
- The Contractor shall ensure that construction camp establishment avoids landscape modifications like tree cutting, grading and levelling of the landscape.
- The Contractor shall write design and placement guidelines for structures and infrastructure i.e. signage, communication, lighting etc. for approval by the ECO and these must consider:
  - Use of appropriate materials;
  - Massing, i.e. cluster activities where possible;
- The Contractor shall ensure the establishment of appropriate setbacks/buffers from adjacent sensitive land uses, especially residential and tourism;
- The Contractor with the approval of the Site Manager acting for Amstilite shall ensure that building structure has modest scale, height and form of simple rectangular nature;
- Erosion risks should be assessed and minimised as erosion scarring can create areas of strong contrast which can be seen from long distances;
- Laydown areas and stockyards should be located in low visibility areas (e.g. valley between the ridges) and existing vegetation should be used to screen them from views;
- Night lighting of the construction sites should be minimised within requirements of safety and efficiency;
- Signs near wind turbines should be avoided unless they serve to inform the public about wind turbines and their function. Advertising billboards should be avoided.
- According to the Aviation Act, 1962, Thirteenth Amendment of the Civil Aviation Regulations, 1997: "*Wind turbines shall be painted bright white to provide maximum daytime conspicuousness. The colours grey, blue and darker shades of white should be avoided altogether. If such colours are to be used, then wind turbines shall be supplemented with daytime lighting, as required.*"
- Lighting should be designed to minimise light pollution without compromising safety. Investigate using motion sensitive lights for security lighting. Turbines are to be lit according to Civil Aviation regulations.
- Trees are an effective measure against shadow flicker and if residents are willing, trees can be planted to reduce flickering.

## 7.22 Employment

Without compromising construction and operation activities and schedules, local labour should be employed as far as possible. Those successful in obtaining employment should be provided with the appropriate skills development and training. This is consistent with Amstilite (RF) Proprietary Limited's current plans.

The facilitation strategy has been developed to provide a framework for the Contractor and Amstilite (RF) Proprietary Limited to effectively facilitate the implementation of the project in a manner that creates opportunities for the intended beneficiaries to be actively involved in the project. The strategy to be adopted should be in line with and guided by the objectives and policies of National Government.

The social dynamics of the Cookhouse community should be taken into consideration in the formulation of a facilitation strategy. For example, in an area where the traditional authorities are dominant, the strategy should be to influence them to engage other community structures. This should be done in a manner that would assure them that their authority is not eroded yet the rest of the community does not feel marginalized.

The project should involve all the communities in the vicinity of the project to ensure full participation in the project. The facilitation of employment in the areas should be done in consultation with their Tribal Authorities, Ward Committees, Councillors, Municipalities and other development committees in the area.

Typically, this approach would involve the following steps:

- **Step One: Appointment of a Co-ordinating Social Facilitator**  
The Co-ordinating Social Facilitator (CSF) will be responsible for all the social components of the project, including the setting up of Project Steering Committees (PSC) the rest of the other structures and systems that will be required for the project. The CSF will manage and monitor the work of the various PSCs and oversee the recruitment, appointment and training of the Community Liaison Officers (CLO).
- **Step Two: Establishment of Project Steering Committees and Labour and Employment Desks:**  
The PSC will essentially be the link between the Project Team and the Local Community. The PSC, together with the CSF and the CLO will be responsible for the development of a labour pool. It is with this labour pool where local labour will be recruited. The PSC through a labour desk will be intricately involved in the recruitment process and will monitor the performance of local labourers.
- **Step Three: Appointment of Community Liaison Officers:**  
The CLO will be on the ground and basically do the day-to-day and week-to-week monitoring of labour in conjunction with the site agent and the Contractor. Both the PSC and the CLO will be responsible, answerable and accountable to the CSF.

Refer to the Grievance Mechanism (Appendix G).

## 8 CONCLUSIONS

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

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

## ANNEXURE A: CONDITIONS OF ENVIRONMENTAL AUTHORISATION

**Table A.1: All conditions of the Environmental Authorisation dated 5 April 2011**

Section	Description	Comment	Status
<b>Section 3: Management of the activity</b>			
3.1	Update the EMPr with the mitigation measures listed in the Final EIR of October 2010. Resubmit this to the DEA for approval.	All mitigation measures listed in the FEIR of October 2010 have been incorporated into this EMPr.	Complete
<b>Section 4: Monitoring</b>			
4.1	The applicant must appoint a suitably experienced independent Environmental Control Officer (ECO) for the construction phase of the development that will have the responsibility to ensure that the mitigation/rehabilitation measures and recommendations referred to in this authorisation are implemented and to ensure compliance with the provisions of the EMPR.	An ECO will be appointed for the construction phase.	Pending
4.2	The ECO shall be appointed before commencement of any authorised activity/ies.	ECO will be appointed prior to authorised activities being undertaken.	Pending
4.3	Once appointed, the name and contact details of the ECO must be submitted to the Director: Compliance Monitoring of the Department.	ECO contact details to be submitted to DEA.	Pending
4.4	The ECO shall keep record of all activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken by the ECO.	ECO duties noted.	Pending
4.5	A detailed incident (including spillage of bitumen, fuels, chemicals, or any other material) and complaint register must be kept on site indicating how these issues were addressed, what rehabilitation measures were taken and what preventative measures were implemented to avoid re-occurrence of incidents/complaints.	ECO duties noted.	Pending
4.6	In addition the ECO must maintain the following on site: - A daily site diary - Copies of all reports submitted to the Department - A schedule of current site activities including the monitoring of such activities.	ECO duties noted.	Pending
4.7	The ECO shall remain employed until all rehabilitation measures, as required for implementation due to construction damage, are completed and the site is ready for operation.	ECO duties noted.	Pending
4.8	Records relating to monitoring and auditing must be kept on site and made available for inspection to any relevant and competent authority in respect of this development.	ECO duties noted.	Pending
<b>Section 5: Recording and reporting to the Department</b>			
5.1	All documentation e.g. audit/monitoring/compliance reports and notifications, required to be submitted to the Department in terms of this authorisation, must be submitted to the Director: Compliance Monitoring at the Department.	ECO duties noted.	Pending
5.2	The holder of the authorisation must submit an environmental audit report to this Department upon completion of the construction and rehabilitation activities.	ECO / authorisation holder duties noted.	Pending
5.3	The environmental audit report must: 5.3.1 Be conducted by an independent environmental auditor; 5.3.2 Indicate the date of the audit, the name of the auditor and the outcome of the audit; 5.3.3 Evaluate compliance with the requirements of the approved EMPR and EA; 5.3.4 Include measures to be implemented to attend to any non-compliances or degradation noted; 5.3.5 Include copies of any approvals granted by other authorities relevant to the development for the reporting period; and 5.3.6 Highlight any outstanding environmental issues that must be addressed, along with recommendations for ensuring these issues are appropriately addressed.	Authorisation holder duties noted.	Pending
5.4	The audit report must be submitted prior to commencement of the operation phase of the project.	Authorisation holder duties noted.	Pending
<b>Section 6: Commencement of the activity</b>			
6.1	The authorised activities shall not commence within thirty (30) days of the date of signature of the authorisation.	Environmental Authorisation was granted in 2011.	Complete
6.2	The applicant must obtain a Water Use Licence Authorisation (WULA) from DWS prior to commencement of the project.	A Water Use License Application for Section (c) and (i) water uses was submitted to the Department of Water and Sanitation in Port Elizabeth in August 2015.	Pending
6.3	Pre-construction monitoring must be undertaken in order to inform the positioning of turbines.	12 months of bat monitoring was conducted between October 2011 and December 2012.  12 months of bird monitoring was completed in October 2012.	Complete
6.4	The applicant must submit a final layout plan for the entire WEF to the Department prior to commencement of construction activities. The layout plan must indicate: • Turbine positions;	Final layout plan will be submitted to the Department of Environmental Affairs in the fourth quarter of 2015.	Pending

	<ul style="list-style-type: none"> <li>• Foundation footprint;</li> <li>• Permanent laydown area footprint;</li> <li>• Construction period laydown area footprint;</li> <li>• Internal roads indicating width (construction and operation phase width) with numbered sections between site elements that they serve (to make commenting on sections possible);</li> <li>• Wetlands, drainage lines, rivers, streams and water crossing of roads and cables indicating the type of bridging structures that will be used;</li> <li>• Heritage sites that will be affected;</li> <li>• Substations and transformer sites including their entire footprint;</li> <li>• Cable routes and trench dimensions;</li> <li>• Connection routes to the distribution/transmission network;</li> <li>• Cut and fill areas at turbine sites, along roads and at substation/transformer sites indicating the expected volume of each cut and fill;</li> <li>• Borrow pits;</li> <li>• Spoil heaps (temporary for topsoil and subsoil and permanent for excess material);</li> <li>• Buildings including accommodation;</li> <li>• All no-go areas.</li> </ul>		
6.5	Botanical and faunal specialist must ground-truth final layout and their recommendations must form part of the final layout plan and Amended EMPr to be submitted to the Department (Point 3.1).	Ground-truthing undertaken in August 2015.  The botanical ground-truthing report states that turbines 7, 23, 41, 47 and 48 are located on or near rocky outcrops which are ecologically sensitive. It is recommended that the position of these hardstands are shifted slightly so as to avoid these areas.  Construction of the proposed road and underground cable should avoid the identified rocky outcrop that occurs between turbines 22 and 23. It is recommended that this is realigned.	Complete
6.6	A geotechnical assessment report proving the facility will be structurally sound must be submitted to DEA prior to commencement of construction activities on site.	A geotechnical study of the site was completed in April 2011. The results are positive.	Complete
6.7	The authorised activities must not commence before a connection and use of system agreement is obtained from Eskom Holdings Limited.	An agreement with Eskom is in place.	Complete
6.8	An appeal under section 43 of the National Environmental Management Act (NEMA), Act 107 of 1998 (as amended), does not suspend an environmental authorisation or exemption, or any provisions or conditions attached thereto, or any directive, unless the Minister, MEC or delegated organ of state directs otherwise.	Noted.	N/A
<b>Section 7: Notification to authorities</b>			
7.1	Fourteen (14) days written notice must be given to the Department that the activity will commence. Commencement for the purposes of this condition includes site preparation. The notice must include a date on which it is anticipated that the activity will commence. This notification period may coincide with the period contemplated in 6.1 above	ECO duties noted.	Pending
<b>Section 8: Operation of the activity</b>			
8.1	Fourteen (14) days written notice must be given to the Department that the activity operational phase will commence.	ECO / authorisation holder duties noted.	Pending
8.2	The applicant must compile an operational EMPR for the operations phase and submit it to the department for approval before commencement of the operational phase of the activity.	This will be compiled by the ECO during the operations phase.	Pending
8.3	The holder of this authorisation must appoint an Environmental Officer (EO) for the operational phase of the project to monitor all operational activities as part of the EMPR.	Authorisation holder duties noted.	Pending
<b>Section 9: Site closure and decommissioning</b>			
9.1	Should the activity ever cease or become redundant, the applicant shall undertake the required actions as prescribed by legislation at the time and comply with all relevant legal requirements administered by any relevant and competent authority at that time.	Authorisation holder duties noted.	N/A
<b>Section 10.1: Avifauna and bats</b>			
10.1.1.	An avifaunal specific EMPR must be completed by a suitably qualified person to further refine the mitigation once all the turbine positions have been finalised.	Avifauna ground-truthing and pre-construction monitoring completed. Recommendations for construction and operation phases in those reports.	Complete
10.1.2.	A bird monitoring programme must be implemented to document the effect of the operation of the wind energy facility on avifauna and bats. This should commence prior to construction (to provide a benchmark) and continue during operation.	Pre-construction bird monitoring completed. Operations phase bird monitoring will be undertaken.	Ongoing

10.1.3.	The results of the pre-construction bird monitoring programme must inform the final layout and the construction schedule of the wind energy facility.	Pre-construction bird monitoring has been completed. Avifauna ground-truthing of the final site footprint has been completed.	Complete
10.1.4.	Turbines must be placed at least 300 m apart to avoid bird collisions.	Turbines are 300m apart.	Complete
10.1.5.	Reports regarding bird monitoring must be submitted to BirdLife South Africa, the Endangered Wildlife Trust (EWT), CapeNature and this Department on a quarterly basis.	ECO duties noted.	Pending
10.1.6.	Ultrasound broadcast must be used to deter bats and birds from flying into wind turbines.	This will only be implemented if recommended by the specialists.	Not implemented
10.1.7	Wind turbines operating times must be restricted during times when bat activity is high or they must be programmed to switch off under specific conditions prone to bird collision such as during low wind.	This will be implemented if recommended by the specialists and agreed to by the developer.	Pending
10.1.8	The applicant must implement, in collaboration with all project proponents for the respective wind farms in Cookhouse and a suitable qualified avifauna specialist, an active long-term bird monitoring programme in order to understand the nature of impacts on avifauna due to wind energy facilities on the site.	ECO duties noted.	Pending
10.1.9	If high bird mortalities are recorded, the applicant must investigate emitting broadcasts for a certain radio frequency to discourage birds from entering high collision areas.	This will only be implemented if recommended by the specialist.	Pending
10.1.10	The baseline data collected and documented during the survey must be shared with the EWT and Birdlife South Africa for a better understanding of the distribution or breeding behaviour of any of the priority species listed in the EIR dated October 2010.	Bird and bat pre-construction monitoring were sent to all relevant authorities.	Pending
10.1.11	Habitat destruction must be kept to an absolute minimum by keeping the lay-down areas as small as possible, reducing the number and size/length of roads and reducing the final extent of the developed area.	ECO duties noted.	Pending
10.1.12	Anti-collision devices such as bird flappers must be installed where power lines cross avifaunal corridors. The input of an avifaunal specialist must be obtained for the fitting of the anti-collision devices onto specific sections of the line once the exact positions of the towers have been surveyed and pegged.	Ground-truthing by an avifaunal specialist has been completed. Recommendations for construction and operation phase will be implemented.	Complete
10.1.13	The applicant must ensure that lighting on the turbines is kept to a minimum, and is coloured red and intermittent, rather than permanent and white, to reduce confusion effects for nocturnal migrants. Night time wind turbine obstruction lighting must consist of medium intensity type B aviation red flashing lights. Minimum intensities of 200 candela for night-time red flashing or strobe lights are required.	ECO duties noted.	Pending
10.1.14	The facility must be designed to discourage their use as perching or nesting substrates by birds.	ECO duties noted.	Pending
<b>Section 10.2: Vegetation, wetlands and water resources</b>			
10.2.1	All Species of Special Concern (SCC) must be identified and every effort must be made to rescue them.	Botanical ground-truthing completed in August 2015. SCC on site have been identified. Permits for their removal will be obtained.	Pending
10.2.2	Critical available biodiversity information must be consulted for the final placement of turbines and infrastructure.	Sensitive areas have been identified with ground-truthing studies and final layout will be cognisant of sensitive areas identified.	Complete
10.2.3	The applicant must ensure that a continuous monitoring and removal of alien plant species such as those of Puntia and Agave species is implemented, as well as careful monitoring of the state of the landscape with the Eastern Cape Biodiversity Conservation Plan (ECBCP) land use planning principles.	ECO duties noted.	Pending
10.2.4	Vegetation clearing must be kept to an absolute minimum. Mitigation measures must be implemented to reduce the risk of erosion and the invasion of alien species.	ECO duties noted.	Pending
10.2.5	A "Plant rescue and protection plan" which allows for the maximum transplant of conservation important species from areas to be transformed must be compiled by a vegetation specialist familiar with the site in consultation with the ECO. This plan must be implemented prior to commencement of the construction phase.	ECO will be responsible for transplanting species identified in the botanical ground-truthing report.	Pending
10.2.6	Before clearing of the site, the appropriate permits must be obtained from the Department of Agriculture Forestry and Fisheries (DAFF) for the removal of plants listed in the National Forest Act and from the Eastern Cape Department of Economic Development and Environmental Affairs (DEDEA) for the destruction of species protected in terms of the Provincial Nature Conservation Ordinance (PNCO) Schedule 4. Copies of the permits must be submitted to the Department for record keeping.	Coastal and Environmental Services will prepare and submit the relevant permits.	Pending
10.2.7	Construction activities must be restricted to demarcated areas to restrict impact on vegetation and animals.	ECO duties noted.	Pending
10.2.8	A comprehensive habitat rehabilitation plan must be developed for the site. Restoration must be undertaken as soon as possible after completion of construction activities to reduce the amount of habitat converted at any one time and to speed up the recovery of natural habitats.	A site rehabilitation plan has been prepared, which will be implemented by the ECO.	Complete
10.2.9	All areas of disturbed soil must be reclaimed using only indigenous grass and shrubs. Reclamation activities should be undertaken as early as possible on disturbed areas.	Rehabilitation will be undertaken according to the rehabilitation plan and will be implemented by the ECO.	Pending
10.2.10	All electrical collector lines must be buried in a manner that minimizes additional surface disturbance.	Internal cables between the turbines and project substation will be buried. A 132 kV overhead line will connect the project substation to the Kopleegte substation.	Pending
10.2.11	Topsoil from all excavations and construction activities must be salvaged and reapplied during reclamation.	A site rehabilitation plan has been prepared, which will be implemented by the ECO.	Pending

10.2.12	The applicant is required to inform the relevant provincial department and/or this Department should the removal of protected species, medicinal plants and "data deficient" plant species be required.	Permits for SCC removal will be submitted.	Pending
10.2.13	All hard infrastructures should be located within existing areas of low sensitivity, as far as possible.	Final layout plan is cognisant of sensitive areas.	Complete
10.2.14	All turbine and infrastructure must be located at least 100m from the edge of any high sensitive areas.	Final layout plan is cognisant of sensitive areas.	Complete
10.2.15	No exotic plants may be used for rehabilitation purposes; only indigenous plants of the area may be utilised.	A site rehabilitation plan has been prepared, which will be implemented by the ECO.	Pending
10.2.16	No activities will be allowed to encroach into a water resource without a water use authorisation being in place from the Department of Water Affairs.	WULA submitted to DWS in August 2015.	Pending
10.2.17	Where infrastructure is to be located close to watercourses, water quality monitoring must be done on a regular basis. The frequency to be agreed with the Department of Water Affairs.	ECO duties noted.	Pending
10.2.18	Appropriate erosion mitigation must be implemented to prevent any potential erosion.	ECO duties noted.	Pending
<b>Section 10.3: Visual resources</b>			
10.3.1	The applicant must ensure to reduce visual impacts during construction by minimising areas of surface disturbance, controlling erosion, using dust suppression techniques, and restoring exposed solid as closely as possible to their original contour and vegetation.	ECO duties noted.	Pending
10.3.2	A lighting engineer must be consulted to assist in the planning and placement of light fixtures in order to reduce visual impacts associated with glare and light trespass.	Specialists install and commission the turbines. ECO will work closely with them in this regard.	Pending
10.3.3	Commercial messages and graffiti on turbines must be avoided.	ECO duties noted.	Pending
10.3.4	The lighting and markings of the wind energy facility must comply with the requirements of the Civil Aviation Authority.	ECO duties noted.	Pending
10.3.5	Construction activities must be restricted to daylight hours in order to negate or reduce visual impacts associated with lighting.	ECO duties noted.	Pending
10.3.6	To reduce the effects of motion smear, rotor blades should either be painted with black stripes across the blade, in different positions on each blade, or a single solid black blade with two solid white blades.	This mitigation measure is highly unusual. Is unlikely to be implemented.	Not implemented
10.3.7	Wind turbines must be painted bright white to provide the maximum daytime conspicuousness.	This is the standard colour for wind turbines.	Pending
<b>Section 10.4: Air emissions</b>			
10.4.1	Dust abatement techniques must be used before and during surface clearing, excavation, or blasting activities.	ECO duties noted.	Pending
10.4.2	Appropriate dust suppression technique must be implemented on all exposed surfaces during periods of high wind. Such measures must include wet suppression, chemical stabilisation use of wind fence covering surfaces with straw chippings and re-vegetation of open areas.	ECO duties noted.	Pending
<b>Section 10.5: Roads and ground transportation</b>			
10.5.1	Existing road infrastructure must be used as far as possible for providing access to the proposed turbine positions. Where no road infrastructure exists, new roads should be placed within existing disturbed areas or environmental conditions must be taken into account to ensure the minimum amount of damage is caused to natural habitats.	Infrastructure has been planned to limit the project footprint.	Complete
10.5.2	Road alignments must be planned in such a way that the minimum of cut and fill operations are required	Infrastructure has been planned to limit the project footprint.	Complete
10.5.3	A transportation plan must be developed, particularly for the transport of turbine components, main assembly cranes and other large pieces of equipment. A permit must be obtained from the relevant transport department for the transportation of all components (abnormal loads) to the sites.	See Section 7.22 of EMPr.	Complete
10.5.4	A traffic management plan must be prepared for the site access roads to ensure that no hazards would results from the increased truck traffic and that traffic flow would not be adversely impacted.	See Section 7.18 of EMPr.	Complete
10.5.5	Signs must be placed along construction roads to identify speed limits, travel restrictions, and other standard traffic control information. To minimize impacts on local commuters, consideration should be given to limiting construction vehicles travelling on public roadways during the morning and late afternoon commute time.	ECO duties noted.	Pending
10.5.6	Roads must be designed so that changes to surface water runoff are avoided and erosion is not initiated.	Civil engineers in consultation with the ECO to implement.	Pending
10.5.7	A designated access to the site must be created and clearly marked to ensure safe entry and exit.	Civil engineers in consultation with the ECO to implement.	Pending
10.5.8	Signage must be erected at appropriate points warning of turning traffic and the construction site.	ECO duties noted.	Pending
10.5.9	Internal access roads must be located away from drainage bottoms and avoid wetlands, if feasible.	Infrastructure has been planned accordingly.	Complete
10.5.10	Internal access roads must be located to minimize stream crossings. All structures crossing streams must be located and constructed so that they do not decrease channel stability or increase water velocity.	Civil engineers in consultation with the ECO to implement.	Pending
10.5.11	Existing drainage must not be altered, especially in sensitive areas.	Some drainage lines will be crossed by project roads, but their drainage characteristics will not altered. A WULA has been submitted to DWS.	Pending
<b>Section 10.6: Noise</b>			
10.6.1	The applicant must ensure that all equipment and machinery are well maintained and equipped with silencers.	ECO duties noted.	Pending
<b>Section 10.7: Historical / palaeontological resources</b>			

10.7.1	Prior to commencement of construction activities, a thorough palaeontological field survey of natural and already existing, artificial bedrock exposures within the study region as a whole must be undertaken by a qualified palaeontologist, to identify specific areas, zones or horizons of high palaeontological sensitivity on the ground that may warrant further specialist mitigation.	A Palaeontological field study was conducted in 2010. The final layout has been assessed by the specialist who conducted that study, John Almond of NaturaViva, stating that the final layout is suitable from a Palaeontological perspective.	Pending
10.7.2	Should any graves be found, all construction activities must be suspended and an archaeologist be immediately contacted. The discovered graves must be cordoned off.	ECO duties noted.	Pending
10.7.3	If there are any changes to the layout of the turbines, then additional survey work will be required in order to ensure that no sites are directly impacted and/or to identify the need for an excavation permit.	A Heritage walk-through was conducted in Q4 2015 to assess the final footprint of the project infrastructure.	Pending
<b>Section 10.8: Hazardous materials and waste management</b>			
10.8.1	Areas around fuel tanks must be bunded or contained in an appropriate manner as per the requirements of SABS 089:1999 Part 1.	ECO duties noted.	Pending
10.8.2	Leakage of fuel must be avoided at all times and if spillage occurs, it must be remedied immediately.	ECO duties noted.	Pending
10.8.3	Hazardous waste such as bitumen, oils, oily rags, paint tins etc must be disposed of at an approved hazardous waste landfill site.	ECO duties noted.	Pending
10.8.4	During the construction phase of the development, an effective monitoring system must be put in place to detect any leakage or spillage of all hazardous substances during their transportation, handling, installation and storage. The applicant must ensure that precautionary measures to limit the possibility of oil and other toxic liquids from entering the soil or storm water system are in place.	ECO duties noted.	Pending
10.8.5	Streams, river, pans, wetlands, dams and their catchments must be protected from erosion, direct or indirect spillage of pollutants.	Infrastructure has been designed to avoid drainage lines as much as possible.	Pending
10.8.6	No dumping or temporary storage of any materials may take place outside designated and demarcated laydown areas, and these must all be located within areas of low environmental sensitivity.	ECO duties noted.	Pending
10.8.7	Hazardous substances must not be stored where there could be accidental leakage into surface or subterranean water.	ECO duties noted.	Pending
10.8.8	The applicant must ensure that an effective monitoring system is put in place to detect any leakage or spillage of all hazardous substances.	ECO duties noted.	Pending
10.8.9	Hazardous and flammable substances must be stored and used in compliance to the applicable regulations and safety instructions. Furthermore no chemicals must be stored nor any vehicle maintenance must occur within 350 m of the temporal zone of wetlands, whether a drainage line with or without an extensive floodplain or hillside wetlands.	ECO duties noted.	Pending
10.8.10	Temporary bunds must be constructed around chemical storage to contain possible spills.	ECO duties noted.	Pending
10.8.11	Spill kits must be made available on-site for the clean-up of spills.	ECO duties noted.	Pending
10.8.12	An integrated waste management approach must be implemented that is based on waste minimisation and must incorporate reduction, recycling, re-use and disposal where appropriate. Any solid waste shall be disposed of at a landfill licensed in terms of section 20 (b) of the National Environment Management Waste Act, 2008 (Act No.59 of 2008).	The Waste Management Plan written for the project will be implemented by the ECO.	Complete
10.8.13	Temporary ablution facilities must be provided for staff at all times during the construction phase. The ablutions must be cleaned regularly with associated waste being disposed of at a registered/permited waste site and must be removed from the site when construction phase is completed.	ECO duties noted.	Pending
<b>Section 10.9: Storm water management</b>			
10.9.1	A comprehensive storm water management plan must be developed and implemented to control storm water and runoff water on the site and prevent off-site migration of contaminated storm water or increased soil erosion. This plan should form part of the EMPR.	A Storm Water Management Plan has been written for the project. It will be implemented by the ECO.	Complete
10.10	Construction must include appropriate design measures that allow surface and subsurface movement of water along drainage lines so as not to impede natural surface and subsurface flows. Drainage measures must promote the dissipation of storm water run-off.	A Storm Water Management Plan has been written for the project. It will be implemented by the ECO.	Pending
<b>Section 10.11: Human health and safety</b>			
10.11.1	A health and safety programme must be developed to protect both workers and the general public during construction, operation and decommissioning of the wind energy facility. The programme must establish a safety zone for wind turbine generator from residences and occupied buildings, roads, right-of-ways, and other public access areas that is sufficient to prevent accidents resulting from the operation if wind turbine generators.	To be implemented by the ECO and the contractor's Health and Safety officer.	Pending
10.11.2	No temporary site camps will be allowed outside the footprint of the development area as the establishment of such structures might trigger a listed activity as defined in the NEMA Regulations, Government Notice 386 and 387 of 2006.	ECO duties noted.	Pending
10.11.3	Potential fire hazards must be managed by ensuring that no fire are permitted on site and that the constructors must be aware of the consequences of starting fire on site to avoid damage to the neighbouring farms.	ECO to monitor that no fires are lit irresponsibly.	Pending
10.11.4	Potentials interference with public safety communication systems (e.g. radio traffic related to emergency activities) must be avoided.	ECO duties noted.	Pending
10.11.5	The applicant must ensure that the operation of the wind facility has minimal electromagnetic interference (EMI) (i.e. impacts to microwave, radio and television transmissions) and should comply with the relevant communication regulation.	Authorisation Holder duties noted.	Pending

10.11.6	The applicant must obtain a written permit or approval from the South Africa Civil Aviation Authority that the wind facility will not interfere with the performance of aerodrome radio Communication, Navigation and Surveillance (CNS) equipment especially the radar prior to commencement of the activity. The approval/permit must be submitted to the Director: Environmental Impact Evaluation.	The CAA approved the wind farm in a letter dated 14 October 2011. They do request submission of the final layout for final comment.	Complete
10.11.7	The applicant must train safety representatives, managers and workers in workplace safety. The construction process must be compliant with all safety and health measures as prescribed by the relevant act.	Contractor's Health and Safety officer will implement a safety induction programme.	Pending
10.11.8	Liaison with land owners/farm managers is to be done prior to construction in order to provide sufficient time for them to plan agricultural activities. If possible, construction should be scheduled to take place within the post-harvest, pre planting season, when fields are lying fallow.	ECO duties noted.	Pending
<b>Section 10.12: Excavation and blasting activities</b>			
10.12.1	Underground cables and internal access roads must be aligned as much as possible along existing infrastructure to limit damage to vegetation and watercourses.	Ground-truthing has been conducted and project footprint is suitable. Botanical ground-truthing recommends minor realignment of certain turbines.	Complete
10.12.2	Foundations and trenches must be backfilled with originally excavated materials- as much as possible. Excess excavation materials must be disposed of only in approved areas or, if suitable, stockpiled for use in reclamation activities.	ECO duties noted.	Pending
10.12.3	Borrow materials must be obtained only from authorized and permitted sites.	ECO duties noted.	Pending
10.12.4	Anti-erosion measures such as silt fences must be installed in disturbed areas.	ECO duties noted.	Pending
<b>Section 10.13: Overhead power line</b>			
10.13.1	A walk-through survey of the final survey power line corridor must be undertaken by a botanical specialist, an ornithologist and a heritage specialist to identify areas where mitigation may be required.	Botanical - conducted 11 to 21 August 2015 Avifauna - conducted 11 to 14 August 2015 Heritage – conducted September 2015	Complete
10.13.2	All sections of the proposed power line passing over or in close proximity of grasslands, rivers, wetlands, and dams must be marked with suitable bird flight diverters in order to deter large birds from colliding with any power line, Additional areas of high sensitivity along the preferred alignment must be identified by an avifaunal specialist for the fitment of anti-collision devices according to Eskom Transmission Guidelines.	All sections to be marked by the ECO in accordance with the findings of the Avifauna ground-truthing.	Pending
10.13.3	A Search and Rescue (S&R) operation of all the Red Data as well as rare endangered plants must be undertaken on the exact spots selected on which the pylons will be erected by a suitable qualified botanist. All plants present must be survey and collected for documentation at South National Biodiversity Institute (SANBI) and particular species, especially those which are rare and threatened species are moved to nurseries for re-establishment after construction and/or relocated to protected areas.	To be implemented by the ECO according to the botanical ground-truthing study.	Pending
<b>Section 10.14: Turbines</b>			
10.14.1	Turbines must be positioned in such a way that they are at least 500m away from farm complexes, most of which have moderate degree of heritage significance.	The final facility design complies with this condition.	Complete
10.14.2	Turbines must be positioned in such a way that shadow flicker does not affect any farm complexes.	The final facility design complies with this condition.	Complete
10.14.3	The applicant must ensure that the placement of turbine on ridges is avoided.	The final facility design complies with this condition.	Complete
10.14.4	Facility and infrastructure must not be placed at any slope that is steeper than 18%, preferable be placed on the crest landscape.	The final facility design complies with this condition.	Complete
10.14.5	Wind turbines and associated laydown areas and access roads which could potentially impact on sensitive areas must be shifted in order to avoid these areas of high sensitivity.	The final facility design complies with this condition. Ground-truthing has been conducted to confirm this.	Complete
<b>Section 11: General</b>			
11.1	A copy of this authorisation must be kept at the property where the activity/ies will be undertaken. The authorisation must be produced to any authorised official of the Department who requests to see it and must be made available for inspection by any employee or agent of the holder of the authorisation who works or undertakes work at the property.	ECO duties noted.	Pending
11.2	Where any of the applicant's contact details change, including the name of the responsible person, the physical or postal address and/or telephonic details, the applicant must notify the Department as soon as the new details become known to the applicant.	Authorisation holder's duties noted.	N/A
11.3	The holder of the authorisation must notify the Department, in writing and within 48 (forty eight) hours, if any condition of this authorisation cannot be or is not adhered to. Any notification in terms of this condition must be accompanied by reasons for the non-compliance. Non-compliance with a condition of this authorisation may result in criminal prosecution or other actions provided for in the National Environmental Management Act, 1998 and the regulations.	The implementation of condition 10.3.6 is unlikely. The ECO will notify the Department thereof.	N/A
11.4	National government, provincial government, local authorities or committees appointed in terms of the conditions of this authorisation or any other public authority shall not be held responsible for any damages or losses suffered by the applicant or his successor in title in any instance where construction or operation subsequent to construction be temporarily or permanently stopped for reasons of non-compliance by the applicant with the conditions of authorisation as set out in this document or any other subsequent document emanating from these conditions of authorisation.	Noted.	N/A

**Table A.2: All conditions listed in the Decision on appeal, 29 November 2012**

Section	Description	Comment	Status
<b>Section 6: Commencement of the activity</b>			
6.9	The applicant must compile a socio-economic report with the specific programmes and project for the entire life of the proposed development that will benefit the community.	A socio-economic plan has been complied.	Complete
6.10	The applicant must submit the socio-economic report with the specific programmes and projects and the final layout of the entire wind energy facility to the registered I&APs and immediate communities in the vicinity of the site before they are submitted to the DEA for approval.	Public participation process for socio-economic plan to be undertaken in Q4 2015.	Pending

**ANNEXURE B: PROFORMA PROTECTION OF THE ENVIRONMENT**

**PRO FORMA**

Employer \_\_\_\_\_

Contract No \_\_\_\_\_

Contract title \_\_\_\_\_

**PROTECTION OF THE ENVIRONMENT**

The Contractor will not be given right of access to the site until this form has been signed.

I/ we \_\_\_\_\_ (Contractor) record  
as follows:

1. I/ we, the undersigned, do hereby declare that I/ we am/ are aware of the increasing requirement by society that construction activities shall be carried out with due regard to their impact on the environment.
2. In view of this requirement of society and a corresponding requirement by the Employer with regard to this Contract, I/ we will, in addition to complying with the letter of the terms of the Contract dealing with protection of the environment, also take into consideration the spirit of such requirements and will, in selecting appropriate employees, plant, materials and methods of construction, in so far as I/ we have the choice, include in the analysis not only the technical and economic (both financial and with regard to time) aspects but also the impact on the environment of the options. In this regard, I/ we recognise and accept the need to abide by the "precautionary principle" which aims to ensure the protection of the environment by the adoption of the most environmentally sensitive construction approach in the face of uncertainty with regard to the environmental implications of construction.
3. I/ we acknowledge and accept the right of \_\_\_\_\_ to deduct, should they so wish, from any amounts due to me/us, such amounts (hereinafter referred to as fines) as the Resident Engineer and Environmental Site Officer shall certify as being warranted in view of my/ our failure to comply with the terms of the Contract dealing with protection of the environment, subject to the following:
  - 3.1 The Resident Engineer and Environmental Officer, in determining the amount of such fine, shall take into account *inter alia*, the nature of the offence, the seriousness of its impact on the environment, the degree of prior compliance/non-compliance, the extent of the Contractor's overall compliance with environmental protection requirements and, in particular, the extent to which he considers it necessary to impose a sanction in order to eliminate/reduce future occurrences.
  - 3.2 The Resident Engineer and Environmental Officer shall, with respect to any fine imposed, provide me/ us with a written statement giving details of the offence, the facts on which the Resident Engineer and Environmental Officer has based his assessment and the terms of the Contract (by reference to the specific clause) which has been contravened.

Signed \_\_\_\_\_  
CONTRACTOR

Date \_\_\_\_\_

**TO BE SIGNED BY CONTRACTORS**

## ANNEXURE C: PROPOSED ENVIRONMENTAL EDUCATION COURSE

### WHAT IS THE ENVIRONMENT?

- Soil
- Water
- Plants
- People
- Animals
- Air we breathe
- Buildings, cars and houses



### WHY MUST WE LOOK AFTER THE ENVIRONMENT?

- It affects us all as well as future generations
- We have a right to a healthy environment
- A contract has been signed
- Disciplinary action (e.g. construction could stop or fines issued)

## HOW DO WE LOOK AFTER THE ENVIRONMENT?

- Report problems to your supervisor/ foreman
- Team work
- Follow the rules in the EMP



## WORKING AREAS

Workers & equipment must stay inside the site boundaries at all times



## RIVERS & STREAMS

- Do not swim in or drink from streams
- Do not throw oil, petrol, diesel, concrete or rubbish in the stream
- Do not work in the stream without direct instruction
- Do not damage the banks or vegetation of the stream



## ANIMALS

- Do not injure or kill any animals on the site
- Ask your supervisor or Contract's Manager to remove animals found on site



## TREES AND FLOWERS

- Do not damage or cut down any trees or plants without permission
- Do not pick flowers



## SMOKING AND FIRE

- Put cigarette butts in a rubbish bin
- Do not smoke near gas, paints or petrol
- Do not light any fires without permission
- Know the positions of fire fighting equipment
- Report all fires
- Do not burn rubbish or vegetation without permission



## PETROL, OIL AND DIESEL

- Work with petrol, oil & diesel in marked areas
- Report any petrol, oil & diesel leaks or spills to your supervisor
- Use a drip tray under vehicles & machinery
- Empty drip trays after rain & throw away where instructed



## DUST

Try to avoid producing dust -  
Use water to make ground & soil wet



## NOISE

- Do not make loud noises around the site, especially near schools and homes
- Report or repair noisy vehicles



## TOILETS

- Use the toilets provided
- Report full or leaking toilets



## EATING

- Only eat in demarcated eating areas
- Never eat near a river or stream
- Put packaging & leftover food into rubbish bins



## RUBBISH

- Do not litter - put all rubbish (especially cement bags) into the bins provided
- Report full bins to your supervisor
- The responsible person should empty bins regularly



## Emergency phone numbers

- **Know all the emergency numbers**
  - Ambulance
  - Fire
  - Police



## TRUCKS AND DRIVING

- Always keep to the speed limit
- Drivers - check & report leaks and vehicles that belch smoke
- Ensure loads are secure & do not spill



## Fines and penalties

- **Spot fines may be issued**
- **Your company may be fined**
- **Removal from site**
- **Construction may be stopped**



## PROBLEMS - WHAT TO DO!

- **Report any breaks, floods, fires, leaks and injuries to your supervisor**
- **Ask questions!**







# ANNEXURE F: DECOMMISSIONING AND CLOSURE MANAGEMENT PLAN

# DECOMMISSIONING & CLOSURE ENVIRONMENTAL MANAGEMENT PROGRAMME

## Golden Valley I Wind Energy Facility

DEA REFERENCE NUMBER: 12/12/20/1717/AM8

<p>Prepared for:</p> 	<p>Prepared by:</p> 
<p><b>BioTherm Energy</b></p>	<p><b>EOH</b> Coastal &amp; Environmental Services</p>
<p>Building 1 Design Quarter Fourways 2055</p>	<p>P.O. Box 8145 East London</p>
<p>South Africa</p>	<p>South Africa</p>

September 2015

## TABLE OF CONTENTS

<b>1</b>	<b>INTRODUCTION.....</b>	<b>1</b>
1.1	Objectives of a DEMPr .....	1
1.2	Form & function of a DEMPR.....	2
1.3	Legal requirements.....	3
1.4	Environmental Authorisation .....	3
<b>2</b>	<b>DETAILS OF THE ENVIRONMENTAL ASSESSMENT TEAM.....</b>	<b>5</b>
<b>3</b>	<b>PROPOSED ACTIVITY.....</b>	<b>7</b>
3.1	Description of proposed activity .....	7
<b>4</b>	<b>SCOPE OF THE DEMPR.....</b>	<b>10</b>
<b>5</b>	<b>MITIGATION AND/OR MANAGEMENT MEASURES .....</b>	<b>11</b>
5.1	Wind turbines .....	11
5.2	Electrical Transformers.....	12
5.3	Underground cabling and overhead powerlines.....	12
5.4	Access Roads .....	12
5.5	Foundations.....	12
5.6	Hardstands and laydown areas .....	12
5.7	Operation and Maintenance Facilities.....	13
5.8	Potential Impacts and mitigation measures.....	13
<b>6</b>	<b>ENVIRONMENTAL MONITORING .....</b>	<b>15</b>
<b>7</b>	<b>ROLES AND RESPONSIBILITIES .....</b>	<b>16</b>
7.1	Amstilitte (RF) proprietary Limited .....	16
7.2	Contractor.....	16
7.3	Environmental Control Officer.....	16
<b>8</b>	<b>COMPLIANCE WITH THE DEMPR .....</b>	<b>18</b>
8.1	Non-compliance.....	18
8.2	Emergency preparedness.....	19
8.3	Incident reporting and remedy .....	19
8.4	Penalties .....	19
<b>9</b>	<b>REPORTING.....</b>	<b>21</b>
9.1	Administration.....	21
9.2	Good housekeeping .....	21
9.3	Record keeping .....	21
9.4	Document control .....	22
<b>10</b>	<b>ENVIRONMENTAL AWARENESS .....</b>	<b>23</b>
10.1	Monitoring of environmental training.....	23
<b>11</b>	<b>CLOSURE PLANNING .....</b>	<b>25</b>
11.1	Post-decommissioning environmental audit.....	25
11.2	General review of DEMPr .....	25
<b>12</b>	<b>CONCLUSIONS.....</b>	<b>26</b>

# 1 INTRODUCTION

Amstilite (RF) Proprietary Limited was awarded as a Preferred Bidder under the fourth round of the Department of Energy's Renewable Energy Independent Power Producer Procurement Programme (REIPPP) and as such will be constructing a 120MW wind energy facility consisting of 48 wind turbines, each with a maximum generating output of 2.55MW. The following ancillary infrastructure will be necessary:

- Internal access roads;
- A building to house the control instrumentation and backup power support, as well as a store room for the maintenance equipment;
- Underground and overhead 33MW electrical cabling connecting the turbines and the project substation;
- On-site Olivewoods 33/132kV substation
- An overhead 132kV line connecting the on-site Olivewoods substation to the Kopleegte substation;
- Turbine foundations and hardstand areas.

The facility will cover 8 farm portions over an area of approximately 9 200ha in the Blue Crane Route Local Municipality within the Cacadu District Municipality of the Eastern Cape Province of South Africa. The land is currently used for agricultural purposes, with livestock production and hunting being the primary economic activities. The area is relatively undeveloped and rural.

## 1.1 OBJECTIVES OF A DEMPR

The Decommissioning & Closure Environmental Management Programme (DEMP<sub>r</sub>) has been compiled to provide recommendations and guidelines according to which compliance monitoring can be done during the decommissioning and closure of the Golden Valley I Wind Energy Facility (WEF) as well as to ensure that all relevant factors are considered to ensure for environmentally responsible decommissioning.

This DEMP<sub>r</sub> informs all relevant parties the Project Coordinator, the Contractor, the Environmental Control Officer (ECO) and all other staff employed by contractor at the site at the time as to their duties in the fulfilment of the legal requirements for the decommissioning and closure of the Golden Valley I WEF with particular reference to the prevention and mitigation of anticipated potential environmental impacts. This DEMP<sub>r</sub> is informed by the Environmental Impact Assessment (EIA) for the Golden Valley WEF authorised in April 2011.

All parties should note that obligations imposed by the DEMP<sub>r</sub> are legally binding in terms of the environmental authorisation granted by the relevant environmental permitting authority.

The objectives of a DEMP<sub>r</sub> are to:

- Ensure compliance with regulatory authority stipulations and guidelines which may be local, provincial, national and/or international;
- Ensure that there is sufficient allocation of resources on the project budget so that the scale of DEMP<sub>r</sub>-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 that could optimize beneficial impacts;

- Create management structures that addresses the concerns and complaints of I&APs with regards to the development;
- Establish a method of monitoring and auditing environmental management practices during the decommissioning phase of the activity;
- Ensure that safety recommendations are complied with;

## 1.2 FORM & FUNCTION OF A DEMPR

The DEMPr will provide an understanding of the decommissioning and closure plan for the project at the end of its useful life, and to describe how Amstilite (RF) Proprietary Limited proposes to restore the project location to an acceptable condition for its intended use following project closure. The DEMPr focuses on sound environmental management practices, which will be undertaken to minimise adverse impacts on the environment during decommissioning of the development. In addition, this DEMPr identifies what measures will be in place or will be actioned to manage any incidents and emergencies that may occur during the decommissioning of the facility. As such the DEMPr provides specifications that must be adhered to, in order to minimise adverse environmental impacts associated with the decommissioning of the facility.

The content of the DEMPr is consistent with the requirements as set out in Appendix 4 of the EIA regulations stated below:

**According to Appendix 4 of GN R 982, an environmental management programme must include:**

- (a) Details of –
  - (i) The EAP who prepared the environmental management programme; and
  - (ii) The expertise of that EAP to prepare an environmental management programme;
- (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, indicate any areas that should be avoided, including buffers;
- (d) A description of the impact management objectives, including management statement, 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
- (e) a description and identification of impact management outcomes required for the aspects contemplated in paragraph (d);
- (f) A description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (d) and (e) will be achieved, and must, where applicable include actions to
  - (i) Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;
  - (ii) Comply with any prescribed environmental management standards or practices;
  - (iii) comply with any applicable provisions of the act regarding closure, where applicable; and
  - (iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where application;
- (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 paragraph (f)

September 2015

Mar 21, 2019 10:43

- (i) an indication of the persons who will be responsible for 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 requirements 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

### 1.3 LEGAL REQUIREMENTS

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

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

- The Constitution of the Republic of South Africa Act 108 of 1996
- Environment Conservation Act 73 of 1989
- National Environmental Management Act 107 of 1998
- National Environmental Management: Protected Areas Act 57 of 2003
- National Environmental Management: Biodiversity Act 10 of 2004
- National Forests Act 43 of 1983
- National Water Act 36 of 1998
- Conservation of Agricultural Resources Act 43 of 1983
- National Veld and Forest Fire Act 101 of 1998
- Hazardous Substances Act 15 of 1973
- National Heritage Resources Act 25 of 1999
- Atmospheric Pollution Prevention Act 45 of 1965
- National Environmental Management: Air Quality Act 39 of 2004
- National Environmental Management: Waste Management Act 59 of 2008
- Mineral and Petroleum Resources Development Act 28 of 2002
- Health Act 63 of 1977
- Occupational Health and Safety Act 85 of 1993
- White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity
- All relevant provincial legislation, Municipal by-laws and ordinances.

### 1.4 ENVIRONMENTAL AUTHORISATION

In accordance with the requirements of the National Environmental Management Act (Act No 107 of

1998) (NEMA), and relevant EIA regulations made in terms of this Act and promulgated in December 2014 (Government Notice R982), and listed activities under (Government Notice R 983, 984, 985), the Golden Valley I Wind Energy Facility was subjected to a Full Scoping and Environmental Impact Assessment.

In terms of the EIA process, all reports generated from the environmental studies form part of a series of documents for the project. The Environmental Impact Assessment identified potentially significant environmental impacts and was the main report in the series. Additional Specialist Assessments served to supplement the assessment contained in the EIA.

This DEMPr interprets the findings of the EIA, and prescribes project-specific specifications to be achieved. In addition to the requirements of Appendix 4 of GNR 982, this DEMPr is based on the principles of Integrated Environmental Management (IEM).

## 2 DETAILS OF THE ENVIRONMENTAL ASSESSMENT TEAM

According to Appendix 4 of GN R 982, an environmental management programme must include:

- (a) details of –
  - (i) the person who prepared the environmental management programme; and
  - (ii) the expertise of that person to prepare an environmental management

### Environmental consulting company:

EOH Coastal & Environmental Services  
25 Tecoma Street, Berea, East London  
PO Box 8145, Nahoon, East London, 5210  
Tel: (043) 726 7809  
Fax: (043) 726 8352  
e-mail: cesel@cesnet.co.za  
www.cesnet.co.za

### Project team:

- Dr Alan Carter
- Mr Roy de Kock

Coastal & Environmental Services (CES), established in 1990, is a dynamic, rapidly growing specialist environmental consulting company. We believe that a balance between development and environmental protection can be achieved by skilful, considerate and careful planning. Our extraordinary success rate in achieving this balance in a variety of developments is evidence of our capability.

Recently, EOH Group of Companies acquired the shares in CES. EOH is the largest provider of enterprise applications, technology, outsourcing, cloud and managed services. The group is active in South Africa, Africa and the United Kingdom and has a strong Black Economic Empowerment profile. This integration will allow CES to combine EOH's great reach and reputation with CES's recognised excellence in environmental and social advisory services, thus maximising CES's strengths and comprehensive offerings in the environmental and social fields.

Our ability to produce first rate environmental assessments is evidence of the multidisciplinary skills that we have in-house at EOH-CES, and through a range of associates with whom we have worked on numerous projects over many years. These multidisciplinary skills are augmented by our working relationship with a number of colleagues at Rhodes University, with whom we have retained links. This association with Rhodes has also enabled us to develop our skills transfer, capacity building and teaching abilities further. EOH-CES staff are all exceptionally well qualified, with many being industry-recognised experts. Six of our staff hold PhD degrees, and all but two post-graduate qualifications in the environmental sciences, with numerous senior staff, including Managing Director Dr Ted Avis, being certified Environmental Practitioners. EOH-CES is also well recognised by leading firms from other professional disciplines, who readily form partnerships with us.

### Dr Alan Carter

Director of the East London Office 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 and holds a PhD in Plant Sciences. He is also a certified ISO14001 EMS auditor with the American National Standards Institute and the British Standards Institute.

**Mr Roy de Kock**

Senior Consultant, Roy holds a BSc Honours in Geology and an MSc in Botany from the Nelson Mandela Metropolitan University in Port Elizabeth. His MSc thesis focused on Rehabilitation Ecology using an open-cast mine as a case study. He has been working for CES since 2010, and is based at the East London branch where he focuses on Ecological and Agricultural Assessments, Geological and Geotechnical analysis, Environmental Management Plans, mining applications and various environmental impact studies. Roy has worked on numerous projects in South Africa, Mozambique and Malawi.

### 3 PROPOSED ACTIVITY

According to Appendix 4 of GN R 982, an environmental management programme must include:

- (c) A detailed description of the aspects of the activity that are covered by the draft environmental management programme;

#### 3.1 DESCRIPTION OF PROPOSED ACTIVITY

The proposed Golden Valley Project – Project 1 is to be constructed on 9 200 hectares (ha) encompassing 8 farm Portions located in the Blue Crane Route Local Municipality with the Cacadu District Municipality of the Eastern Cape Province of South Africa (figure 3.1). The area is relatively undeveloped and rural.

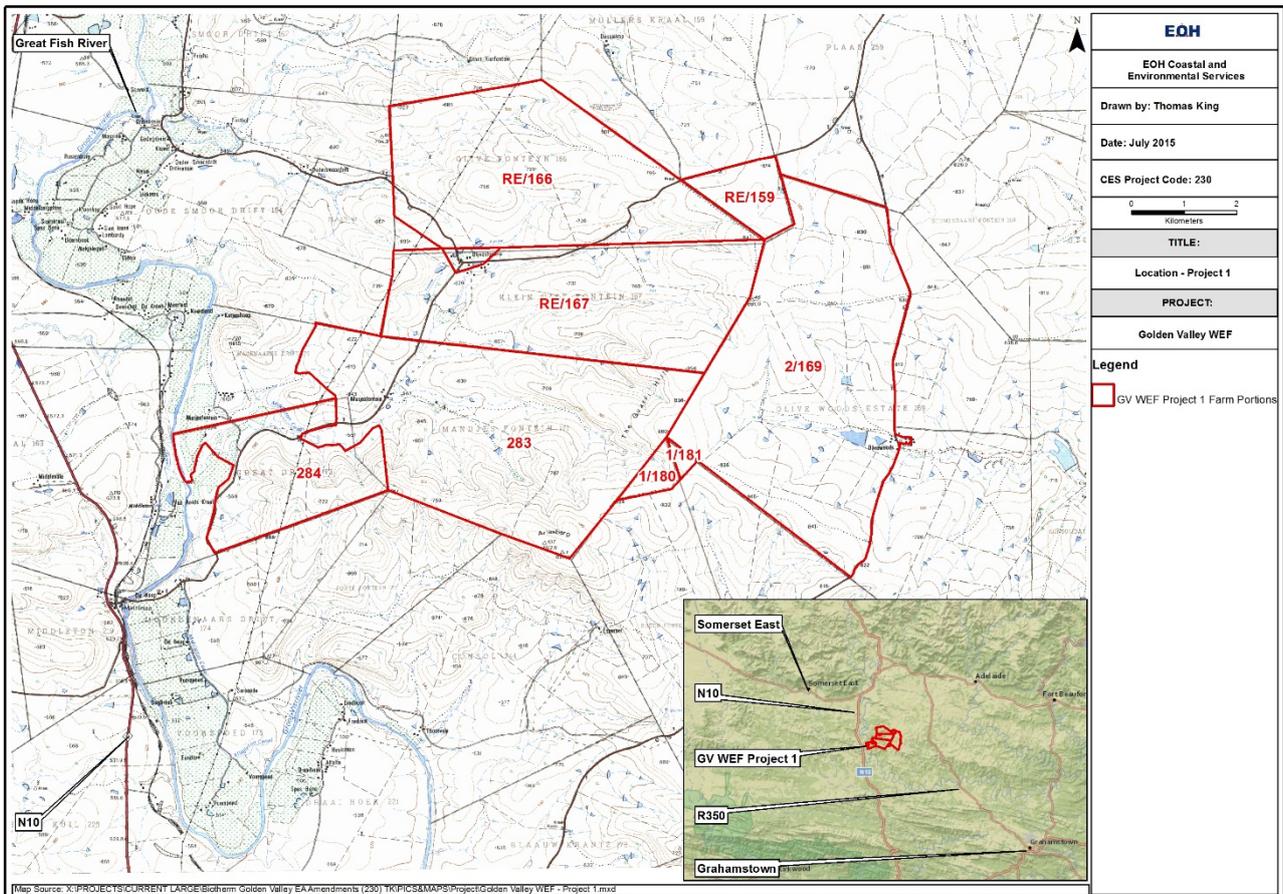


Figure 3-1: Locality of the Golden Valley Wind Energy Project

The Golden Valley WEF is proposed to comprise of 48 wind turbines, each with a maximum generating output of 3MW. The following ancillary infrastructure will be necessary:

- Internal access roads;
- A building to house the control instrumentation and backup power support, as well as a store room for the maintenance equipment
- Underground and overhead 33MW electrical cabling connecting the turbines and the project substation;
- On-site Olivewoods 33/132kV substation
- An overhead 132kV line connecting the on-site Olivewoods substation to the Kopleegte substation;
- Turbine foundations and hardstand areas.

Figure 3.2 is the site layout plan for the preferred alternative in the EIA process. Table 3.1 lists the latitude and longitude of the turbines.

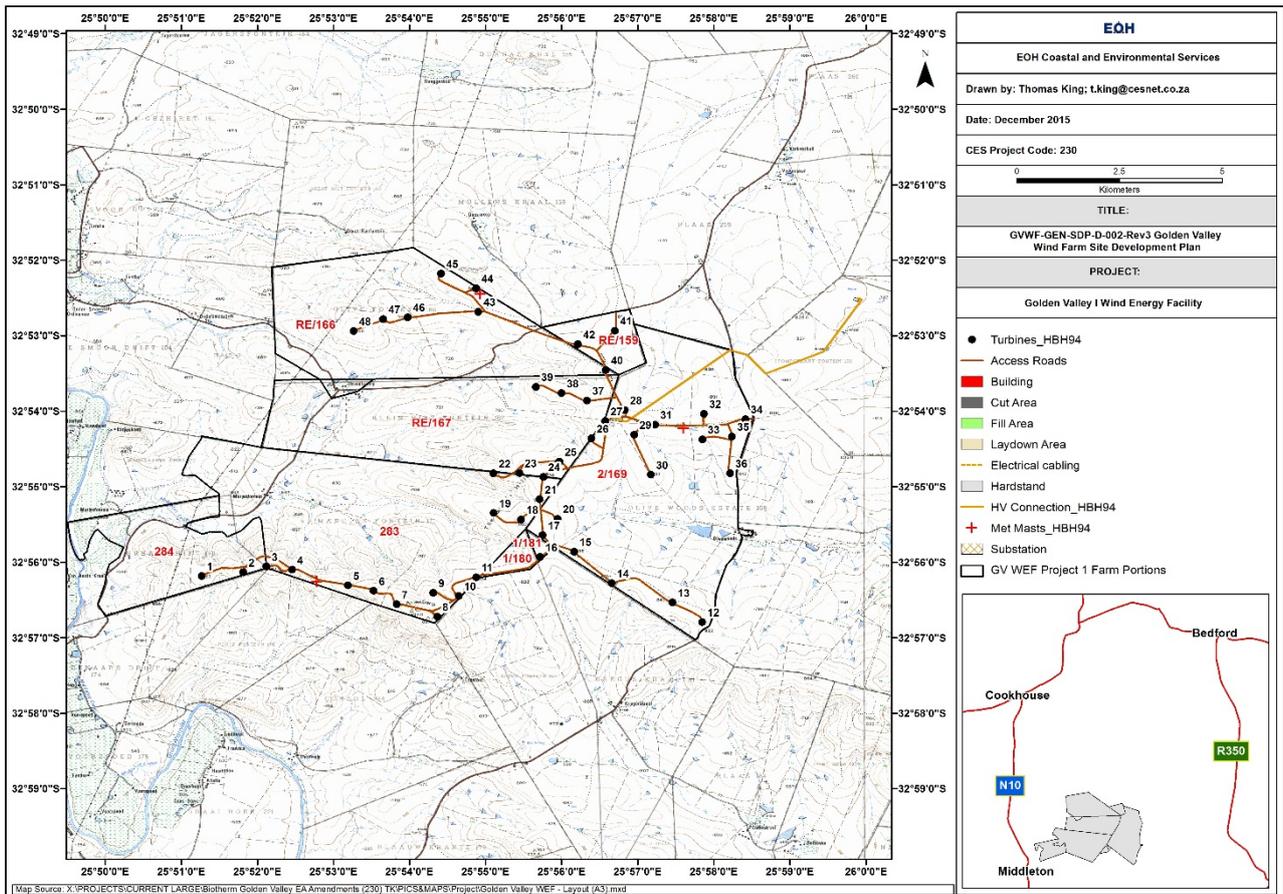


Figure 3.2: Site Layout of the Golden Valley Wind Energy Facility

Table 3.1. Revised coordinates of the turbines for the proposed Golden Valley WEF - Project 1 given in Decimal Degrees)

Name	Latitude	Longitude
1	-32.936342	25.854452
2	-32.935523	25.863555
3	-32.934271	25.868651
4	-32.934944	25.874258
5	-32.938436	25.886515
6	-32.939613	25.892116
7	-32.942589	25.897160
8	-32.945310	25.906059
9	-32.940053	25.905193
10	-32.940742	25.910757
11	-32.936636	25.914594
12	-32.946509	25.964132
13	-32.942206	25.957603
14	-32.937945	25.944272
15	-32.930976	25.936076
16	-32.932282	25.928488
17	-32.927309	25.929168
18	-32.923885	25.924397

**September 2015**

Mar 21, 2019 10:43

19	-32.922444	25.918414
20	-32.923728	25.932420
21	-32.919410	25.928461
22	-32.913686	25.918371
23	-32.913281	25.923723
24	-32.914457	25.929323
25	-32.911104	25.932839
26	-32.905977	25.939850
27	-32.902169	25.942836
28	-32.899725	25.947142
29	-32.905155	25.949216
30	-32.913979	25.952855
31	-32.902938	25.953787
32	-32.900547	25.964507
33	-32.906181	25.964174
34	-32.901749	25.973581
35	-32.905558	25.970597
36	-32.913673	25.970236
37	-32.897626	25.938881
38	-32.896000	25.933287
39	-32.894599	25.927691
40	-32.890896	25.942970
41	-32.882208	25.944976
42	-32.885207	25.936891
43	-32.878029	25.915063
44	-32.872838	25.914592
45	-32.869614	25.906882
46	-32.879246	25.899549
47	-32.879650	25.894199
48	-32.882299	25.887752

## **4 SCOPE OF THE DEMPr**

In order to ensure a holistic approach to the management of environmental impacts during decommissioning and closure, this DEMPr sets out the methods by which proper environmental controls are to be implemented by the Contractor and all other parties involved.

The DEMPr is a dynamic document subject to influences and changes as are wrought by variations to the provisions of the project specification.

The DEMPr focuses on the decommissioning and closure of this project. Impacts are identified and given a brief description. This section will be required to be re-visited and updated at the time of decommissioning.

## 5 MITIGATION AND/OR MANAGEMENT MEASURES

**According to Appendix 4 of GN R 982, an environmental management programme must include:**

- (d) Information on any proposed management or mitigation measures that will be taken to address the environmental impacts that have been identified in a report contemplated by these Regulations, including environmental impacts or objectives in respect of –
  - (i) Planning and design;
  - (ii) Pre-construction;
  - (iii) Construction activities;
  - (iv) Rehabilitation of the environment after construction and where applicable post closure; and
  - (v) where relevant, operation activities;
- (e) a description and identification of impact outcomes required for the aspects contemplated in (d).
- (f) a description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (d) and (e) will be achieved, and must, where applicable include actions to –
  - (i) Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;
  - (ii) Comply with any prescribed environmental management standards or practices;
  - (iii) Comply with any applicable provisions of the Act regarding closure, where applicable;
  - (iv) Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;

Decommissioning activities will need to be performed in accordance with the applicable laws and regulations current at the time.

The infrastructure has a design life of a minimum of 25 years. There after the facility could be:

- Extended in use for a minimum of 25 years dependent on a lease extension; or
- Retrofitted with new equipment for 25 years or more; or
- Decommissioned in its entirety.

In the event of total decommissioning, the removal of existing infrastructure and rehabilitation actions will be at the developer's expense. The entire works and any disturbed areas adjacent to the site as a result of development activities will need to be rehabilitated; this would include rehabilitation of vegetation disturbed by the decommissioning operation itself.

The decommissioning phase as envisaged would involve the removal of the turbines, electrical transformers, possibly underground cables and overhead power lines, access roads, hardstands and laydown areas, operation and Maintenance facilities and foundations.

### 5.1 WIND TURBINES

At the end of their commercial life, turbines will be shut down and removed from active service and physically disconnected from the electrical infrastructure in order to make them safe before the dismantling process starts. Once safe and ready for dismantling all liquids must be drained and contained (oils, grease, lubricants and coolants etc) and any other consumable and disposable items must be removed where necessary. Any wastes and materials may be recycled or reused wherever practicable to do so, and if not practicable, disposed of at an appropriate waste facility. Any handling, storage and disposal of waste must be done in accordance with the projects Waste Management Plan.

Dismantling of the turbine blades, nacelle and tower will be generally carried out in the reverse sequence to their original assembly during construction. Dismantling will involve disassembly of the various components, which will be lowered by crane and transported to a storage / laydown area before removal from site. Metallic components with valuable raw materials can be recovered for recycling (copper, zinc plated steel, inox steel, glass). Any other non-metallic waste materials such as plastics, composites or civil material that cannot be reused or recycled must be crushed or compacted and disposed of at an appropriate waste facility.

## **5.2 ELECTRICAL TRANSFORMERS**

To decommission the transformers they must be shut down, removed and made safe. To dismantle the transformers they must first be allowed to cool before removing and drained of all liquids prior to transporting them off-site. Transformer foundations will remain in situ below the ground and all exposed cabling, conduit and housing must be removed.

## **5.3 UNDERGROUND CABLING AND OVERHEAD POWERLINES**

Underground electrical cabling must be deactivated and may be left in situ during decommissioning. The cables contain no materials considered harmful to the environment and the process of digging them up and removing them may have a far bigger impact on the environment than leaving them in situ. Should underground electrical cabling need to be removed, for farming purposes or other reasons, they must be removed in a way that minimises impact on the surrounding area as much as possible. Any disturbed areas must be backfilled and graded and where necessary planted with vegetation to reintegrate it with the surrounding environment.

All overhead electrical cabling and powerlines must be dismantled, removed and materials may be reused or sold where possible. The powerline poles must be removed and the holes filled with compatible soil material and revegetated. In locations where potential environmental damage from complete extraction of the powerline pole may outweigh the benefits, the pole may be cut off at ground level.

## **5.4 ACCESS ROADS**

Access roads are likely to be retained by the landowners, however in the event that decommissioning of access roads is required, the gravel topping and sub layers will be removed and transported to an appropriate disposal location. This may include reuse as land fill on site if required, or at an offsite location. All associated access road infrastructure including drainage structures, culverts and crossings may be removed and reused where possible, or disposed of at an appropriate location. Cleared areas must be backfilled and graded to preserve the slope of the surrounding area. The ground must be remediated as appropriated and covered with compatible topsoil and planted with grasses or foliage to reintegrate it with the surrounding environment.

## **5.5 FOUNDATIONS**

The foundation design of the turbine would need to take cognisance of the possible need for complete decommissioning, although after the lifetime of 25 years a retrofit re-using the foundation is quite probable. If no retrofit is agreed, foundations will be removed at least 1 m below ground and the site rehabilitated to the satisfaction of the engineer and the ECO. The concrete foundations must be covered with a layer of compatible sub-grade material and graded to preserve the slope of the surrounding area. The ground must be redressed with topsoil, and planted with appropriate grasses to reintegrate it with the surrounding environment.

## **5.6 HARDSTANDS AND LAYDOWN AREAS**

Hardstand areas are generally constructed in a similar manner to access roads but may have an increased level of compactness for crane lifts. Laydown and storage areas are also constructed in a

similar manner to access roads and therefore remediation of these areas would be the same as for access roads.

## 5.7 OPERATION AND MAINTENANCE FACILITIES

The buildings and structures required to for operational and maintenance facilities may be retained and refurbished depending on the land owner. If buildings are to be demolished and removed, this must be undertaken in accordance with standard demolition practices for such structures at the time of decommissioning.

## 5.8 POTENTIAL IMPACTS AND MITIGATION MEASURES

A variety of potential impacts are associated with the decommissioning activities for this project. These impacts can be categorised as general decommissioning related impacts as well as decommissioning impacts specifically related to this site. General best practice rules to closure and decommissioning should be followed at all times. In addition to this the specific mitigation measures and recommendations as highlighted by the EIR and various specialists for this specific site is highlighted in Table 5-1 below.

**Table 5.1 Impacts and Mitigation Measures Associated with the Decommissioning and Closure Phase of the Golden Valley Wind Energy Facility.**

Activity	COMPLIANCE SPECIFICATION
<b>Pollution</b>	<ul style="list-style-type: none"> <li>• Littering <u>must</u> be avoided and litter bins should be made available at various strategic points on site. Refuse from the site must be collected on a regular basis and deposited at an appropriate landfill.</li> <li>• 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.</li> <li>• Ensure adequate storm water management by implementing recommendations of the Storm Water Management Plan during decommissioning.</li> </ul>
<b>Dust</b>	<ul style="list-style-type: none"> <li>• Fugitive/nuisance dust must be reduced by implementing the following:               <ul style="list-style-type: none"> <li>• Damping down of un-surfaced and un-vegetated areas;</li> <li>• Retention of vegetation where possible; 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;</li> <li>• A speed limit of 30km/h must not be exceeded on dirt roads.</li> <li>• Any complaints or claims emanating from the lack of dust control must be attended to immediately by the Contractor.</li> </ul> </li> </ul>
<b>Traffic &amp; Transport</b>	<ul style="list-style-type: none"> <li>• Decommissioning vehicles and machinery must make use of existing infrastructure such as roads as far as possible to minimise disturbance on the receiving environment. There must be no unnecessary disturbance of existing vegetation.</li> </ul>
<b>Soil erosion</b>	<ul style="list-style-type: none"> <li>• After the removal of all wind turbine-related structures, the disturbed soils must be re-vegetated to avoid unnecessary soil erosion.</li> </ul>

September 2015

Mar 21, 2019 10:43

<b>Land use</b>	<ul style="list-style-type: none"> <li>• Ensure that an appropriate land use is adopted.</li> </ul>
<b>Avifaunal habitat disturbance</b>	<ul style="list-style-type: none"> <li>• Dismantling activity should be restricted to the immediate footprint of the infrastructure, and in particular to the proposed road network. Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species.</li> <li>• Dismantling activity should be restricted to the immediate footprint of the infrastructure, and in particular to the power line servitude.</li> <li>• Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species.</li> </ul>
<b>Visual intrusion of equipment</b>	<ul style="list-style-type: none"> <li>• Dismantling must be limited to normal working hours (08:00 till 17:00) unless otherwise specified in the DEMPr.</li> </ul>
<b>Noise generation by decommissioning activities</b>	<ul style="list-style-type: none"> <li>• All decommissioning activities must occur during daylight hours (08:00 till 17:00) unless otherwise specified in the DEMPr, to ensure that noise levels are kept to a minimum. This condition may be lifted for specific decommissioning activities by agreement with the ECO.</li> </ul>
<b>Lack of rehabilitation</b>	<ul style="list-style-type: none"> <li>• A percentage of operational earnings should be set aside for the decommissioning phase, which must include costs for landscaping and re-vegetation of the whole development footprint.</li> <li>• A Decommissioning: Rehabilitation Plan must be developed and include primary objectives of rehabilitation and the latest acceptable methods for implementation.</li> </ul>
<b>Disturbance to surrounding wildlife and fauna</b>	<ul style="list-style-type: none"> <li>• Restrict decommissioning activities to post-dawn and pre-dusk unless otherwise specified in the DEMPr.</li> <li>• Decommissioning of the turbines must be undertaken in the shortest time practical.</li> <li>• Decommission workers must be transported to and from the site daily.</li> <li>• No residence may be set up on site.</li> <li>• An inspection of the immediate Thicket vegetation surrounding the turbine sites for evidence of snares must be undertaken.</li> </ul>

## 6 ENVIRONMENTAL MONITORING

**According to regulation 4 of GN R 982, an environmental management programme must include:**

- (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);

A monitoring programme must be implemented for the duration of the decommissioning phase. This programme will include:

- Establishing a baseline of pre-decommissioning site conditions validated with photographic evidence.
- Bi-weekly audits to be conducted by an independent ECO for the duration of the decommissioning phase to ensure compliance to the DEMPr conditions, and where necessary make recommendations for corrective action. These audits can be conducted randomly and do not require prior arrangement with the Site Manager.
- Compilation of an audit report with a rating of compliance with the DEMPr. The ECO shall keep a photographic record of the demarcated sites and decommissioning area. The Contractor shall be held liable for all unnecessary damage to the environment. A register shall be kept of all complaints from the community. All complaints / claims shall be handled immediately to ensure timeous rectification / payment by the responsible party.
- Compilation of a final audit report after all site decommissioning and rehabilitation are completed.

## 7 ROLES AND RESPONSIBILITIES

**According to Appendix 4 of GN R 982, an environmental management programme must include:**

- (i) An indication of the persons who will be responsible for the implementation of the impact management actions;

### 7.1 AMSTILITE (RF) PROPRIETARY LIMITED

Amstilite (RF) Proprietary Limited (Amstilite) is the applicant and shall therefore be the entity monitoring the implementation of the EMPr and compliance with the authorisation. However, Amstilite will appoint a Contractor to implement the project and hence implement the proposed mitigation measures documented in this DEMPr on their behalf; the successful contractor's responsibilities are outlined as follows.

### 7.2 CONTRACTOR

The successful Contractor shall:

- Be responsible for the finalisation of the DEMPr in terms of methodologies (Method Statements) which are required to be implemented to achieve the environmental specifications contained herein and the relevant requirements contained in the environmental authorisation, if issued by DEA;
- Be responsible for the overall implementation of the DEMPr in accordance with the requirements of the environmental authorisation issued by DEA;
- 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 DEMPr;
- Be responsible for obtaining any environmental permits which are required for the design, construction and operation of the Golden Valley I WEF.

### 7.3 ENVIRONMENTAL CONTROL OFFICER

For the purposes of implementing the conditions contained herein, Amstilite shall appoint an Environmental Control Officer (ECO) for the contract. The ECO shall be the responsible person for ensuring that the provisions of the DEMPr are complied with during the decommissioning period. The ECO will be responsible for issuing instructions to the contractor where environmental considerations call for action to be taken. The ECO shall submit regular written reports to Amstilite, but not less frequently than once every two weeks.

The ECO will be responsible for the monitoring, reviewing and verifying of compliance with the DEMPr and conditions of the environmental authorisation by the Contractor. The ECO's duties in this regard will include, inter alia, the following:

- Confirming that all the environmental authorisations and permits required in terms of the applicable legislation have been obtained prior to decommissioning commencing.
- Monitoring and verifying that the DEMPr, Environmental Authorisation 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 decommissioning method statements with input from the ECO and Engineer, where necessary, in order to ensure that the environmental specifications contained within this DEMPr and environmental authorisation are adhered to.
- Inspecting the site and surrounding areas on a regular basis regarding compliance with the DEMPr, Environmental Authorisation and Contract.
- Monitoring the undertaking by the Contractor of environmental awareness training for all new

personnel on site.

- Ensuring that activities on site comply with all relevant environmental legislation.
- Ordering the removal of, or issuing spot fines for person/s and/or equipment not complying with the specifications of the DEMPr and/or environmental authorisation.
- Undertaking a continual internal review of the DEMPr and submitting any changes to Amstilite and/or DEA (in case of major changes) for review and approval.
- Checking the register of complaints kept on site and maintained by the site manager 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 Amstilite (RF) Proprietary Limited.
- The ECO shall also submit compliance audit reports to DEA, in accordance with the requirements of the environmental authorisation. Such reports shall be reviewed by Amstilite, prior to submission.
- Keeping a photographic record of progress on site from an environmental perspective. This can be conducted in conjunction with the site manager as the site manager will be the person that will be onsite at all times and can therefore take photographic records weekly. The ECO would need to check and ensure that the site manager understands the task at hand.
- Recommending additional environmental protection measures, should this be necessary.
- Providing report back on any environmental issues at 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.
  - Environmental Management Systems.

The ECO must be fully conversant with the Environmental Impact Assessment, Decommissioning and Closure Environmental Management Programme, Environmental Authorisation for the Golden Valley I WEF and all relevant environmental legislation.

Amstilite shall have the authority to replace the ECO if, in their opinion, the appointed officer is not fulfilling his/her duties in terms of the requirements of the DEMPr or this specification. Such instruction will be in writing and shall clearly set out the reasons why a replacement is required and within what timeframe.

## 8 COMPLIANCE WITH THE DEMPr

**According to regulation 4 of GN R 982, an environmental management programme must include:**

- (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);s

A copy of the DEMPr must be kept on site at all times during the decommissioning period. The DEMPr will be binding on all contractors operating on the site and must be included within the Contractual Clauses.

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

### 8.1 NON-COMPLIANCE

The contractors shall act immediately when notice of non-compliance is received and correct whatever is the cause for the issuing of the notice. Complaints received regarding activities on the decommissioning site pertaining to the environment shall be recorded in a dedicated register and the response noted with the date and action taken. The ECO should be made aware of any complaints.

Any non-compliance with the agreed procedures of the DEMPr is a transgression of the various statutes and laws that define the manner by which the environment is managed. Failure to redress the cause shall be reported to the relevant authority for them to deal with the transgression, as it deems fit.

The Contractor is deemed not to have complied with the DEMPr if, *inter alia*:

- there is evidence of contravention of the DEMPr specifications within the boundaries of the decommissioning site, site extensions and roads;
- there is contravention of the DEMPr specifications which relate to activities outside the boundaries of the site.
- environmental damage ensues due to negligence;
- decommissioning activities take place outside the defined boundaries of the site; and/or
- the Contractor fails to comply with corrective or other instructions issued by the Engineer within a specific time period.

It is recommended that the engineers/contractors institute penalties for the following less serious violations and any others determined during the course of work as detailed below:

- Littering on site.
- Lighting of illegal fires on site.
- Persistent or un-repaired fuel and oil leaks.
- Any persons, vehicles or equipment related to the Contractor's operations found within the designated "no-go" areas.
- Excess dust or excess noise emanating from site.
- Possession or use of intoxicating substances on site.
- Any vehicles being driven in excess of designated speed limits.
- Removal and/or damage to fauna, flora or cultural or heritage objects on site.

- Urination and defecation anywhere except at designated facilities.

## 8.2 EMERGENCY PREPAREDNESS

The Contractor shall compile and maintain environmental emergency procedures to ensure that there will be an appropriate response to unexpected or accidental actions or incidents that will cause environmental impacts, throughout the decommissioning period. Such activities may include, *inter alia*:

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

These plans shall include:

- Emergency organisation (manpower) and responsibilities, accountability and liability.
- A list of key personnel and contact details.
- Details of emergency services available (e.g. the fire department, spill clean-up services, etc.).
- Internal and external communication plans, including prescribed reporting procedures where required by legislation.
- Actions to be taken in the event of different types of emergencies.
- Incident recording, progress reporting and remediation measures required to be implemented.
- Information on hazardous materials, including the potential impact associated with each, and measures to be taken in the event of accidental release.
- Training plans, testing exercises and schedules for effectiveness.

The Contractor shall comply with the emergency preparedness and incident and accident-reporting requirements, as required by legislation at the time of decommissioning, currently, the Occupational Health and Safety Act, 1993 (Act No 85 of 1993), the NEMA, 1998 (Act No 107 of 1998), the National Water Act, 1998 (Act No 36 of 1998) and the National Veld and Forest Fire Act, 1998 (Act No 101 of 1998) as amended and/or any other relevant legislation.

## 8.3 INCIDENT REPORTING AND REMEDY

If a leakage or spillage of hazardous substances occurs on site, the local emergency services must be immediately notified of the incident. The following information must be provided:

- the location;
- the nature of the load;
- the extent of the impact; and
- the status at the site of the accident itself (i.e. whether further leakage is still taking place, whether the vehicle or the load is on fire).

Written records must be kept on the corrective and remedial measures decided upon and the progress achieved therewith over time. Such progress reporting is important for monitoring and auditing purposes. The written reports may be used for training purposes in an effort to prevent similar future occurrences.

## 8.4 PENALTIES

Where environmental damage is caused or a pollution incident, and/or failure to comply with any of the environmental specifications contained in the DEMPr, the developer and/or contractor shall be liable.

The following violations, and any others determined during the course of work, should be penalised:

- Hazardous chemical/oil spill and/or dumping in non-approved sites.
- Damage to sensitive environments.
- Damage to cultural and historical sites.
- Unauthorised removal/damage to indigenous trees and other vegetation, particularly in identified sensitive areas.
- Uncontrolled/unmanaged erosion.
- Unauthorised blasting activities (if applicable).
- Pollution of water sources.
- Unnecessary removal or damage to trees.

## 9 REPORTING

**According to APPENDIX 4 of GN R 982, an environmental management programme must include:**

- (l) A program for reporting on compliance, taking into account the requirement as prescribed by the regulations;

### 9.1 ADMINISTRATION

Before the contractor begins decommissioning activities, the Contractor shall give to the ECO and engineer a written method statement setting out the following:

- The type of decommissioning activity.
- Locality where the activity will take place.
- Identification of impacts that might result from the activity.
- Identification of activities or aspects that may cause an impact.
- Methodology and/or specifications for impact prevention for each activity or aspect.
- Methodology and/or specifications for impact containment for each activity or aspect.
- Emergency/disaster incident and reaction procedures.
- Treatment and continued maintenance of impacted environment.

The contractor may provide such information in advance of any or all decommissioning activities provided that new submissions shall be given to the ECO and/or engineer whenever there is a change or variation to the original.

The ECO and/or engineer may provide comment on the methodology and procedures proposed by the Contractor but he shall not be responsible for the contractor's chosen measures of impact mitigation and emergency/disaster management systems. However, the contractor shall demonstrate at inception and at least once during the contract that the approved measures and procedures function properly.

### 9.2 GOOD HOUSEKEEPING

The contractor shall undertake "good housekeeping" practices during decommissioning. This will help avoid disputes on responsibility and allow for the smooth running of the closure and decommissioning as a whole.

### 9.3 RECORD KEEPING

The engineer and the ECO will continuously monitor the contractor's adherence to the approved impact prevention procedures and the engineer shall issue to the contractor 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 action taken to discontinue the non-compliance, the action taken to mitigate its effects and the results of the actions. The non-compliance shall be documented and reported to the engineer in the monthly report. These reports shall be made available to DEA when requested.

The Contractor shall ensure that an electronic filing system identifying all documentation related to the EMP is established.

A list of reports likely to be generated during this phase of the Project is provided below, and all applicable documentation must be included in the environmental filing system catalogue or document retrieval index.

- Environmental Management Plan.

**September 2015**

Mar 21, 2019 10:43

- Final documents issued to and by the Contractor.
- All communications detailing changes of scope that may have environmental implications.
- Daily, weekly and monthly site monitoring reports.
- Complaints register.
- Medical reports.
- Training manual.
- Training attendance registers.
- Incident and accident reports.
- Emergency preparedness and response plans.
- Copies of all relevant environmental legislation.
- Permits and legal documents, including letters authorising specific personnel of their duties as part of emergency preparedness teams e.g. fire teams, etc.
- Crisis communication manual.
- Disciplinary procedures.
- Monthly site meeting minutes during decommissioning.
- All relevant permits.
- Environmental Authorisation on the EIA from the DEA.
- All method statements from the Contractor for the decommissioning phase of the project.

#### **9.4 DOCUMENT CONTROL**

The Contractor and resident engineer shall be 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 positions, who drafted and compiled the document, who reviewed and recommended approval, and who finally approved the document for distribution.
- All documents should be dated, provided with a revision number and reference number, filed systematically, and retained for a five year period.

The Contractor shall 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 DEMPr are performed. All documents shall be made available to the independent external auditor.

## 10 ENVIRONMENTAL AWARENESS

**According to regulation 4 of GN R 982, an environmental management programme must include:**

- (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

Contractors shall ensure that its employees and any third party who carries out all or part of the Contractor's obligations are adequately trained with regard to the implementation of the DEMPr, as well as regarding environmental legal requirements and obligations. Training shall be conducted by the ECO where necessary.

Environment and health awareness training programmes should be targeted at three distinct levels of employment, i.e. the executive, middle management and labour. Environmental awareness training programmes shall 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.
- A schedule for the presentation of the training courses.

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

The Developer shall ensure that adequate environmental training takes place. All employees shall have been given an induction presentation on environmental awareness and the content of the DEMPr. The presentation needs to be conducted in the language of the employees to ensure it is understood. The environmental training shall, 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 mitigation measures required to be implemented when carrying out their work activities.
- Environmental legal requirements and obligations.
- Details regarding floral/faunal species of special concern and protected species, and the procedures to be followed should these be encountered during decommissioning.
- The importance of not littering.
- The importance of using supplied toilet 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.
- Details regarding archaeological and/or historical sites which may be unearthed during decommissioning and the procedures to be followed should these be encountered.

### 10.1 MONITORING OF ENVIRONMENTAL TRAINING

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

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**September 2015**

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Mar 21, 2019 10:43

/ 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.

## **11 CLOSURE PLANNING**

Final site cleaning - the contractor shall clear and clean the site and ensure that everything not forming part of the permanent works is removed from site before issuing the completion certificate or as otherwise agreed.

Rehabilitation - the contractor (landscape architect/horticulturist) shall be responsible for rehabilitating and re-vegetation of all disturbed areas earmarked for conservation during decommissioning to the satisfaction of the engineer and ECO.

### **11.1 POST-DECOMMISSIONING ENVIRONMENTAL AUDIT**

A post-decommissioning environmental audit must be carried out and submitted to DEA at the expense of the developer so as to fulfil conditions of the Environmental Authorisation granted. Objectives should be to audit compliances with the key components of the DEMPr, to identify main areas requiring attention and recommend priority actions. A follow-up audit should be done a year after the site has been rehabilitated to help determine whether additional restoration is required as determined by the ECO.

Results of the audits should inform changes required to the specifications of the DEMPr 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 DEMPR**

The DEMPr will be reviewed by the ECO on an ongoing 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 the DEMPr on site.

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

## **12 CONCLUSIONS**

Although all foreseeable actions and potential mitigations or management actions are contained in this document, the DEMPr should be seen as a day-to-day management document. The DEMPr thus sets out the environmental and social standards, which would be required to minimise the negative impacts and maximise the positive benefits of the Golden Valley I WEF as detailed in the EIA and specialist reports. The DEMPr could thus change daily, and if managed correctly lead to a successful decommissioning phase.

Further guidance should also be taken for any conditions contained in the Environmental Authorisation, and that these DEA conditions must be incorporated into the final DEMPr.

# ANNEXURE G - GRIEVANCE MECHANISM

# GRIEVANCE MANAGEMENT PROCEDURE

**120MW Golden Valley I Wind Energy Facility near Cookhouse**

**Eastern Cape Province**

<p><b>Prepared for:</b></p>  <p><b>BioTherm Energy</b></p> <p>Building 1 Design Quarter Fourways 2055</p> <p>South Africa</p>	<p><b>Prepared by:</b></p>  <p><b>EOH Coastal &amp; Environmental Services</b></p> <p>67 African Street, Grahamstown, 6139</p> <p>South Africa</p>
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Mr Lungisa Bosman	Author	09 September 2015
Mr Anton Hough	Reviewer	

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## 1. Introduction

Amstilite (RF) Proprietary Limited was awarded as a preferred bidder under the fourth round of the Department of Energy's (DoE) Renewable Energy Independent Power Producer Procurement Programme (REIPPP). As such, the client will be constructing a 120MW Wind Energy Facility (WEF) consisting of 48 wind turbines, each with a maximum generating output of 2.55MW. The following ancillary infrastructure will be necessary:

- I. Internal access roads;
- II. A building to house the control instrumentation and backup power support, as well as a store room for the maintenance equipment;
- III. Underground and overhead electrical cabling connecting the turbines and the project substation;
- IV. An on-site substation;
- V. An overhead 132kV line connecting the on-site substation to the Preferred Bidder Amakhala Emoyeni Wind Energy Facility on-site Kopleegte Substation; and
- VI. Turbine foundations and hardstand areas.

The facility will cover 8 farm portions over an area of approximately 9,200ha in the Blue Crane Route Local Municipality within the Cacadu District Municipality of the Eastern Cape Province of South Africa. The land is currently used for agricultural purposes, with livestock production and hunting being the primary economic activities. The area is relatively undeveloped and rural.

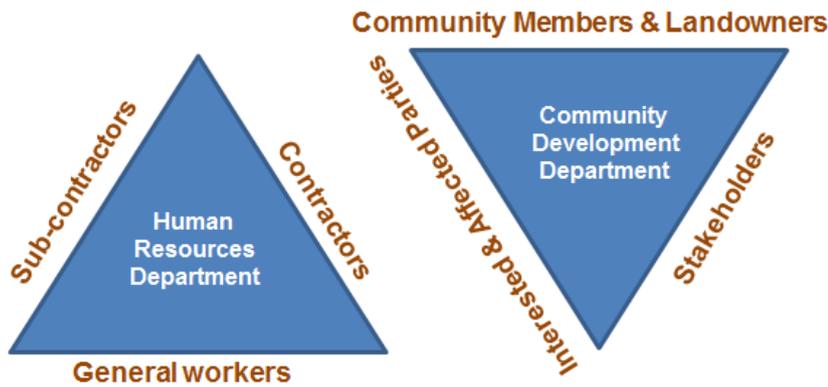
## 2. Grievance Mechanism

### 2.1 Overview

Grievance mechanisms are valuable tools for allowing affected people to voice their concerns about important issues which affect them directly or indirectly as a result of a project. These mechanisms also allow corrective action to be taken timeously, thereby enabling effective communication, problem solving and feedback mechanisms between affected landowners and adjacent communities.

A grievance mechanism can be described as a formal, legal or non-legal (or 'judicial/non-judicial') complaint process that can be used by individuals, workers, communities and/or civil society organisations that are being negatively affected by certain business activities and operations. Having such a mechanism is a key requirement of the International Finance Corporation's (IFC) Performance Standard (PS) 1 on the Assessment and Management of Environmental and Social Risks and Impacts (2012).

Two grievance procedures are required for Golden Valley WEF, namely one for its own employees, contractors, subcontractors and on-site personnel (i.e. an internal mechanism), as well as one for its Project-Affected Communities (PACs), stakeholders, Interested and/or Affected Parties (I&APs) and landowners (i.e. an external one). Both mechanisms are based on the same steps, although two distinct management bodies are required for each. These are a Community Development Department (CDD) under the auspices of a Community Liaison Officer (CLO), and a Human Resources (HR) Department, managed by a HR Manager.



Each mechanism is elaborated upon below.

## 2.1 Internal Grievance Mechanism

### 2.1.1 Overview

**Requirement:** According to the PS 2, a Grievance Mechanism is required for project developers to raise workplace concerns. The PS states that:

*“[...] The client will inform the workers of the Grievance Mechanism at the time of recruitment and make it easily accessible to them. The mechanism should involve an appropriate level of management and address concerns promptly, using an understandable and transparent process that provides timely feedback to those concerned, without any retribution. (IFC, 2012: p. 4<sup>1</sup>).*

An HR Department will be established under which this mechanism will function. The Grievance Mechanism shall be incorporated into the project’s HR policies and procedures, and a dedicated coordinator under this department will be assigned under the HR Manager with the responsibility to manage this mechanism. The mechanism shall be disclosed as per the normal human resources policies and procedures, as well as at the time of general labour recruitment, which includes the recruitment of any contractors or subcontractors.

The following procedures aim to ensure that all formal grievances for the workers, herewith defined as all on-site personnel, general workers as they are defined within the company, contractors and sub-contractors, are promptly heard, analysed, answered and managed. In order for the grievance mechanism to be effective, it must have (amongst other things) the following objectives:

- I. Established procedures that are easy to understand;
- II. Ensuring complainant’s confidentiality if he/she so wishes;
- III. A procedure for management to follow-up on reported grievances – the procedure must be clearly communicated with workers; and
- IV. A procedure for workers to monitor the status of their complaints.

The role and responsibilities of the coordinator under this department will be to:

<sup>1</sup> IFC. 2012. *IFC PS on Environmental and Social Sustainability*. [Online]. Available: [http://www.ifc.org/wps/wcm/connect/topics\\_ext\\_content/ifc\\_external\\_corporate\\_site/ifc+sustainability/our+approach/risk+management/performance+standards/environmental+and+social+performance+standards+and+guidance+notes](http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/our+approach/risk+management/performance+standards/environmental+and+social+performance+standards+and+guidance+notes) [2015, September 08].

- I. Receive complaints and grievances from workers in various forms, such as in a box, file or any other place that is deemed to be convenient and safe for the workers;
- II. Register the complaint in a complaints register and ensure that it is passed to the HR Manager;
- III. Should this become necessary and under the guidance of the HR Manager, bearing the responsibility of establishing an Internal Steering Committee (ISC) that will be ensuring the smooth resolution of grievances;
- IV. Bear the responsibility of promoting an environment that supports worker involvement in the project;
- V. Provide workers with opportunities to express their concerns and raise issues with experts in the field;
- VI. Establish and maintain an effective relationship between workers, their working environment, and ultimately the company; and
- VII. Build team spirit around the project.

## 2.2 Grievance Steps

The following mechanism for the Golden Valley WEF outlines six steps for receiving and recording grievances. These steps are:

**Step 1: Complaint Submission:** A complaint must be lodged verbally or in writing with the coordinator, the HR Manager or any member sitting on the ISC (should this be established). The coordinator will verify the authenticity of the complaint and pass it to the HR Manager or any member within the department elected to perform this task. All complaints submitted will be kept in a file and will also be registered electronically. Complaints can also be anonymous.

**Step 2: Complaint Registration:** The coordinator or anyone deputising for him/her must register the complaint and pass it to the responsible individual within 48 hours of receiving the complaint. The grievance must be logged in a complaints log database to be created for this purpose. The complainant will receive a stamped copy of this grievance form and will be notified of the date on which the grievance will be addressed.

**Step 3:** The HR Manager must make preliminary recommendations to the Golden Valley WEF Management for resolving the grievance. If necessary and appropriate, the manager may consult the ISC regarding the preliminary recommendation, which must take into consideration all relevant issues and potential outcomes. The coordinator must provide the preliminary recommendation to the responsible individual in a timely manner, but this cannot exceed 48 hours.

**Step 4:** A formal written response must be developed and delivered to the complainant within five (5) days of the date on which the grievance was lodged for submission. This response must include the rationale behind the response, the preliminary recommendation and potential outcomes. If the complaint requires action by the Golden Valley WEF Management, the responsible individual will assign responsibility for completing the action to the coordinator who will draft an action log to record the steps and deadlines to sign-off the grievance.

**Step 5:** If the complainant accepts Golden Valley WEF's formal response, this decision will be documented with the complainant signature on the complaints response form. In

this case, the latter form will be returned to the coordinator for recording into the grievance log. If the complainant rejects the response, then Step 6 is followed.

**Step 6:** The ISC will consult the HR Manager to review the merits of the rejection and to determine other measures to resolve the grievance, such as third party conciliation or consultation with the ISC. The complainant can consult with the ISC or any other person or body. If the ISC rejects the Golden Valley WEF's response, the matter will be referred back to the Golden Valley WEF's representatives and the complainant with the objective to reach a final agreement accepted by both the Golden Valley WEF and the complainant. If agreement is reached between both parties, the agreement will be captured in the complaints form with the signature of the complainant. If no agreement can be reached, the complainant can pursue other avenues such as legal and administrative at his/her own discretion and cost.

**Step 7:** The coordinator will develop a comprehensive record of the complaint and how it was resolved. Where formal action was identified to resolve the complaint, the complainant will confirm that the work has been completed by signing the complaints response form. If no agreement can be reached with the complainant, the coordinator - with the help of the ISC - will include the rationale for close-out and this form will be signed by the complainant and Golden Valley WEF Management.

## 2.1 External Grievance Mechanism

### 2.1.1 Overview

**Requirement:** According to the PS 1, an external communications and Grievance Mechanism is required for project developers to:

*"[...] i) receive and register external communications from the public; ii) screen and assess the issues raised and determine how to address them; iii) provide, track, and document responses, if any; and iv) adjust the management programme, as appropriate (IFC, 2012: p. 36<sup>2</sup>).*

A CDD should be established to deal with the following Grievance Procedures, which should also be incorporated into a Stakeholder Engagement Plan (SEP). Under the CDD, a CLO should be appointed to manage the grievance procedures. The mechanism shall be disclosed to the relevant PACs and landowners, stakeholders and I&APs as per the developer's Stakeholder Engagement Plan (SEP).

The following procedures aim to ensure that all formal grievances for the landowners and affected communities and local authorities are promptly heard, analysed, answered and managed. In order for the grievance mechanism to be effective, it must have (amongst other things) the following objectives:

- V. Established procedures that are easy to understand;
- VI. Ensuring complainant's confidentiality;
- VII.A procedure for management to follow-up on reported grievances – the procedure must be clearly communicated with affected landowners, adjacent communities and contractors; and

---

<sup>2</sup> IFC. 2012. *IFC PS on Environmental and Social Sustainability*. [Online]. Available: [http://www.ifc.org/wps/wcm/connect/topics\\_ext\\_content/ifc\\_external\\_corporate\\_site/ifc+sustainability/our+approach/risk+m anagement/performance+standards/environmental+and+social+performance+standards+and+guidance+notes](http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/our+approach/risk+m anagement/performance+standards/environmental+and+social+performance+standards+and+guidance+notes) [2015, September 08].

VIII. A procedure for communities and landowners to monitor the status of their complaints.

It will be important for the Golden Valley Project to employ a Community Liaison Officer (CLO) who will receive and record any grievances. The role and responsibilities of the CLO will be to:

- VIII. Receive complaints and grievances from landowners, communities and workers of the project;
- IX. Register the complaint in a complaints register and ensure that it is passed to the individual responsible for consideration. During the construction phase, the responsible party will be the Environmental Control Officer (ECO). During the operations phase, the responsible party will be the Operations and Management (O&M) contractor.
- X. Bear the responsibility of establishing a project steering committee (PSC) that will be ensuring the smooth resolution of grievances;
- XI. Bear the responsibility of promoting an environment that supports community involvement in the project;
- XII. Provide community members with opportunities to express their concerns and raise issues with experts in the field;
- XIII. Establish and maintain an effective relationship between the local community/ies and the project developers; and
- XIV. Build community spirit around the project.

## **2.2 Grievance Steps**

The following mechanism for the Golden Valley WEF outlines six steps for receiving and recording grievances. These steps are:

**Step 1: Complaint Submission:** A complaint must be lodged verbally or in writing with the CLO or members of the PSC when established. The CLO will verify the authenticity of the complaint and pass it to the individual responsible for consideration of complaints. All complaints submitted to the CLO will be kept in a file and also registered electronically.

**Step 2: Complaint Registration:** The Community Liaison Officer (CLO) or anyone deputising for him/her must register the complaint and pass it to the responsible individual within 48 hours of receiving the complaint. The grievance must be logged in a complaints log database to be created for this purpose. The complainant will receive a stamped copy of this grievance form and will be notified of the date on which the grievance will be addressed.

**Step 3:** The CLO must make preliminary recommendations to the Golden Valley WEF Management for resolving the grievance. If necessary and appropriate, the CLO may consult the PSC regarding the preliminary recommendation, which must take into consideration all relevant issues and potential outcomes. The CLO must provide his/her preliminary recommendation to the responsible individual in a timely manner, but this cannot exceed 48 hours.

**Step 4:** A formal written response must be developed and delivered to the complainant within five (5) days of the date on which the grievance was lodged for submission. This response must include the rationale behind the response, the preliminary recommendation and potential outcomes. If the complaint requires action by the

Golden Valley WEF Management, the responsible individual will assign responsibility for completing the action to the CLO who will draft an action log to record the steps and deadlines to sign-off the grievance.

**Step 5:** If the complainant accepts Golden Valley WEF's formal response, this decision will be documented with the complainant signature on the complaints response form. In this case, the latter form will be returned to the CLO for recording into the grievance log. If the complainant rejects the response, then Step 6 is followed.

**Step 6:** The PSC will consult the project manager to review the merits of the rejection and to determine other measures to resolve the grievance, such as third party conciliation or consultation with the PSC. The complainant can consult with the PSC or any other person or body. If the PSC rejects the Golden Valley WEF's response, the matter will be referred back to the Golden Valley WEF's representatives and the complainant with the objective to reach a final agreement accepted by both the Golden Valley WEF and the complainant. If agreement is reached between both parties, the agreement will be captured in the complaints form with the signature of the complainant. If no agreement can be reached, the complainant can pursue other avenues such as legal and administrative at his/her own discretion and cost.

**Step 7:** The CLO will develop a comprehensive record of the complaint and how it was resolved. Where formal action was identified to resolve the complaint, the complainant will confirm that the work has been completed by signing the complaints response form. If no agreement can be reached with the complainant, the CLO - with the help of the PSC - will include the rationale for close-out and this form will be signed by the complainant and Golden Valley WEF Management.

# ANNEXURE H - REHABILITATION AND TOPSOIL MANAGEMENT PLAN

## Golden Valley I Wind Energy Facility

# REHABILITATION AND TOPSOIL MANAGEMENT PLAN

<p><b>Prepared for:</b></p>  <p><b>BioTherm Energy</b></p> <p>Building 1 Design Quarter Fourways 2055</p> <p>South Africa</p>	<p><b>Prepared by:</b></p>  <p><b>EOH Coastal &amp; Environmental Services</b></p> <p>67 African Street, Grahamstown, 6139</p> <p>South Africa</p>
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**28 August 2015**

## REVISIONS TRACKING TABLE



### EOH Coastal and Environmental Services

**Report Title:** Golden Valley I WEF; Rehabilitation and Topsoil Management Plan

**Report Version:** Final

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Name	Responsibility	Signature	Date
Roy de Kock	Rehabilitation Specialist/Author		28 August 2015

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## TABLE OF CONTENTS

<b>1</b>	<b>INTRODUCTION</b> .....	<b>1</b>
<b>2</b>	<b>OPEN SPACE MANAGEMENT PLAN</b> .....	<b>2</b>
<b>3</b>	<b>WATER COURSES AND WETLANDS</b> .....	<b>3</b>
<b>4</b>	<b>FAUNAL RELOCATION PLAN</b> .....	<b>4</b>
4.1	General conditions.....	4
4.2	Reptile relocation.....	4
4.3	Amphibian relocation .....	4
4.4	Mammal relocation .....	5
<b>5</b>	<b>FLORAL RELOCATION</b> .....	<b>6</b>
5.1	General conditions.....	8
<b>6</b>	<b>SITE CLEARING</b> .....	<b>9</b>
6.1	Vegetation clearing.....	9
6.2	Topsoil clearing .....	9
<b>7</b>	<b>REHABILITATION AND LANDSCAPING MANAGEMENT</b> .....	<b>10</b>
7.1	Vegetation .....	10
7.2	Weeds and alien invasive plants/trees.....	11
7.3	Soil stabilisation and stockpiling .....	11
7.4	Monitoring.....	12
<b>8</b>	<b>ALIEN MANAGEMENT PLAN</b> .....	<b>14</b>
8.1	Initial Control .....	14
8.1.1	<i>Fell trees - control stumps - plant grass (Rooikrantz, Bugweed)</i> .....	14
8.1.2	<i>Control for shrubs (such as Lantana rugosa)</i> .....	15
8.1.3	<i>Chemical control of alien herbs:</i> .....	16
8.2	Follow-up control .....	16
8.2.1	<i>Control methods for dense re-growth</i> .....	16
8.2.2	<i>Control methods for low-medium density re-growth</i> .....	17
8.2.3	<i>Maintenance Control</i> .....	17
8.3	Integrated Control.....	18
8.3.1	<i>High Priority Areas for control</i> .....	18
8.3.2	<i>Low priority areas for control</i> .....	19
<b>9</b>	<b>FIRE MANAGEMENT</b> .....	<b>20</b>
9.1	Construction .....	20
9.2	Operation .....	20

## LIST OF TABLES

Table 1.1.	Details of the eight farm portions for the Golden Valley I Wind Energy Facility.....	1
Table 5.1.	List of floral species for relocation .....	6
Table 8.1.	List of Alien Vegetation identified onsite.....	14

# 1 INTRODUCTION

Amstilite (RF) Proprietary Limited was awarded as a preferred bidder under the fourth round of the Department of Energy's (DoE) Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). As such, the client will be constructing a 120MW Wind Energy Facility (WEF) consisting of 48 wind turbines, each with a maximum generating output of 2.55MW. The following ancillary infrastructure will be necessary:

- I. Internal access roads;
- II. A building to house the control instrumentation and backup power support, as well as a store room for the maintenance equipment;
- III. Underground and overhead 33MW electrical cabling connecting the turbines and the project substation;
- IV. On-site Olivewoods 33/132kV substation;
- V. An overhead 132kV line connecting the on-site Olivewoods Substation to the Preferred Bidder Amakhala Emoyeni Wind Energy Facility on-site Kopleegte Substation; and
- VI. Turbine foundations and hardstand areas.

Amstilite (RF) Proprietary Limited plans to develop a Wind Energy Facility (WEF) on eight farms (Table 1.1) around the town of Cookhouse in the Blue Crane Route Local Municipality in the Eastern Cape Province of South Africa.

**Table 1.1. Details of the eight farm portions for the Golden Valley I Wind Energy Facility**

	Farm Number
1	Portion 2 of the Farm Olive Woods Estate No. 169
2	Farm No. 283
3	Portion 1 of the Farm Cregus Kraal No. 181
4	The Farm No. 284
6	The Remaining Extent of the Farm Mullerskraal No. 159
7	The Remaining Extent of the Farm Olive Fonteyn No. 166
8	The Remaining Extent of the Farm Klein Riet Fontein No. 167
9	Portion 1 of the Farm Boschfonteyn 180

EOH Coastal & Environmental Services (EOH) were commissioned by Amstilite (RF) Proprietary Limited to prepare a Rehabilitation and Topsoil Management Plan for the Golden Valley I WEF.

This Rehabilitation and Topsoil Management Plan includes the following management aspects:

1. Open space management
2. Water course and wetland management
3. Faunal relocation
4. Floral relocation
5. Site clearing
  - a. Vegetation clearing
  - b. Topsoil clearing
6. Rehabilitation & landscaping management
  - a. Vegetation
  - b. Weeds and alien invasive plants/trees
  - c. Soil stabilisation and stockpiling
  - d. Monitoring
7. Alien vegetation management
8. Fire management

## 2 OPEN SPACE MANAGEMENT PLAN

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

The following issues should be addressed:

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

### **3 WATER COURSES AND WETLANDS**

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

- a. No hard standing surfaces must be constructed within 100 m from a channel edge, except for roads and cable crossings.
- b. Any stormwater management features must be suitably designed and constructed to maintain stormwater flow to acceptable levels and minimise risk of erosion and scouring.
- c. No storm-water runoff should be discharged directly into the drainage line/seep, where it could lead to erosion.
- d. The exotic vegetation growing within the water courses and wetlands and/or buffers directly adjacent to the proposed development should be removed as soon as possible and these areas should be kept weed free.

## 4 FAUNAL RELOCATION PLAN

### 4.1 General conditions

- a. No fauna present on the property may be wilfully harmed unless it threatens the life of an employee.
- b. Hunting, disturbance and collection of animals in the area must be prohibited.
- c. Construction areas must be screened for slow moving fauna before any activities commence and removed if necessary.
- d. Any animals injured by the construction activities should be taken to a veterinarian for treatment.
- e. Minimise impacts on faunal habitat by adhering to the vegetation specialist recommendations.
- f. Vehicle speeds should be kept to a minimum by using informative signage and speed humps.
- g. If certain areas are found to involve unusually high mortality rates, then suitable mitigation (e.g. the erection of low fences alongside the problem area) may be required. Seasonal mortality to amphibians moving to breeding sites around dams should be monitored and road traffic at night during peak amphibian breeding periods should be controlled.
- h. Monitor excavations daily and rescue any trapped fauna. When filled with water the excavations should be checked twice a day. Release the rescued fauna in a suitable habitat adjacent to the study area.
- i. The removal of trees (including alien vegetation) should not be undertaken during the breeding season.
- j. Domestic waste should be placed in suitable covered containers and removed from the site on a regular basis to reduce the attraction of scavenging animals, e.g. gulls and monkeys.
- k. External and internal fences must be monitored for traps.

### 4.2 Reptile relocation

- a. An on foot search conducted by a professional reptile team is to be carried out to search for reptiles within every possible habitat. This is achieved by walking to find reptiles during the day which are sun basking, hunting etc.; lifting features such as rock, where reptiles may be retreating etc.; and searching the roads after dark in the immediate areas around the proposed development site. The last mentioned method is only used when practical. The theory behind this method is that nocturnal reptile species often cross roads at night or moon bask after dark (sleep on the road surface to absorb heat from the road).
- b. Once caught, each reptile will be placed into transport containers suited for that individual reptile.
- c. Cannibalistic reptiles will be transported separately.
- d. The transport containers will be kept cool to decrease stress for the reptiles.
- e. The reptiles will be relocated as soon as possible after they have been caught.
- f. Professional equipment (such as hook sticks and goggles) will be used to ensure limited harm to the reptiles and to prevent the team members from being bitten by venomous snakes and to prevent venom sprayed into one's eyes from Rinkhals.
- g. Baited traps will not be used.
- h. Nooses will not be used as this causes injury to lizards.
- i. Safety procedures will be in place for the reptile's release.

### 4.3 Amphibian relocation

- a. Amphibians will be caught by hand and net.
- b. Amphibians will be placed into transport containers with damp substrates to avoid dehydration.
- c. Tadpoles may be collected; they will be placed into water containers and released as soon as possible.
- d. During release, the tadpoles will be allowed to acclimatize to the new water in terms of temperature, pH etc.
- e. Breeding adult frogs and toads may be captured at night when they are exposed.

#### **4.4 Mammal relocation**

- a. In terms of the conducted survey, the areas demarcated for clearing do not pose a risk/threat to mammals, for example: the presence of mammals was minimal.
- b. If a mammal is trapped within an area where construction is taking place then a professional handler will be called upon to remove the mammal.
- c. Protective clothing such as gloves will be used when handling mammals.
- d. All staff used in the capture and relocation of mammals will be inoculated against Rabies and Tetanus.
- e. No immobilizers or tranquilizers will be used on the mammals.

## 5 FLORAL RELOCATION

Plant species that have been recorded or that are likely to occur, for which permits will be required in terms of the Cape Nature and Environmental Conservation Ordinance No. 19 of 1974, TOPS and the National Forests Act of 1998 (NFA), are listed in the table below (Table 5.1). Protected species will be removed from the designated construction footprint and relocated to adjacent areas of similar habitat that will not be affected by construction. Plant search and rescue will only be conducted within the area where direct construction activities are to occur as per the approved project EMP. In terms of a site survey conducted, it is noted that the type of plant species together with the amount of plant species, setting up a nursery is not necessary for this project.

**Table 5.1. List of floral species for relocation**

Family	Scientific Name	SA red data list	PNCO	NEMBA	Protected Tree List
AIZOACEAE	<i>Aizoon rigidum</i>	Least Concern	Schedule 4	-	-
ASPHODELACEAE	<i>Aloe ciliaris</i>	Not Evaluated	Schedule 4	-	-
ASPHODELACEAE	<i>Aloe saponaria</i>	Least Concern	Schedule 4	-	-
ASPHODELACEAE	<i>Aloe striata</i>	Least Concern	Schedule 4	-	-
AMARYLLIDACEAE	<i>Ammocharis coranica</i>	Least Concern	Schedule 4	-	-
PORTULACACEAE	<i>Anacampseros telephiastrum</i>	Least Concern	Schedule 4	-	-
IRIDACEAE	<i>Aristea pusilla</i>	Least Concern	Schedule 4	-	-
MESEMBRYANTHEMACEAE	<i>Bergeranthus katbergensis</i>	Least Concern	Schedule 4	-	-
MESEMBRYANTHEMACEAE	<i>Bergeranthus multiceps</i>	Data Deficient	Schedule 4	-	-
AMARYLLIDACEAE	<i>Boophone disticha</i>	Declining	Schedule 4	-	-
AMARYLLIDACEAE	<i>Brunsvigia gregaria</i>	Least Concern	Schedule 4	-	-
APOCYNACEAE	<i>Carissa haematocarpa</i>	Not Evaluated	Schedule 4	-	-
MESEMBRYANTHEMACEAE	<i>Chasmatophyllum musculinum</i>	Least Concern	Schedule 4	-	-
AMARYLLIDACEAE	<i>Crinum sp</i>	-	Schedule 4	-	-
APOCYNACEAE	<i>Cynanchum natalitium</i>	Least Concern	Schedule 4	-	-
MESEMBRYANTHEMACEAE	<i>Delosperma ecklonii</i>	-	Schedule 4	-	-
MESEMBRYANTHEMACEAE	<i>Drosantherum lique</i>	Least Concern	Schedule 4	-	-
APOCYNACEAE	<i>Duvalia caespitosa</i>	Least Concern	Schedule 4	-	-
EUPHORBIACEAE	<i>Euphorbia esculenta</i>	Least Concern	-	-	-

Rehabilitation Management Plan – 28 August 2015

Mar 21, 2019 10:43

EUPHORBIACEAE	<i>Euphorbia globosa</i>	Endangered	Schedule 4	-	-
EUPHORBIACEAE	<i>Euphorbia meloformis</i>	Near Threatened	Schedule 4	Protected Species	-
AIZOACEAE	<i>Galenia pubescens</i>	Least Concern	Schedule 4	-	-
IRIDACEAE	<i>Gladiolus edulis</i>	Least Concern	Schedule 4	-	-
IRIDACEAE	<i>Gladiolus ochroleucus</i>	Least Concern	Schedule 4	-	-
MESEMBRYANTHEMACEAE	<i>Glottiphyllum cf longum</i>	Least Concern	Schedule 4	-	-
AMARYLLIDACEAE	<i>Haemanthus albiflos</i>	Least Concern	Schedule 4	-	-
ASPHODELACEAE	<i>Haworthia blackburniana</i>	-	Schedule 4	-	-
ORCHIDACEAE	<i>Holothrix sp</i>	-	Schedule 4	-	-
MESEMBRYANTHEMACEAE	<i>Mestoklema elatum</i>	Least Concern	Schedule 4	-	-
IRIDACEAE	<i>Moraea algoensis</i>		Schedule 4	-	-
IRIDACEAE	<i>Moraea bipartita</i>	Least Concern	Schedule 4	-	-
APOCYNACEAE	<i>Pachypodium sp</i>	-	Schedule 4	-	-
MESEMBRYANTHEMACEAE	<i>Ruschia cradockensis</i>	Least Concern	Schedule 4	-	-
MESEMBRYANTHEMACEAE	<i>Ruschia rigens</i>	Least Concern	Schedule 4	-	-
MESEMBRYANTHEMACEAE	<i>Ruschia sp</i>	-	Schedule 4	-	-
APOCYNACEAE	<i>Sarcostemma viminale</i>	Least Concern	Schedule 4	-	-
APOCYNACEAE	<i>Stapelia gigantea</i>	Least Concern	Schedule 4	-	-
MESEMBRYANTHEMACEAE	<i>Trichodiadema bulbosum</i>	Least Concern	Schedule 4	-	-
MESEMBRYANTHEMACEAE	<i>Trichodiadema setuliferum</i>	Least Concern	Schedule 4	-	-
IRIDACEAE	<i>Tritonia securigera</i>	Least Concern	Schedule 4	-	-

## 5.1 General conditions

Below are the recommendations/conditions for plant removal:

- a. A micro-siting exercise is to be conducted before the layout is finalised with all specialists to try and minimise impacts as best possible. Once the final site layout has been determined the botanist will be consulted in association with the appointed ECO to finalise the plant relocation and vegetation clearing plan.
- b. Areas to be cleared of vegetation must be clearly demarcated before clearing commences.
- c. Areas must only be stripped of vegetation as and when required and in particular only once all SCC have been relocated for that area.
- d. Once site boundaries are demarcated, the area to be cleared of vegetation will be surveyed by the plant search and rescue team under the supervision of the botanist and ECO to identify species suitable for rescue and commence removal of plants.
- e. This material should be appropriately removed from its locality and immediately relocated into adjacent areas of similar habitat that will not be disturbed by construction.
- f. Wherever possible any seed-bearing material will be collected immediately and planted as soon as possible.
- g. Permits from DEDEAT and DAFF must be kept on site and in the possession of the flora search and rescue team at all times.
- h. Should a portion of an access road be newly constructed, the route shall be selected to have a minimal disturbance to natural vegetation under the guidance of the ECO and botanical specialist. No other routes shall be used by vehicles or personnel for the purpose of gaining access to the site.
- i. Once search and rescue and plant relocation is complete, a short audit report and certificate of clearance will be issued by the respective contractor or botanical specialist and copies will be supplied to DEDEAT and DAFF.

## **6 SITE CLEARING**

### **6.1 Vegetation clearing**

- a. Before clearing of vegetation, the Contractor shall ensure that all litter and non-organic material is removed from the area to be cleared.
- b. Vegetation clearing shall take place in a phased manner in order to retain vegetation cover for as long as possible in order to reduce the size of areas where dust can be generated by wind.
- c. All seed bearing invasive alien vegetation shall be removed from site.
- d. No removed vegetation will be dumped onto adjacent intact vegetation and topsoil will be removed separately.
- e. All indigenous plant material removed from cleared areas shall be stockpiled for mulching or temporarily stockpiled in a demarcated area, which meets the satisfaction of the RE or ECO, before disposal at an approved landfill site.
- f. The use of herbicides is prohibited unless approved by the RE and ECO.
- g. The Contractor shall submit a site clearing Method Statement to the RE and ECO. This Method Statement shall clearly detail the phasing of the clearing and how this will be done, where and how cleared material will be stored or disposed of, etc.

### **6.2 Topsoil clearing**

- a. Topsoil (an approximately 100 - 150 mm layer) shall be removed from areas to be disturbed during construction and safely stockpiled for landscaping purposes.
- b. Topsoil stockpiles shall be convex and no more than 2 m high.
- c. Stockpiles shall be located in areas agreed to by the ECO or RE.
- d. Topsoil stockpiles shall not be subject to compaction greater than 1 500 kg/m<sup>2</sup> and shall not be pushed by a bulldozer for more than 50 m.
- e. Topsoil stockpiles shall be monitored regularly to identify any alien plants, which shall be removed when they germinate to prevent contamination of the seed bank.
- f. Appropriate measures, as agreed with the ECO/RE, shall be taken to protect topsoil stockpiles from erosion by wind or water by providing suitable stormwater and cut off drains, containment using hessian or similar material and/or by establishing suitable temporary vegetation.
- g. Stockpiles shall not be covered with materials such as plastic that may cause it to compost or would kill the seed bank.
- h. The Contractor shall be held responsible for the replacement, at his/her own cost, for any unnecessary loss of topsoil due to his failure to work according to the requirements of this Management Plan and Method Statement.

## 7 REHABILITATION AND LANDSCAPING MANAGEMENT

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

The Rehabilitation and Landscaping Plan will rehabilitate the following areas:

- a. Road verges after road construction is completed;
- b. Stormwater soak away features and landscaped areas;
- c. The transformed portions of the site not developed must be rehabilitated by planting indigenous plant species occurring in the area.
- d. Areas where pockets of alien invasive species have been removed.
- e. Only plants on the approved list may be used for landscaping purposes in gardens and also for rehabilitation.

A list of indigenous plants used during rehabilitation must be approved by the ECO prior to commencement of rehabilitation activities.

### 7.1 Vegetation

The re-vegetation process will not only focus on the rehabilitation of the road verges but also on all exposed soil, transformed areas and areas where alien invasives have been removed within the site.

Indigenous grass species, such as *Melinis repens*, *Cynodon dactylon* *Stenotaphrum secundatum* (or other approved) should be incorporated into these areas to create the initial cover. These should either be seeded or sods removed from cleared areas. Where slopes are steep, pioneer species such as *Carpobrotus edulis/deliciosus* and *Tetragonia fruticosa* should be used to create a stabilizing cover.

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

- Clearing of vegetation should take place in accordance with the construction programme, instead of exposing large tracts of land simultaneously.
- Clearing of invaded areas should be undertaken as per the Alien Management Plan;
- No re-useable topsoil should be removed from the site.
- Sods used in re-vegetation should be obtained directly from the veld, but not from the sensitive areas on site. Veld sods shall contain at least a 50 mm topsoil layer and the roots shall be minimally disturbed. They shall be obtained either from the near vicinity of the site from an area selected by the Site Engineer or ECO, or from areas of the proposed development site that are earmarked for development. The soil shall be compatible with that removed from the area to be re-vegetated and shall not have been compacted by heavy machinery.
- Indigenous seeds may be harvested for purposes of re-vegetation in areas that are free of alien invasive vegetation, either at the site prior to clearance or from suitable neighbouring sites;
- The stockpiled vegetation from the clearing operations should be reduced to mulch;
- Indigenous plant material must be kept separate from alien material. The indigenous vegetative material shall be reduced by either mechanically means (chipper) or by hand-axing to sticks no longer than 100 mm. The chipped material should be mixed with the topsoil at a ratio not exceeding 1:1;

- Mulch is to be harvested from areas that are to be denuded of vegetation during construction activities, provided that they are free of seed-bearing alien invasive plants;
- No harvesting of vegetation may be done outside the area to be disturbed by construction activities;
- Mulches shall be collected in such a manner as to restrict the loss of seed;
- Brush-cut mulch shall be stored for as short a period as possible, and seed released from stockpiles shall be collected for use in the rehabilitation process.
- Re-vegetated areas should be monitored every 3 months for the first 12 months and every 6 months thereafter;
- Re-vegetated areas showing inadequate surface coverage (less than 30% within 9 months after re-vegetation) should be prepared and re-vegetated from scratch;
- The Contractor will be responsible for maintaining the desired level of moisture necessary to maintain vigorous and healthy growth in re-vegetated area. The quantity of water applied at one time should be sufficient to penetrate the soil to a minimum depth of 800 mm, where appropriate, and at a rate that will prevent saturation of the soil;
- Water used for the irrigation of re-vegetated areas should be free of chlorine and other pollutants that might have a detrimental effect on the plants;
- All seeded, planted or sodded grass areas and all shrubs or trees planted are to be irrigated at regular intervals;
- Where herbicides are used to clear vegetation, species-specific chemicals should be applied to individual plants only. General spraying should be strictly prohibited;
- All horticultural activities should meet the following requirements:
  - Activities must be limited to the building environs and certain landscaped areas;
  - fertiliser, pesticide and herbicide use should be strictly controlled;
  - Invertebrate pests should be controlled using the least environmentally damaging insecticides. Pyrethroids and Phenylpyrazoles are preferable to Acetylcholines. Insecticides that are specific to the pest (species specific) should be favoured. The lowest effective dosages must be applied. Supplier's advice should be sought. Fungal pathogens should be used in preference to chemical insecticides; and no dumping of any materials in undeveloped open areas and buffer strips (biological corridors) should be permitted. Activities in the surrounding open undeveloped areas must be strictly regulated.

## 7.2 Weeds and alien invasive plants/trees

- The Contractor will be responsible for controlling any woody alien invasive species. The Contractor shall ensure that all weeds and alien invasive species are removed.
- Alien management should be as per recommendation of the Alien Management Plan (Section 8)
- The Contractor shall mow the grass in specified grassed areas or on road verges at intervals ordered by the Engineer. Grass cuttings shall be collected and disposed of as directed by the Engineer. The grass shall be mowed at regular intervals to stimulate lateral growth. The first cutting shall take place when the grass is 50 mm high and thereafter the height shall be maintained at between 30 and 50 mm.
- If during the establishment period, non-indigenous weeds or other non-indigenous plants are present in the planted areas, such vegetation shall be removed by hand.
- The areas where alien vegetation must be removed:
  - Areas within the demarcated wider development footprint (100mx120m)
  - If alien vegetation is currently used by people such as farm workers etc. for fire wood, then the vegetation may be left for this purpose.

## 7.3 Soil stabilisation and stockpiling

- Soil stockpiles during the construction phase should be placed in such a manner that natural drainage pattern is not disrupted (i.e. no stockpiles should be located in or adjacent to any seepage or drainage areas);

- Topsoil stockpiles older than six months should be enriched prior to use in rehabilitation activities to ensure the effectiveness of the topsoil;
- No imported soil material should be used on the property, unless it can be ensured that it is free of exotic and alien vegetation seeds;
- Where necessary, appropriate dust suppression techniques should be employed, such as regular watering of exposed areas and stockpiles;
- It is recommended that exposed areas of soil be stabilised as soon as possible, either through appropriate surfacing (e.g. roads) or through landscaping (e.g. servitudes, etc.); and
- It is recommended that topsoil be stockpiled separately to subsoil for use as the final soil layer during rehabilitation.
- The natural topography of the site should, as far as possible, be maintained during and after construction (i.e. indiscriminate levelling or elevating of the site should be avoided);
- Where any addition slope elevation has occurred this must be levelled and contoured to reduce the slope as well as erosion potential while un-vegetated.
- In the case of surface wash-away or wind erosion, the Contractor shall implement remedial measures as soon as possible in order to prevent further erosion;
- Appropriate erosion control/ soil stabilisation measures are to be implemented;
- During construction the Contractor shall protect areas susceptible to erosion by installing necessary temporary and permanent drainage works as soon as possible and by taking other measures necessary to prevent the surface water from being concentrated in streams and from scouring the slopes, banks or other areas.
- Any runnels or erosion channels developed during the construction period or during the vegetation establishment period shall be backfilled and compacted by the Contractor, and the areas restored to a proper condition;
- Installing silt fences wherever surface runoff is likely to occur;
- Additional stabilisation of cleared areas to prevent and control erosion must be actively managed. The method of stabilisation should be determined in consultation with the ECO and engineer. The following methods (or a combination) may be considered, depending on the specific conditions of the site:
  - Brushcut packing
  - Mulch or chip cover
  - Straw stabilising (at the rate of one bale/m<sup>2</sup> and rotated into the top 100mm of the completed earthworks)
  - Watering
  - Planting / sodding
  - Hand seeding
  - Hydroseeding
  - Soil binders and anti-erosion compounds
  - Mechanical cover or packing structures:
    - Geofabric
    - Hessian cover
    - Armourflex
    - Log / pole fencing
    - Retaining walls
- Traffic and movement over stabilised areas is to be restricted and controlled, and damage to stabilised areas shall be repaired and maintained to the satisfaction of the ECO;
- Anti-erosion compounds, consisting of an organic or inorganic material, may be employed to bind soil particles together. Products used must be proven able to suppress dust and erosion; and
- Areas to be landscaped that have been compacted to the development activity must be ripped and seeded.

## 7.4 Monitoring

A monitoring programme shall be put in place not only to ensure compliance with the approved site EMPr throughout the construction phase, but also to monitor any environmental issues and

impacts which require attention over the vegetation establishment phase, post construction.

An ECO must be appointed to ensure compliance with the EMPr and to carry out monitoring activities, which may be required on an annual or biannual basis for the lifespan of the wind energy facility.

## 8 ALIEN MANAGEMENT PLAN

All alien invasive species and declared weeds, in terms of the Conservation of Agricultural Resources Act (Act 43 of 1983), as well as the Alien and Invasive Species list in terms of sections 66(1), 67(1), 70(1)(a), 71(3) and 71A of the National Environmental Management: Biodiversity Act (Act 10 of 2004) are to be systematically eradicated, and any of these species colonising disturbed ground after the completion of construction are to be eradicated and destroyed prior to attaining the seed formation phase.

The following provides guidelines for onsite alien plant management:

- a. The appropriate alien management strategy pertinent to the situation/environment should be identified and implemented.
- b. Alien Plant Management plan must commence in a phased manner in parallel with construction phases.
- c. The Integrated Alien Plant Management Plan for alien vegetation includes three phases:
  - I. **Initial control:** drastic reduction of the existing population;
  - II. **Follow-up control:** reduction of seedlings, root suckers and coppice growth;
  - III. **Maintenance control:** sustain low alien plant numbers/density with low annual costs. At this phase, alien plants must no longer be considered a problem. Monitor the situation two-three times each year (spring, mid-summer and autumn) to avoid alien plant re-infestation, spread and densification, and thereby avoid increased control costs.

The following alien vegetation was identified onsite:

**Table 8.1. List of Alien Vegetation identified onsite.**

Scientific Name	Common name	Category
<i>Opuntia aurantiaca</i>	Jointed cactus	1b
<i>Opuntia lindheimeri</i>	Small round-leaved prickly pair	1b
<i>Opuntia ficus-indica</i>	Sweet prickly pair	1b
<i>Lantana rugosa</i>	Bird's Brandy	1b

### 8.1 Initial Control

#### 8.1.1 Fell trees - control stumps - plant grass (Rooikrantz, Bugweed)

- a. Fell trees, treat stumps, remove wood and plant grass. This strategy is suitable where infestations are easily accessible and can be harvested (i.e. for firewood, charcoal, building materials, mulch production). It is also suitable for trees that need removal for utility or aesthetic purposes or where they pose a potential hazard to waterways, building structures, etc.
- b. Control Method for trees: Use chainsaws, bow saws, brush cutters or cane knives to fell trees and saplings. Stump height should be less than 15 cm. Apply a registered herbicide mix with hand sprayers, paint brushes or knapsack sprayers at low pressure, using solid cone nozzles. Use a suitable dye to ensure that stumps are not missed.
  - I. Cut stump treatment: Apply the recommended herbicide mixed in water to the cut surface of stumps. Do NOT spray the sides of stumps. Apply herbicide mix up to one hour after felling or the cut wood will seal.
  - II. Total Stump treatment: Apply the recommended herbicide mixed in diesel to the cut surface, down the sides of stumps and to any exposed roots. The herbicide mix can be applied even several days after felling. Ensure herbicide can be mixed with diesel.

- III. Stump treatment with herbicide plugs: After felling, make holes in the stumps and insert plugs containing the herbicide, which is released into the stumps.
- c. Control method for seedlings, saplings and coppice: In a mixed age stand, where there are young plants and coppice growth, cut the plants with a brush cutter and treat the stumps. Hand-pull seedlings. Do not spray foliage as many plants may be damaged during felling and may not absorb enough of the herbicide for effective control. Untreated plants can be controlled with foliar herbicide during follow-up work.
- d. Disposal of brushwood: Where wild fires are a potential hazard, spread out the brushwood evenly over a large area. Avoid large heaps as this is a fire hazard and burning will cause breakdown of the soil structure. Trees that cannot be utilised should be controlled standing to avoid burning large amounts of wood lying on the soil surface.
- e. Rehabilitation: Sow grass in the bare soil around the stumps immediately after the first reliable rains. Spread brushwood over the buried grass seed to aid seedling establishment. Brushwood can be used as fences/barriers and pegged to stabilise slopes where necessary.

### 8.1.2 Control for shrubs (such as Lantana rugosa)

- a. Alien shrubs less than 1 m tall:
  - I. Foliar application of a registered herbicide is required.
  - II. Where grass is present use selective broadleaf herbicides that do not harm the grass.
  - III. Where grass is absent, use selective or non-selective herbicides.
  - IV. When dense seedling growth of uniform height is present use knapsack sprayers with flat fan nozzles.
  - V. Use solid cone nozzles for seedlings of uneven height, coppice growth, root suckers and short saplings.
- b. Alien shrubs taller than 1 m:
  - I. *Mechanical Control pre-treatment*: Where shrubs are taller than 1.5 m, the height must be reduced by cutting, using sharpened hoes, cane knives or motorised brush cutters. For large areas of dense growth, use a tractor-mounted gyro-mower (set as low as possible) after slashing or cutting plants, either treat the freshly cut stumps or allow re-growth to knee height and then spray with a suitable registered herbicide.
  - II. *Cutting for stump treatment*: This is suitable for low - medium density infestations but is usually not practical for high density infestations. Slash plants below 15 cm in height for stump application. Control the stumps immediately after cutting the plants. Stump application is best during the active growing season.
  - III. *Cutting from coppice treatment*: This is suitable for medium - high density infestations. Slash plants at a convenient height (e.g. knee height for foliar application to coppice re-growth. Cutting dense plants is good winter work but is tiring so must be well organised. Spray coppice re-growth during the active growing season, when there is enough leaf cover to absorb the herbicide.
  - IV. *Flattening*: Roll empty 200L metal drums or place large pieces of corrugated iron to make paths through dense thickets of plants (e.g. Bramble). This increase access for foliar or stump application.
  - V. *Cut pathways*: This increases access for control work.
  - VI. *Mechanical uprooting*: Uprooting of shrubs with mattocks results in soil disturbance, especially where large plants are present in dense thickets. Use only where not susceptible to erosion or where soil can be stabilised effectively.
- c. Disposal of small amounts of cut material: Small amounts of cut top growth material do not impede access for follow-up control work. Leave the material to act as a mulch and to decompose, or spread over planted grass seed to aid seedling establishment. This adds organic material to the soil.
- d. Disposal of large amounts of cut material: Cut the plants and use long poles/branches to roll

the material away from stumps. Where cut material hampers access for follow-up control, roll into heaps and burn. Alternatively, spread large amounts of cut material over a large area for a cool burn. This avoids hot intense fires that would destroy the soil surface. Burn during the wet season for a cooler burn.

- e. **Rehabilitation:** Avoid sowing on compacted soil or soil with a 'crust' as the seed will be washed away after the first rains. In such cases light soil disturbance is necessary e.g. using rakes for broadcast sowing or sharp-pointed hoes for row sowing. Sow suitable grass species on bare soil. Cover the buried seed with small amounts of cut top growth material to aid grass establishment. The material retains moisture in the soil, traps soil after heavy rains, and by rotting adds organic material to the soil to aid seedling establishment.

### **8.1.3 Chemical control of alien herbs:**

- a. There are many herbaceous alien (soft/non-woody) species present and likely to occur sporadically throughout the operational phase of the development.
- b. Alien herbs are called broadleaf weeds and some have pre and post-emergent herbicides registered for their control.
- c. However, where alien herbs are associated with woody alien plants, herbicides registered for control of woody aliens are often also used for control of broadleaf weeds.
- d. Alternatively, glyphosate is used, as this is often registered for both woody and non-woody species. Glyphosate is a post-emergent (foliar applied) herbicide that is inactivated by soil.
- e. Rehabilitation: Alien herbs usually occur in disturbed areas, where rehabilitation is not generally a high priority. However in some situations, rehabilitation with grass is required for control of alien herbs. Rehabilitation is required, for example, after control of thickets of *Bidens* species (black jacks) and *Tagetes minuta* (Khakibos) is controlled prior to planting summer grasses.
- f. Perennial grasses are often planted after a disturbance to stabilise the soil and suppress alien herbs. Alternatively creeping species that have good soil binding ability prevent erosion. Planting a quick-growing grass on bare soil results in a dense rapid cover that successfully competes with establishing alien herbs.

## **8.2 Follow-up control**

Follow up control of alien seedlings, saplings and coppice re-growth is essential to achieve and sustain the progress made with initial control work. If this phase is neglected, the cleared area will soon become infested with dense alien vegetation again, arising either from re-invasion by the original species or from invasion/encroachment by another species. Follow-up control is essential to prevent alien seedlings suppressing planted or colonizing grasses. Before starting initial control operations in new infestations, all required follow-up control and rehabilitation work must be completed or in progress in areas initially prioritised for clearing and rehabilitation.

Follow-up control should combine the following methods:

- **Chemical control methods** (always use registered herbicides);
- **Mechanical control methods**, and
- **Available biological control agents**

Evaluate and select methods for follow-up control work according to species, and the type and density of re-growth.

### **8.2.1 Control methods for dense re-growth**

Dense re-growth may arise after initial control operations, as seedlings, root suckers or stump coppices. For example wattle seedlings are stimulated to germinate after fire or seedlings may arise from a high seed bank in the soil.

- a. Do not uproot or hoe out dense seedlings. This would result in soil disturbance that promotes germination and flushes of alien seed growth.
- b. Do not cut plants to control stumps where stump density is high. Stump application would be impractical with many untreated stumps.
- c. Instead cut tall dense re-growth with brush cutters or bush knives. Remove top growth to allow access for foliar spray of coppice re-growth.
- d. Burn high fuel loads of grass below the alien plant infestations. The fire spreads into the infestations, kills many seedlings and opens up access to the infestations. Spot spray coppice re-growth of plants that survive burning.
- e. Livestock graze palatable seedlings (e.g. wattle), thereby effectively removing most of the seedlings. Plant grass after the area has been cleared of competition from dense alien seedlings.

### **8.2.2 Control methods for low-medium density re-growth**

Areas with low-medium density re-growth are considered high priority for control as neglect of these areas will result in densification and spread that is more costly to control. Large areas of low density growth can be controlled rapidly.

- a. Cut plants and control the stumps: Stump height should be less than 15 cm. Use a recommended registered herbicide. Apply the herbicide mix with hand sprayers, paint brushes or knapsack sprayers at low pressure, using solid cone nozzles. Use a suitable dye to ensure no stumps are missed. For cut stump treatment, apply the herbicide mixed in water to the cut surface of stumps. Do NOT spray the sides of the stumps. Apply the herbicide within 1 hour of cutting the plants before the wound seals. For total stump treatment, apply a herbicide mixed with diesel to the cut surface, down the sides of stumps and to exposed roots. The herbicide mix can be applied up to several days after cutting the plants.
- b. Foliar spray on coppice re-growth and saplings: Re-growth can be sprayed up to a height of 1 m. Apply the herbicide in knapsack sprayers using solid cone nozzles with a suitable dye to avoid over- or under-spraying.
- c. Mechanical control options:
  - I. Hand pull seedlings when the soil is wet, using gloves to protect the hands.
  - II. Grazing will kill palatable seedlings as grass is utilised.
  - III. Burn grass to control saplings - the control burning of high grass fuel loads is another option in an integrated control programme. Any burning must be done in a controlled, safe manner and according to local burning regulations. Protect neighbouring veld during the burn. Fire can destroy the seedlings of invader species and increase the competitive ability of the grass sward. The control of saplings can only be effective if the fuel load is high. Aim for at least tons of grass per hectare in dry areas and 5 tons per hectare in moist areas. Rest the veld for a period prior to the burn to ensure the accumulation of sufficient fuel loads and burn when conditions will favour a hot fire. Fire alone will not kill the trees, it only kills top growth. Many shrubs and trees coppice after burning. Treat any coppice growth with herbicides. If this is not done, the coppices will form multi-stemmed plants.

### **8.2.3 Maintenance Control**

Aim to keep the area stabilised by maintaining a good grass cover. Prevent further soil disturbance. Planted grass must be maintained as a healthy mat to achieve the aims of rehabilitation. If the grass is neglected, it can become rank and moribund or suppressed by alien plant seedlings. Annual inspection of grass cover and alien plant re-growth is essential. Follow-up and maintenance control work each year will protect the planted grass cover. If this is neglected, the rehabilitated area will revert to dense patches of alien plants, resulting in increased control costs and loss of grass cover.

To keep grass healthy:

- a. Use correct animal stocking rates to avoid loss of palatable grass vigour and long-term

replacement with unpalatable species in open space areas.

- b. Use correct burning frequency and timing of burns in open space areas to allow grasses between 1 and 3 years to become established.
- c. Follow-up control work is essential using appropriate measures.

### 8.3 Integrated Control

Areas should be ranked into high, medium and low priority work areas, where high priority areas would be controlled first.

#### 8.3.1 High Priority Areas for control

- a. Low density infestations
  - I. Start maintenance control in areas with low alien plant numbers, targeting especially mature seed-producing trees (identifiable by the presence of flowers during the flowering season and/or presence of seed), or parent trees that are a source of seed to the site. This may include trees outside of the site, within a minimum of 100 m from the site boundary.
  - II. Maintenance control is rapid and cost effective.
  - III. This will protect the grass that is already there, prevent formation of thickets, and halt encroachment (spread) of alien plants into surrounding areas.
- b. Areas near the top of slopes, water courses, steep bare slopes or long bare slopes
  - I. Start control at the top end of water courses or at the top of slopes.
  - II. This prevents seed spreading downstream or downhill to infest new areas.
  - III. Plant grasses on bare soil, especially on steep slopes or long bare slopes, to prevent erosion.
- c. Areas where initial control work is completed and re-growth is present
  - I. Complete major follow-up control and rehabilitation work in all areas before starting initial control in new infestations.
  - II. Control of seedlings protects newly planted grass.
  - III. Failure to control re-growth results in densification and spread of infestations, with increased control and loss of grass cover.
  - IV. Continued maintenance is a long-term ongoing exercise to prevent re-infestation.
- d. Newly disturbed areas
  - I. Areas where mechanical disturbance (such as removal of alien plants), loss of grass cover or where intense uncontrolled fires occurred provides an ideal seed bed for pioneer alien plant seedling establishment.
  - II. This re-growth should be controlled while still less than 0.5 m tall.
  - III. If this is neglected, re-growth will become taller and denser, resulting in more costly control work and loss of grass cover.
- e. Edges of dense spreading infestations
  - I. Confine infestations when there are insufficient funds to control the whole infestation and where the alien plants are likely to spread and invade neighbouring areas.
  - II. To prevent spread, control trees, saplings, seedlings, coppice re-growth or shrubs in a 5 - 10 m wide strip around the edges of such infestations to confine them.
  - III. Move inwards from the edges with control work as funds become available.
- f. Low density areas inside dense infestations

- I. Thin inside infestations to prevent densification (i.e. control all low-density areas inside the infestations to encourage grass growth. This will break up the large infestations into several smaller infestations that are more easily controlled.
- II. Grass will gradually spread into the controlled areas as the alien plants die or are removed. The direction of grass spread therefore follows the control work, as the alien plants die. Sow grass seed in bare soil for a more rapid ground cover, especially on steep slopes or on easily eroded soil.
- III. Monitor confined and thinned infestations 2 - 3 times each year. Repeat follow-up control operations as required, to ensure the controlled areas remain clear of re-growth and that the planted grass has established and remains healthy. Seedling re-growth will be evident in spring and early summer while re-growth and coppice will be easily observed in summer. When a re-infestation is observed it should be controlled immediately.

### **8.3.2 Low priority areas for control**

- a. Stabilised areas where there is a healthy dense grass cover, and any alien plants are very sparse, difficult to detect and with little or no impact at present. Monitor alien plant growth and grass cover 2-3 times a year to ensure timely maintenance work.
- b. Areas where dense infestation could become worse. Confine these dense infestations to prevent spread into new areas.
- c. Areas where alien plants have little or no impact.
- d. Thus, high priority areas are identified where resources should be concentrated to achieve the desired aims. Control in these areas gives the greatest total benefit, and allows the best use of the limited available resources.

The low priority areas would consume resources with little benefit, and should therefore be ignored or re-evaluated each year for attention at a later date.

## 9 FIRE MANAGEMENT

The site is prone to fire and it is imperative that the necessary precautions be implemented to minimise this risk.

### 9.1 Construction

- a. Ensure that all personnel are aware of the fire risk and the need to extinguish cigarettes before disposal, in appropriate waste disposal container.
- b. The risk of fire is highest in the late summer and autumn months, during high wind velocities and dry periods. To avoid and manage fire risk the following steps should be implemented:
  - Have on site fire-fighting equipment and ensure that all personnel are educated how to use it and procedures to be followed in the event of a fire.
  - Identify the relevant authorities and structures responsible for fighting fires in the area and shall liaise with them regarding procedures should a fire commence.
  - Ensure that all the necessary telephone numbers etc. are posted at conspicuous and relevant locations in the event of an emergency.
  - Should a contractor be found responsible for the outbreak of a fire, he shall be liable for any associated costs.
  - No open fires shall be allowed on site for the purpose of cooking or warmth. Bona fide braai fires (such braai fires shall be limited to the traditional “month end” braais and not individual daily cooking fires) may be lit within the construction camp or site.
  - The Contractor shall take all reasonable steps to prevent the accidental occurrence or spread of fire. The Contractor shall appoint a fire officer who shall be responsible for ensuring immediate and appropriate action in the event of a fire. The Contractor shall ensure that all site personnel are aware of the procedure to be followed in the event of a fire. The appointed fire officer shall notify the Fire and Emergency Services in the event of a fire and shall not delay doing so until such time as the fire is beyond his / her control.
  - The Contractor shall ensure that there is basic fire-fighting equipment on site at all times. This equipment shall include fire extinguishers and beaters. The Contractor shall pay the costs incurred by organisations called to put out fires started by himself/herself, his/her staff or any sub-contractor. The Contractor shall also pay the costs incurred to reinstate burnt areas as deemed necessary the RE.
  - Any work that requires the use of fire may only take place at that designated area and as approved by the RE. Fire-fighting equipment shall be available in these areas.
  - The Contractor shall ensure that the telephone number of the local Fire and Emergency Service are displayed at the site offices.
  - The Independent Contractor is to ascertain the fire requirements and shall submit a fire contingency plan Method Statement to the RE and ECO.

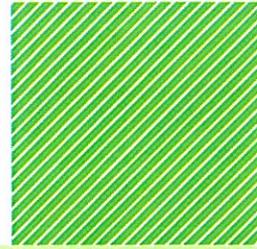
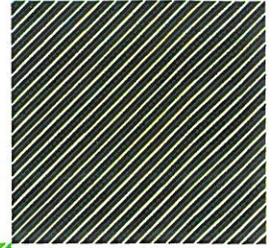
### 9.2 Operation

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

- a. Formation of a Fire Protection Association (FPA);
- b. Duty to prepare and maintain firebreaks;
- c. Requirements for firebreaks;
- d. Readiness for firefighting;
- e. Actions to fight fires.
- f. In areas other than designated development footprints within the Open Space area, a network of firebreaks must be maintained and overlap with any firebreaks managed by the landowners to ensure that fires are not able to spread over the development area.
  - I. All road reserves will serve as firebreak;
  - II. All firebreaks must be maintained as required by the local Fire Chief

- g. Firebreaks are to be positioned and prepared in such a way as to cause the least disturbance to soil and biodiversity. Firebreaks should be free from combustible material, e.g. prunings and leaf litter.
- h. Ensure firefighting equipment is maintained and in good working order before the start of each fire season.
- i. Smoking outside of designated safe areas must not be permitted. Flicking of cigarette butts into adjacent vegetation will not be permitted.
- j. Suitable signage must be provided on site, including entrance warning of fire risk and warnings not to flick cigarette butts into vegetated areas.

# ANNEXURE I - STORM WATER MANAGEMENT PLAN



**GOLDEN VALLEY WIND ENERGY  
FACILITY**  
STORMWATER AND EROSION  
MANAGEMENT PLAN

Reference: 111886  
Prepared for: Goldwind  
Revision: 1  
31 August 2015

Prepared for



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# GOLDEN VALLEY WIND ENERGY FACILITY

## STORMWATER AND EROSION MANAGEMENT PLAN

Date 31 August 2015  
Reference 111886  
Revision 1

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# Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
1.1	Scope	1
1.2	Definitions / Assumptions	2
<b>2</b>	<b>SITE STORMWATER</b>	<b>2</b>
2.1	Climate	2
2.2	Drainage Characteristics	4
2.3	Stormwater Calculations	6
2.4	Proposed Measures for Stormwater Management	11
2.5	Erosion Protection Measures	13
2.6	Waste Water Management	15
<b>3</b>	<b>CONCLUSION</b>	<b>16</b>

## Figures

Figure 1:	Key Plan	1
Figure 2:	Average Rainfall	3
Figure 3:	Average Temperature	3
Figure 4:	Drainage Characteristics	4
Figure 5:	Golden Valley WF Catchment Areas.	5
Figure 6:	Drainage Patterns	8
Figure 7:	Post Development Obstructed Drainage Areas	10
Figure 8:	Typical Detail - Gravel Drift	11
Figure 9:	Typical Detail – Berm	12
Figure 10:	Typical Cross Section of Culvert under Road	12
Figure 11:	Section through Typical Inlet/Outlet Structure	12
Figure 12:	Typical Detail – Outlet with Erosion Protection	13

## Tables

Table 1:	Rainfall Data: Nearby Rainfall Stations	2
Table 2:	Catchment Areas	6
Table 3:	Average Slopes of Catchment Areas	7
Table 4:	Run-off Coefficient	7
Table 5:	Run-off Calculations	9
Table 6:	Summary of Obstructed Run-off Volumes	9
Table 7:	Additional Erosion Protection Measures	13

# 1 Introduction

Goldwind has engaged Aurecon to prepare a conceptual Stormwater Management Plan (SMP), for the proposed 120MW Golden Valley Wind Energy Facility. The site covers nearly 213 km<sup>2</sup>, with the proposed development area covering about 90 km<sup>2</sup>. The development area is spread across eight farm portions, with the bulk of the proposed works being located on Olive Woods Estate (Farm 169, portion 0), Olive Fonteyn (Farm 166, portion 0) and Farm 283, portion 0. The site, and all farm portions covered by it, are situated in the district of Bedford Rd, Eastern Cape, within the jurisdiction of Blue Crane Route Local Municipality, South of the town of Cookhouse.

The site location is indicated in Figure 1, below:

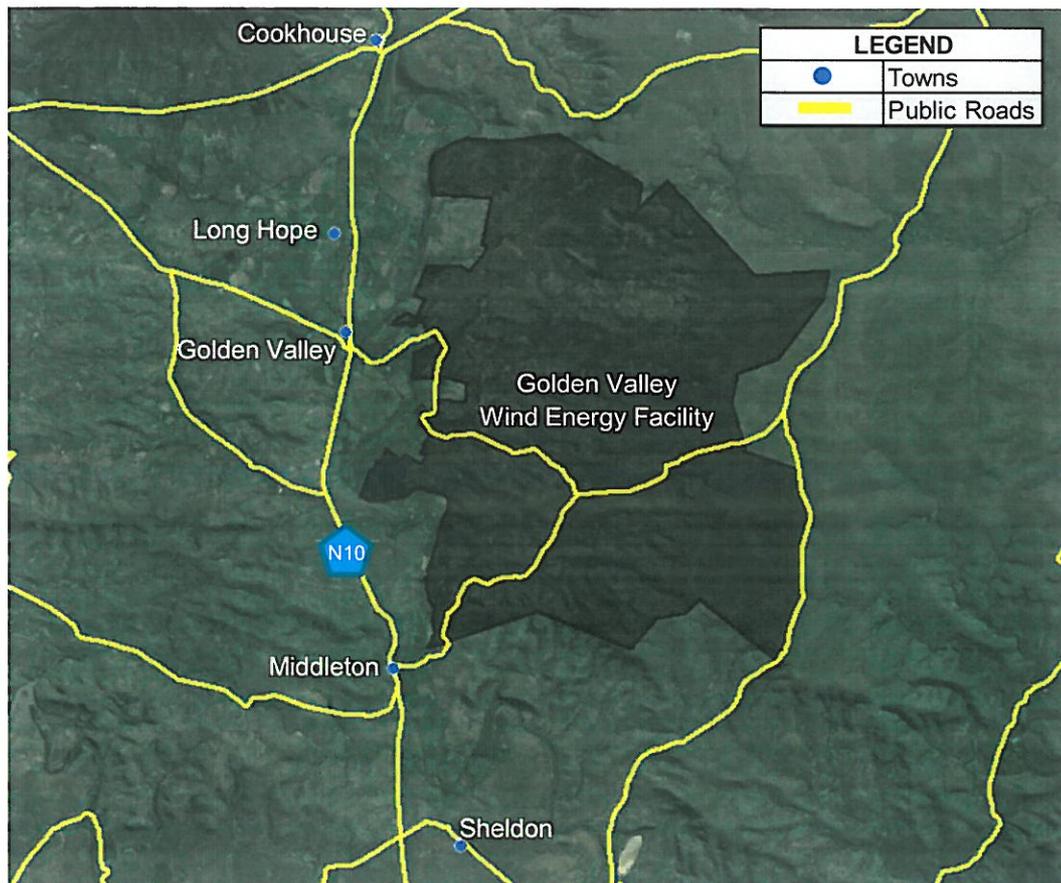


Figure 1: Key Plan

## 1.1 Scope

The scope of this study is to prepare a conceptual Stormwater Management Plan (SMP) to support the Environmental Impact Assessment Process of the proposed Golden Valley Wind Energy Facility. The scope of the Stormwater Management Plan (SMP) includes, inter alia:

- Determine catchment area for the project site.
- Estimate floods expected for the catchment.
- Confirm existing drainage patterns and streams.

- Propose drainage elements such as side drains, outlets and other mitigation measures to accommodate the flows.
- Prepare a conceptual drainage layout plan and -strategy for the project site.

## 1.2 Definitions / Assumptions

The following assumptions are made:

- The flood calculation method used – Rational Method.
- The recurrence period normally applied for this type of development, to reduce risk of increased maintenance during the operational phase, is 1:50 years.
- As a principle, to minimise earthworks and changes to the existing drainage patterns, the drainage layout should be based on the existing contours.

# 2 SITE STORMWATER

## 2.1 Climate

Software for the estimation of design rainfall in South Africa was used to find the mean annual precipitation (MAP) measured at various rainfall stations in the area. A summary of the data associated with these stations is given in Table 1. The length of the rainfall records, the distance from site, as well as the altitudes of the various stations were considered in determining the rainfall on the site.

Table 1: Rainfall Data: Nearby Rainfall Stations

Station Name	Record Length	Distance from Site	Altitude	MAP
	(Years)	(km)	(m)	(mm)
Middleton (SAR)	71	12.1	520	323
Nelskraal	47	15.3	620	363
Cookhouse (SAR)	88	19.5	640	422
Albertvale	96	20.1	737	469
Leeuwfontein	28	32.6	600	356
Cullendale	80	39.5	700	533

Elevations on the project site varies between about 500 and 900 meters above mean sea level (MAMSL). While Middleton station is the nearest station to the site, it's elevation of 520 MAMSL and low MAP of 323 mm resulted in it being omitted from the analysis. Nelskraal station was excluded, due the relatively short rainfall record of 47 years and the relatively low MAP of 363 mm. Leeuwfontein and Cullendale stations were excluded, due to their distances from the project site of over 30 km. Both Cookhouse and Albertvale stations have rainfall records of sufficient length, are located within about 20 km of the wind energy facility and sit at elevations which are comparable to those on site. While the MAP of 422 mm measured at Cookhouse station was accepted to be sufficiently representative, the 469mm measured at Albertvale station would result in a more conservative analysis. For this reason, the MAP on site has been assumed to be 469 mm.

The town of Cookhouse, which sits at an elevation of approximately 587 MAMSL, has been used as a base point to determine the climate in the region of the site. The temperature and rainfall figures reported below are based on the period from 2000 to 2012, sourced from an online global weather service. The average monthly rainfall figures are graphically illustrated in Figure 2:

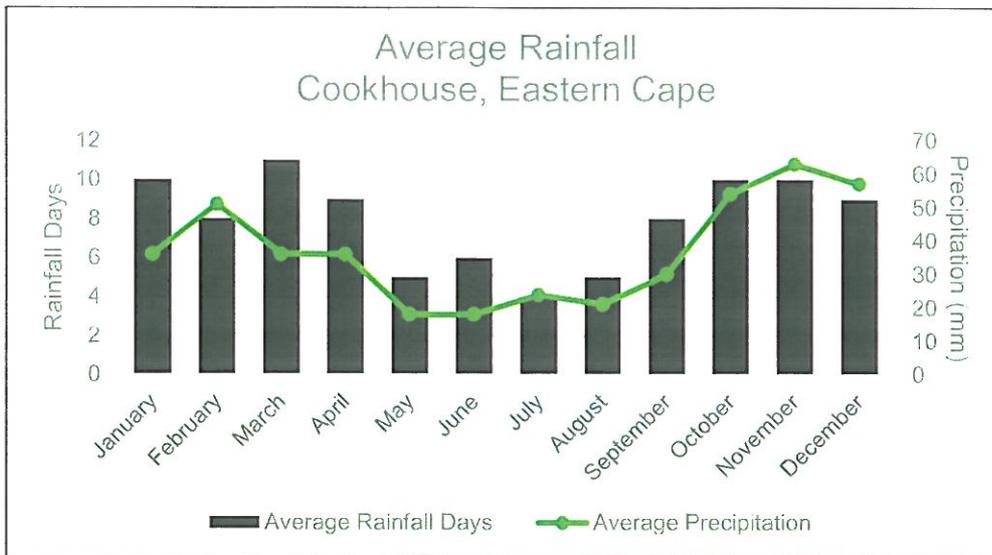


Figure 2: Average Rainfall

This figure shows that the site lies in a summer rainfall region, with the months of October to December experiencing the peak downpours. The data shows a MAP of 444 mm between 2000 and 2012 at Cookhouse, falling over an average of 95 days per annum, comparing well to the MAP of 469 mm used for the analysis.

Figure 3 shows the average monthly minimum- and maximum temperatures for Cookhouse over the same period:

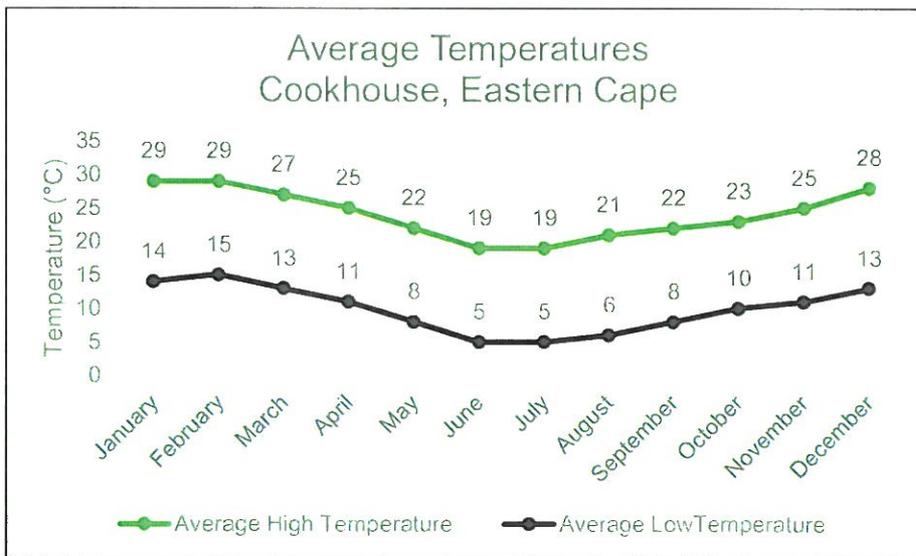


Figure 3: Average Temperature

Average midday temperatures for Cookhouse ranged from a maximum of 29°C in January and February, to 19°C in June and July during this period. Minimum night-time temperatures of 5°C were also encountered during the winter months.

## 2.2 Drainage Characteristics

A North-South orientated ridge cuts through the site, splitting the site into two main drainage areas. The larger of these areas lies to the West of the Ridge and covers 179 km<sup>2</sup>, with the remainder of the site (34 km<sup>2</sup>) being covered by the smaller drainage area to the East.

The larger Western drainage area drains directly into the 644 km long Great Fish River, which defines the majority of the Western boundary of the project site. The terrain is steep at higher elevations and gradually flattens out in the valley bottom towards the river. A maximum slope of 45.2% is encountered in this area, which has an average slope of 7.6%. The predominant direction of the slopes in this area is illustrated in Figure 4, which also shows the major natural drainage channels in the vicinity of the site.

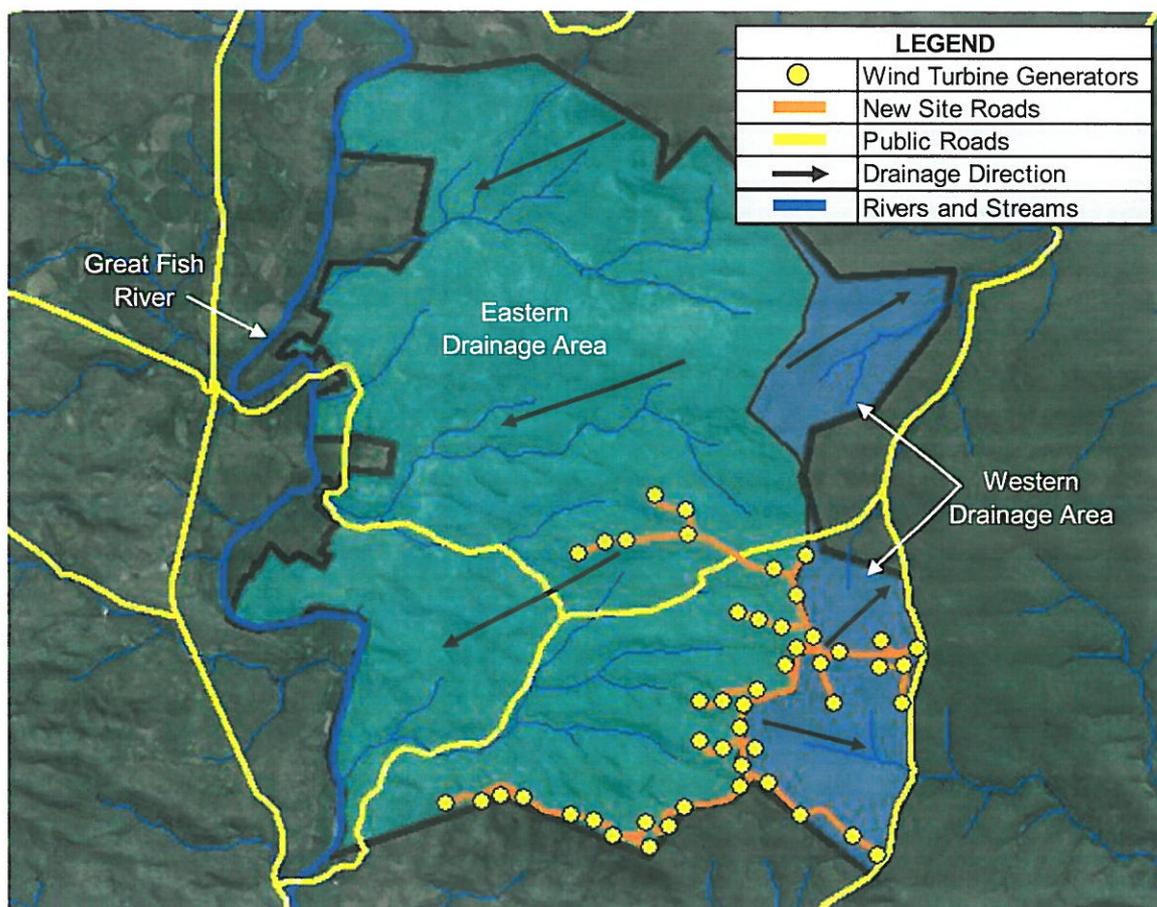


Figure 4: Drainage Characteristics

Further illustrated in Figure 4, the smaller Eastern drainage area displays drainage patterns which diverge towards the Nyara River in the North-East and the intermittent Oliewenboskloof River to the South-East. The Eastern face of the ridge comprises more gradual slopes than the West, with maximum- and average slopes of 23.2% and 4.5%, respectively.

### 2.2.1 Drainage Patterns

#### 2.2.1.1 Catchment Areas

A watershed analysis was performed on the site and surrounds, which identified the catchment areas contributing to the flows in the streams and rivers within the analysis area. Figure 5 illustrates the

results of this analysis; catchment areas are differentiated by colour and each contributes to the flow in the streams depicted within their bounds. Note that the small, un-coloured areas around the fringes of the site form part of catchments contributing to the flows in streams or rivers which are not located within the site bounds, i.e. these areas drain directly off the premises. Further, note that some portions of drainage areas lie outside the site boundary; these areas have been included since they drain towards the project site.

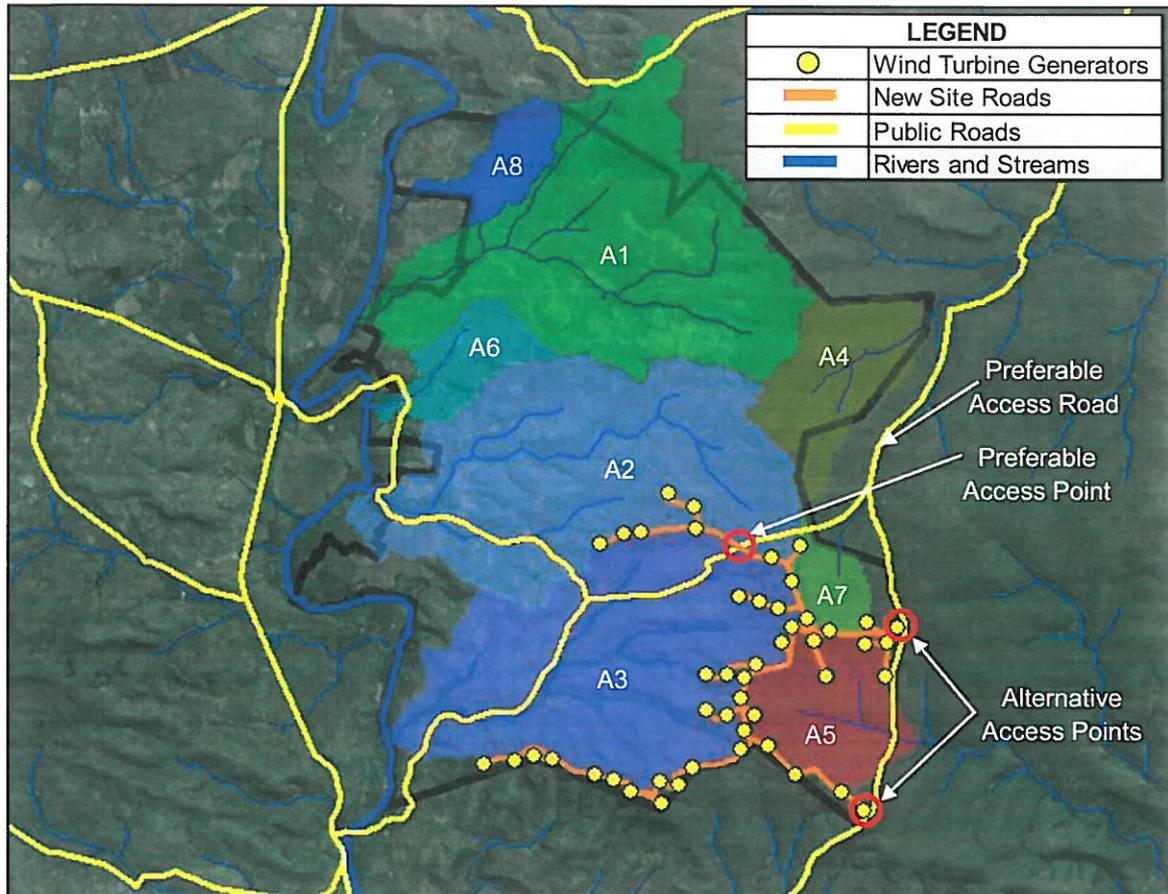


Figure 5: Golden Valley WF Catchment Areas.

In total, eight drainage areas were identified, of which three are predominant. Table 2 summarises the catchment areas identified by the watershed analysis.

Table 2: Catchment Areas

Catchment ID	Catchment Area
	km <sup>2</sup>
A1	52.77
A2	52.63
A3	51.53
A4	14.16
A5	14.21
A6	7.57
A7	4.42
A8	5.74

Of the catchment listed above, catchment areas A1, A4, A6 and A8 will in no way be impacted by the development.

#### 2.2.1.2 Access Road

The preferred access point, as indicated in Figure 5, provides a single point of access to the entire site, which lies to both sides of the existing gravel road. This allows for a single security point to secure the entire construction area. The alternative access points, indicated on the same figure, may provide quick access for maintenance after construction has been completed.

The preferred access route follows the gravel road from the North to the access point. The road has already been upgraded to a point around 1km north of the Y junction. Upgrades to the point indicated in Figure 5 would be required, including accompanying drainage.

## 2.3 Stormwater Calculations

### 2.3.1 Method and Assumptions

For purposes of the SMP, the rational method was used to calculate run-off. While this method provides greater accuracy when applied to small sites, it has been deemed sufficiently accurate for the purposes of this report. The rational method utilises Equation 1, below:

$$Q = \frac{CIA}{3.6} \quad \text{Equation 1}$$

With:  $Q$  = Peak flow (m<sup>3</sup>/s)

$C$  = Dimensionless catchment run-off coefficient

$I$  = Average catchment rainfall intensity (mm/hour)

$A$  = Effective catchment area (km<sup>2</sup>)

The run-off parameters required to determine the variables in this equation, and the assumptions upon which they were based, are detailed in subsequent sections.

#### 2.3.1.1 Return Period

A 1:50 year return period was considered. Note that, normally, a 1:20 year return period provides sufficient risk mitigation. However, utilisation of a 1:50 year return period may reduce the risk of damage and higher maintenance effort further, potentially by up to 25%.

### 2.3.1.2 Run-off Coefficient

The run-off coefficient for a catchment is a numerical value which represents the portion of the storm rainfall which will contribute to the peak run-off at the catchment outlet. It is determined by considering the main factors influencing the rainfall-run-off relationship, such as surface slopes, surface permeability, vegetation cover and urban land use.

The site comprises sparse vegetation and semi-permeable soils. While the vegetation and soil permeability has been assumed to be generally consistent throughout the site, the surface slopes in the various catchment areas display some variability. The average slopes for the catchment areas are summarised in Table 3:

Table 3: Average Slopes of Catchment Areas

Catchment ID	S <sub>ave</sub>
	%
A1	6.47
A2	6.57
A3	10.17
A4	2.68
A5	5.65
A6	5.42
A7	4.47
A8	7.5

The table shows that, although the surface slopes vary throughout the site, the average slopes of all catchments fall within the range of 3-10%. This classifies the entire site as 'flat areas', in accordance with the methodology of the Rational Method.

Since the surface slopes of all catchment areas fall within the same classification bracket and vegetation and permeability has been assumed to be consistent throughout the site, a single run-off coefficient was determined to be used for all eight catchment areas. The assumptions upon which the calculated run-off coefficient is based, are summarised in Table 4:

Table 4: Run-off Coefficient

Slope	% Area	Permeability	% Applied	Vegetation	% Applied
< 3%	0%	Very	5%	Dense Woods	0%
3% to 10%	100%	Permeable	30%	Light bush / Farm	45%
10% to 30%	0%	Semi Permeable	60%	Grassland	50%
>30%	0%	Non-permeable	5%	Rock	5%

The run-off coefficient calculated and used in the flood estimation is 0.242, which is typical for the area.

### 2.3.1.3 Time of Concentration

Time of concentration ( $T_c$ ) is defined as the storm duration required for the entire catchment area to be contributing to the flow at the catchment outlet. The run-off calculations are performed for a storm period equalling this time, in order to ensure that the run-off from the entire catchment area is taken into consideration. The time of concentration was calculated by the widely used United States Bureau of Reclamation (USBR) stream flow equation, Equation 2 below:

$$T_c = \left( \frac{0,87 \cdot L^2}{1000 \cdot S} \right)^{0,385} \quad \text{Equation 2}$$

With:  $T_c$  = Time of Concentration (hours)

$L$  = Length of longest watercourse in catchment area (km)

$S$  = Average slope (%)

In general, a minimum time of concentration of 15 minutes is assumed. Therefore, if a catchment's calculated  $T_c$  value is less than 0.25 hours, it is assumed to be equal to 0.25 hours.

## 2.3.2 Run-off

### 2.3.2.1 Entire Project Site

Due to the nature of a wind energy facility, the majority of the development will occur upon the crests of the ridges on the site. As illustrated in Figure 6, the majority of the site roads run along these crests. This means that the roads will have limited impact on the run-off in the catchments. Further, the roads which branch off from the main line into the catchment areas, do so in a manner which corresponds with the drainage directions in the respective catchments. Therefore, limited drainage is likely to be required. The proposed drainage measures for the site are discussed later in the report.

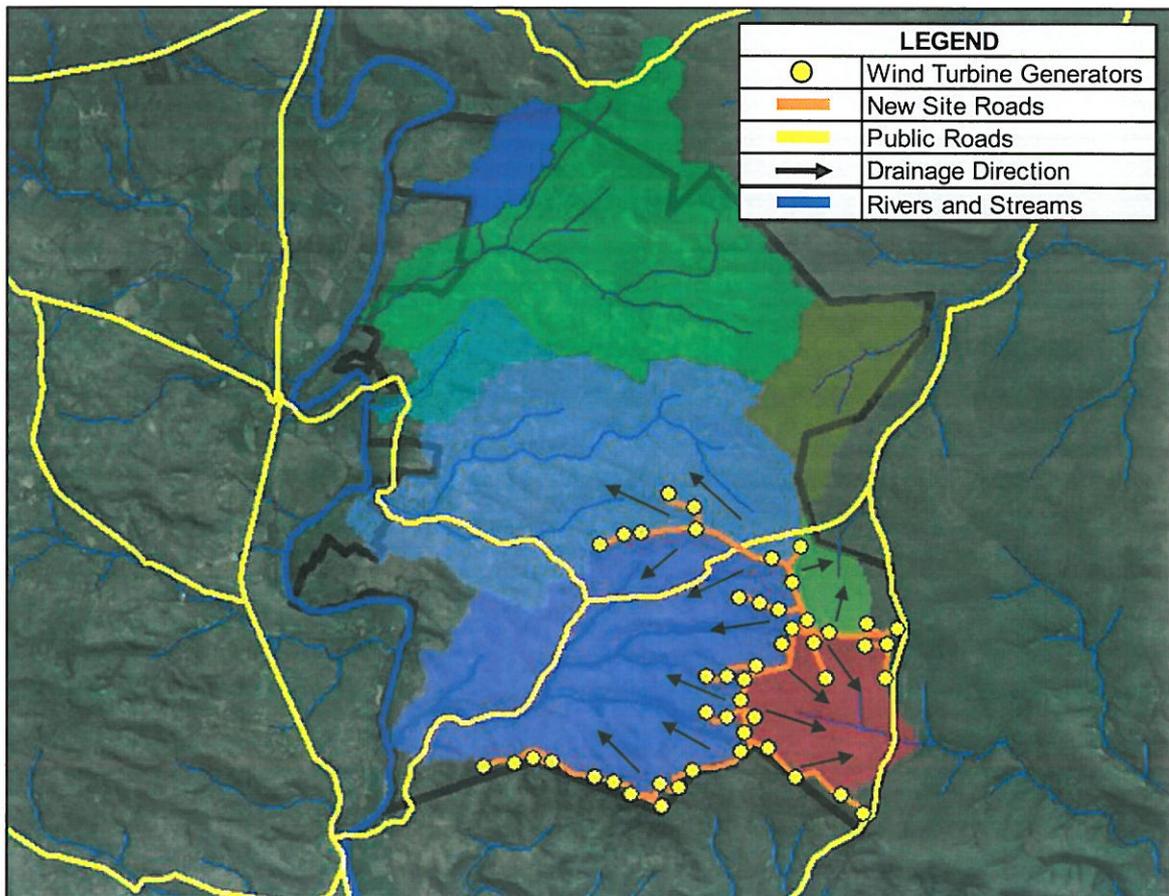


Figure 6: Drainage Patterns

Following the methodology discussed in preceding sections, the 1:50 year run-off per catchment area was determined. The findings of these calculations are summarised in Table 5:

Table 5: Run-off Calculations

Catchment ID	Run-off Coefficient	Intensity	Time of Concentration	Area	Peak Flow
		mm/h	hours	km <sup>2</sup>	m <sup>3</sup> /s
A1	0.24	36.1	2.53	52.8	122.0
A2	0.24	34.6	2.67	52.6	117.1
A3	0.24	39.6	2.25	51.5	130.4
A4	0.24	55.2	1.47	14.2	52.6
A5	0.24	74.4	0.98	14.2	71.1
A6	0.24	65.5	1.17	7.6	33.3
A7	0.24	118.0	0.49	4.4	35.1
A8	0.24	112.6	0.52	5.7	43.5

The table shows that, during a 50 year flood event, approximately 605 m<sup>3</sup>/s of water will run off from the site. Of this, approximately 251 m<sup>3</sup>/s originates from catchment areas A1, A4, A6 and A8, which are in no way impacted by the development. In the remaining areas, the proposed development will have a negligible impact on run-off volumes reaching the rivers, as a relatively small area of hard surfaces will be introduced by the development. The development is therefore unlikely to cause any issues for structures crossing the respective rivers downstream of the site.

### 2.3.2.2 Developed Area

In order to estimate the extent of drainage which may be required on site, it was first necessary to identify areas in which the natural flow of run-off may be obstructed by the development. The satellite data, used for the watershed analysis discussed in preceding sections, was not of sufficient resolution to perform this detailed analysis. Geo-referenced topographical maps were therefore used to identify the small catchment areas created by the proposed roads and hardstands.

In total, 20 such areas were identified, ranging in size from 0.2 to 33.1 ha. The same methodology as before was followed, as discussed in Section 2.3.1. Due to the small sizes of these catchment areas, the calculated  $T_c$  values for all were lower than the minimum of 15 minutes; the time of concentration for these areas was therefore assumed to be 15 minutes. The findings of this analysis are summarised in Table 6:

Table 6: Summary of Obstructed Run-off Volumes

Catchment ID	Run-off Coefficient	Intensity	Time of Concentration	Area	Peak Flow
		mm/h	hours	km <sup>2</sup>	m <sup>3</sup> /s
R1	0.24	120	0.25	0.080	0.65
R2	0.24	120	0.25	0.072	0.58
R3	0.24	120	0.25	0.331	2.67
R4	0.24	120	0.25	0.070	0.57
R5	0.24	120.0	0.25	0.042	0.34
R6	0.24	120.0	0.25	0.199	1.60
R7	0.24	120.0	0.25	0.048	0.38
R8	0.24	120.0	0.25	0.212	1.71
R9	0.24	120.0	0.25	0.052	0.42
R10	0.24	120.0	0.25	0.164	1.32
R11	0.24	120.0	0.25	0.149	1.20

Catchment ID	Run-off Coefficient	Intensity	Time of Concentration	Area	Peak Flow
		mm/h	hours		
R12	0.24	120.0	0.25	0.064	0.51
R13	0.24	120.0	0.25	0.019	0.15
R14	0.24	120.0	0.25	0.051	0.41
R15	0.24	120.0	0.25	0.108	0.87
R16	0.24	120.0	0.25	0.007	0.06
R17	0.24	120.0	0.25	0.048	0.39
R18	0.24	120.0	0.25	0.002	0.01
R19	0.24	120.0	0.25	0.017	0.14
R20	0.24	120.0	0.25	0.079	0.64

The table shows that an approximate total of 14.6 m<sup>3</sup>/s will need to be safely channelled and discharged during a 50 year rainfall event, across the entire development area. Figure 7 shows the positions of the catchment areas listed in Table 6, for which drainage will need to be provided:

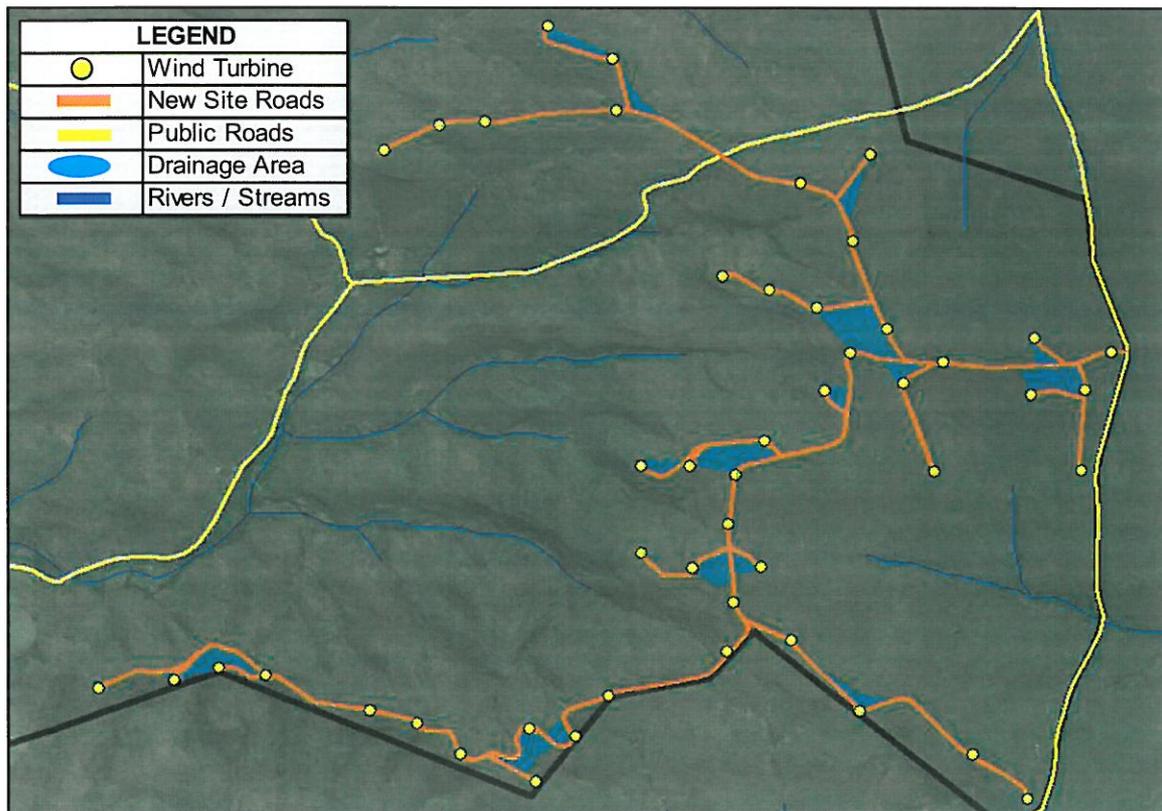


Figure 7: Post Development Obstructed Drainage Areas

### 2.3.2.3 Flow and Outlet Conditions

The flow velocity and depth at the various outlets will have to be confirmed during detail design stage. However, based on the small areas of flow obstruction created by the roads and the limited increase in run-off introduced by the hard surfaces, the flows would generally not cause any serious erosion. Appropriate measures should still be implemented at outlets and points of concentration caused by drainage ditches to reduce any risk of erosion damage on the site.

## 2.4 Proposed Measures for Stormwater Management

### 2.4.1 General

The existing drainage patterns and characteristics should be preserved as far as possible. To that end it is suggested that existing contours (and vegetation) be retained where feasible and that internal roads are kept to minimum standards.

Drainage structures would generally be small diameter pipes or concrete drifts. Where gravel drifts are utilised, they should be provided with a cut-off wall on the down-stream side as a minimum requirement (Figure 8). Erosion protection, in the form of Reno mattresses or rip-rap, is to be provided in areas of steep slopes.

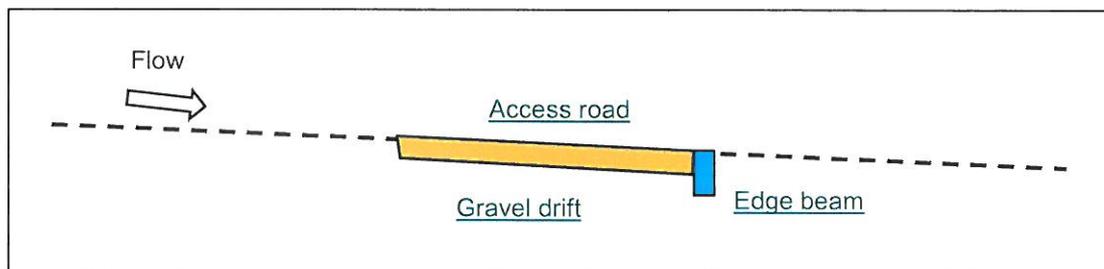


Figure 8: Typical Detail - Gravel Drift

During construction, it will be important to mitigate ponding, particularly in the vicinity of roads and structures. Such ponding is likely to occur in the catchment areas illustrated in Figure 7. Such ponding, both during and after construction, has been identified as one of the main stormwater-related risks which will need to be managed. Pipe culverts or drifts are likely to be necessary in such areas; alternatively, this water may be collected and channelled to be discharged elsewhere.

### 2.4.2 Side Drains

In general open drains will be provided along the proposed internal roads where the natural flow of water may become obstructed. Based on the small areas of flow obstruction (as shown in Figure 7), and the low run-off volumes which need to be managed (Table 6), side drains will likely be able to accommodate for the majority of the run-off impact of the development.

The open drains would be gravel drains with concrete or edge beam protection at road crossings, where required.

### 2.4.3 Access Roads

No changes to the drainage are required for the first portion of the main access road. The last 4.68km will require provisions for drainage. Frequent nominal drainage should be provided at 200m – 300m intervals on the upgraded portion of the gravel access road. This could be provided as drifts where the road alignment is close to the natural ground level, or culverts where required.

Adequate drainage elements - preferably nominal pipe culverts - should be provided for the internal service roads within the site area, as required. All pipe- or box culverts should be of adequate strength to support the loads imposed by the abnormal weights of the wind turbine generator components to be delivered to site.

### 2.4.4 Berms

Berms are proposed to prevent flowing across access roads or down large cut slopes and should direct flow to suitable areas of release. An example of such a berm is given in Figure 9:

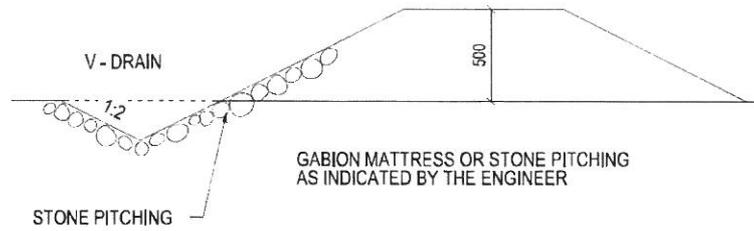


Figure 9: Typical Detail – Berm

## 2.4.5 Outlets

Culverts located on the access- and site roads should preferably have concrete outlets with erosion protection. In steep areas, erosion protection may also be required at the inlets. Details of a typical pipe culvert are illustrated in Figure 10 and Figure 11 below:

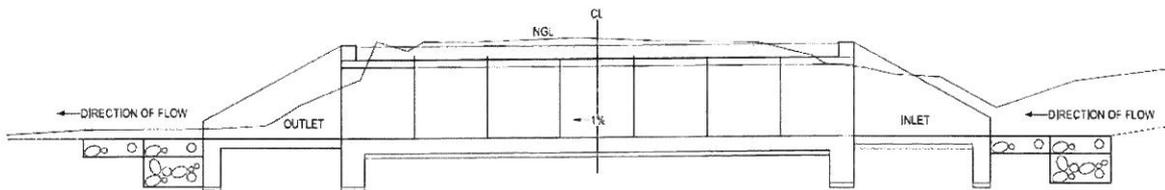


Figure 10: Typical Cross Section of Culvert under Road

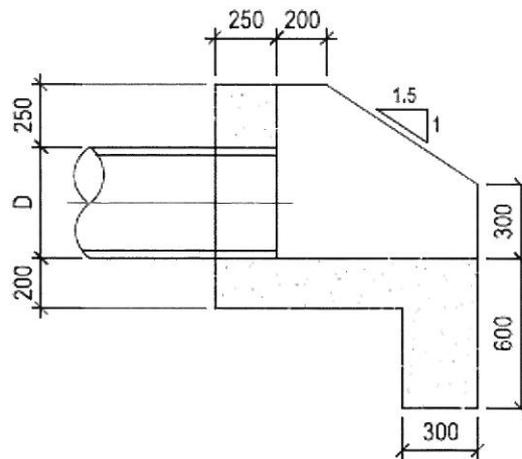


Figure 11: Section through Typical Inlet/Outlet Structure

Side drain outlets should be terminated with suitable erosion protection, in order to reduce the velocity and flow depth of the discharged stormwater. A detail of such an outlet is provided in Figure 12:

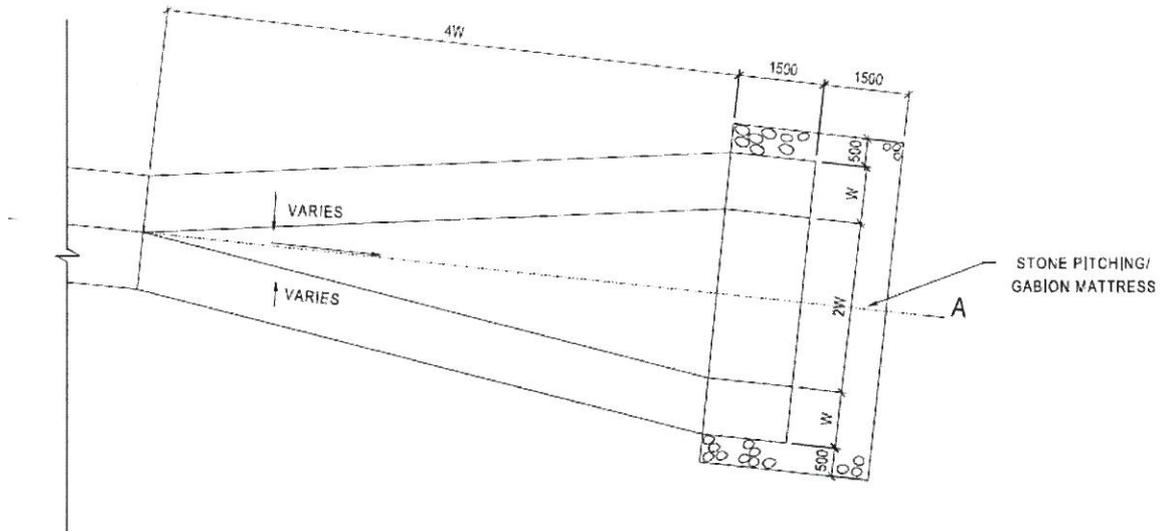


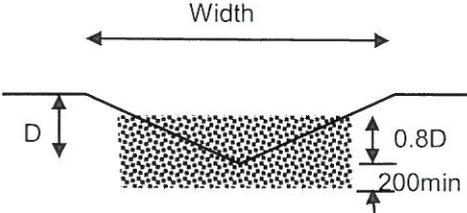
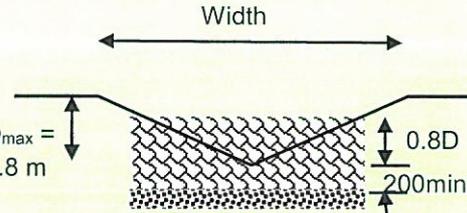
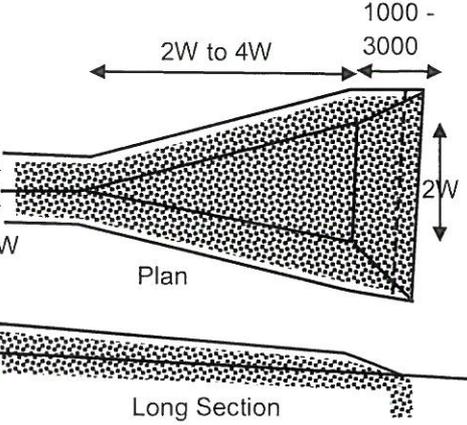
Figure 12: Typical Detail – Outlet with Erosion Protection

## 2.5 Erosion Protection Measures

It will be important to evaluate all elements during the detail design phase, with regard to the run-off and in particular the velocity of storm water on the site. Provisionally, Table 7 provides examples of erosion protection measures which may be required.

Table 7: Additional Erosion Protection Measures

Element	Possible Protection Measure		Typical Details
Side Drain	Lining	Stone Pitching	<p><u>Application</u> : Slope &gt; 1% in erodible material</p>
		Concrete	<p><u>Application</u> : Slope &gt; 2% in erodible material</p>

Element	Possible Protection Measure	Typical Details
	Walls Gabions	 <p>Width</p> <p>D</p> <p>0.8D</p> <p>200min</p> <p>Application : Slope &gt; 2% in erodible material                      Top width = 300mm                      1m invert protection downstream</p>
	Stone Masonry with 1:5 slopes	 <p>Width</p> <p>D<sub>max</sub> = 0.8 m</p> <p>0.8D</p> <p>200min</p> <p>Application : Slope &gt; 2% in erodible material                      Width = 300mm                      1m invert protection downstream                      100 mm concrete blinding class 15/19</p>
In/Outlets	Structure Concrete	 <p>1000 - 3000</p> <p>2W to 4W</p> <p>2W</p> <p>W</p> <p>Plan</p> <p>Long Section</p> <p>Application : Lined drain outlet with typical dimensions                      Actual dimensions to be verified with detail design</p>
	Stone Gabions	Same as for concrete Same as for concrete

Element	Possible Protection Measure		Typical Details
	Stilling Basin	Concrete	<p>Application : Lined drain drop outlet with typical dimensions                      Actual dimensions to be verified with detail design</p>
		Stone	Same as for concrete
		Gabions	Same as for concrete

Although it is possible that these measures will be required, it is relatively unlikely due to the limited impact of the proposed site layout on the drainage patterns on site. It is, therefore, likely that only minimal measures will be required, such as:

- Stone masonry walls to reduce the flow velocity in steeper areas;
- Side Drain Outlet with stone pitching to prevent erosion;
- Temporary berms and straw bales during construction in the vicinity of identified streams to reduce flow and sediment transport during this phase.

## 2.6 Waste Water Management

### 2.6.1 Risk of Pollution

Construction of the Golden Valley Wind Energy Facility could potentially cause localised, short term, deterioration in surface water quality. Construction activities are likely to increase the risk of hydrocarbon and other hazardous chemical spills. Contractors should submit method statements on how this risk will be mitigated, while complying with the approved Environmental Management Programme.

### 3 CONCLUSION

The proposed Stormwater Management Plan presents a strategy for drainage elements required to accommodate the stormwater throughout the site, along the internal roads and the main access to the facility.

The proposed strategy is to align roads along the existing contours and ridge crests, in order to minimise impacts on the existing drainage patterns. It is noted that preliminary site layout, as depicted in this report, complies with this strategy, as site roads are located and oriented in such a way that the natural flow of water on the site is not heavily affected. During the detailed design phase, it is suggested that the locations of roads and hardstands relative to ridge crests and watershed boundaries be taken into consideration, in order to mitigate the risk of ponding.

It is further noted that the developed area constitutes less than 1% of the total site area, concentrated close to the peaks of the ridges on site. In total, it is estimated that the natural flow of about 21 m<sup>3</sup>/s of run-off may be obstructed by the development during a 50 year rainfall event. This water will have to be safely channelled and discharged.

Based on the findings of the analyses performed, coupled with the placement and orientation of the proposed features to be developed on site, it is concluded that limited stormwater infrastructure is likely to be required. This will mainly comprise side channels, with nominal pipe culverts and drifts provided where required, to discharge run-off which would otherwise become entrapped between the site roads and ridge crests.

The proposed drainage elements should be incorporated into the detailed design to ensure effective management of the stormwater on the site.



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United Arab Emirates, Vietnam.

# ANNEXURE J - TRAFFIC MANAGEMENT PLAN



GW 2.5MW, Guanting Olympic Wind Farm

## GOLDEN VALLEY WIND ENERGY FACILITY

### TRAFFIC MANAGEMENT PLAN

	Reviewed By	Approved By	Approved By
<b>Name</b>	Roy de Kock	Mark Marshall	
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<b>Date</b>	9 /8/ 2015	9 /8/ 2015	

## Contents

<b>1</b>	<b>Purpose</b> .....	<b>1</b>
<b>2</b>	<b>Scope</b> .....	<b>1</b>
<b>3</b>	<b>Application</b> .....	<b>1</b>
<b>4</b>	<b>Definitions, Acronyms and Abbreviations</b> .....	<b>1</b>
4.1	Company Vehicles and Mobile Construction Equipment .....	1
4.2	Vehicle Coordinator .....	1
4.3	Operator.....	1
4.4	Remote Site .....	2
4.5	Journey Board.....	2
4.6	Travel Log .....	2
4.7	Pre-Start Checklist.....	2
4.8	Maintenance Schedule .....	2
<b>5</b>	<b>General</b> .....	<b>2</b>
<b>6</b>	<b>Identified Hazards</b> .....	<b>2</b>
<b>7</b>	<b>General Public Interface</b> .....	<b>3</b>
<b>8</b>	<b>Maintenance Crews on Roads</b> .....	<b>3</b>
<b>9</b>	<b>Flagging</b> .....	<b>3</b>
9.1	FlaggingTraffic.....	3
9.2	Hand Signaling Devices.....	3
9.3	Flagman.....	4
9.4	Training.....	4
9.5	Flagging Traffic.....	4
9.6	Flagging Procedures .....	4
<b>10</b>	<b>Restricted Areas and Escort Vehicles</b> .....	<b>4</b>
10.1	Restricted Areas.....	4
10.2	Escort Vehicles.....	5
<b>11</b>	<b>Vehicle Speed</b> .....	<b>5</b>
<b>12</b>	<b>Excavations</b> .....	<b>5</b>
<b>13</b>	<b>Light Vehicle Driver Training</b> .....	<b>5</b>
13.1	Vehicle Safety Standards .....	5
<b>14</b>	<b>Journey Management</b> .....	<b>6</b>
<b>15</b>	<b>Defective Light Vehicles and Mobile Equipment</b> .....	<b>6</b>
15.1	No Go Conditions.....	6
<b>16</b>	<b>Signage</b> .....	<b>7</b>
<b>17</b>	<b>Records</b> .....	<b>7</b>
<b>18</b>	<b>Work Instruction Maintenance</b> .....	<b>7</b>
<b>19</b>	<b>Attachments</b> .....	<b>7</b>
<b>20</b>	<b>Document Revisions</b> .....	<b>7</b>

## 1 Purpose

This plan describes the management and safe operation of public vehicles and mobile construction equipment during road construction.

## 2 Scope

This plan addresses:

- General public and traffic interface
- Maintenance crews on roads;
- Vehicle interaction and speed;
- Company vehicle operator training;
- Road conditions;
- Communications;
- Traffic control;
- Road demarcation and signage;
- Restricted areas and escort vehicles;
- Operational machinery;
- Blind crests and corners;
- Excavations;
- Vehicle safety standards;
- Journey management;
- Road rules;
- Blasting near road ways
- Equipment and vehicle inspections;
- Defective light vehicles and mobile plant; and
- Search and rescue and emergency access.

## 3 Application

It applies to the control of public as well as company vehicles (cars, utilities, sedans, etc.) and mobile plant and personnel who use them on the project land, road, infrastructure or facility.

## 4 Definitions, Acronyms and Abbreviations

### 4.1 Company Vehicles and Mobile Construction Equipment

A vehicle and/or mobile equipment leased or rented by the Construction Cluster.

### 4.2 Vehicle Coordinator

An employee trained in this procedure who the operation shall contact prior to travelling and rep ort to upon arrival or report back to up on return from a remote site.

### 4.3 Operator

The employee trained in this procedure authorized to operate a vehicle or mobile equipment.

The employee shall have completed an approved operator course and be assessed as being

---

competent by a suitably authorized person on Site.

#### **4.4 Remote Site**

Any unmanned Site (e.g. exploration or survey area) to which a person intends travelling.

#### **4.5 Journey Board**

A white board located a point of origin that details the proposed journey, ETA and personnel involved.

#### **4.6 Travel Log**

A document detailing the journey type, purpose, vehicle, duration, personnel involved and routes, etc.

#### **4.7 Pre-Start Checklist**

A form that requires all vehicle operators to inspect a vehicle prior to operation.

#### **4.8 Maintenance Schedule**

A pre-determined regular maintenance programme done by a competent qualified person to mobile construction equipment on Site.

### **5 General**

Any changes to the Traffic Management Plan will be communicated to all affected parties as soon as possible.

### **6 Identified Hazards**

Identified hazards to people working or travelling in, through or around the road construction areas or infrastructure road system include:

- General public and traffic interface;
- Maintenance crews on roads;
- Vehicle interaction and speed;
- Company vehicle operator training;
- Road conditions;
- Communications;
- Traffic Control;
- Road demarcation and signage;
- Restricted areas and escort vehicles;
- Operational machinery;
- Blind crests and corners;
- Excavations;
- Vehicle safety standards;
- Journey management;
- Road rules;
- Blasting near roadways;
- Equipment and vehicle inspections;

- Defective light vehicles and mobile plant; and
- Search and rescue and emergency access.

## **7 General Public Interface**

Due to interface with the general public, extra precautions are required to restrict access or control traffic in to or through the project area.

This will be achieved by the use of signage and/or demarcations and the issuing of public information bulletins to notify the public that beyond a designated location is a project area and access is restricted to project personnel and contractors only.

Where appropriate, additional warning signs, revolving lights and/or personnel will be used to control traffic flow.

## **8 Maintenance Crews on Roads**

The speed limit for the project is to be limited to a maximum of 60Kph. Roads which have conditions where potentially hazardous work is being undertaken (e.g. culverts, where personnel are close to the access road), shall have a speed restriction of 20Kph, and signs will be placed at both ends of the specific work area.

Where maintenance crews are working close to traffic, additional precautions will be taken to keep visibility and early warning at a maximum. These may include local watering of dust generating areas, wearing of high visibility vests and posting of additional traffic controllers at the extremities of the work environment.

All personnel on site are required to wear high visibility reflective vests or clothing and utilise the correct signage at all times.

## **9 Flagging**

The primary function of a flagman/woman is to guide the flow of traffic (loaders, dozers, dump trucks, excavators, automobiles, etc.) safely and expeditiously through or around work areas or where traffic lanes are intermittently blocked.

### **9.1 Flagging Traffic**

Flagging personnel are used to control traffic flow through work areas at decreased speeds to reduce the hazards to personnel working in the area. The flagman must be clearly visible from a distance to permit appropriate response to the flagman's instructions by a vehicle operator. If at any point the flagman is not visible, all equipment moving through that area must shut down.

### **9.2 Hand Signaling Devices**

Hand signaling devices (orange flags) shall be used in controlling traffic through work areas. Flags used for signaling purposes shall be at least 450mm square, made of a good grade of fluorescent orange material, and securely fastened to a staff approximately three one meter in length. Yellow flashing lights must be used during periods of darkness or poor visibility.

### 9.3 Flagman

Due to the priority the Construction Cluster places on human safety, the selection of capable personnel is essential. Flagman shall wear an orange reflective safety vest as an outer garment. Reflective apparel must be worn at all times.

### 9.4 Training

Flagmen should be given instruction and training by their Supervisor to develop a clear understanding of their duties and responsibilities.

As a minimum, instruction and training should include:

- Communications;
- Attitude;
- Safety equipment;
- Tools;
- Hand signals;
- Location or positioning;
- Action(s) for directing traffic; and
- Emergency procedures.

Project/Site Management must approve and verify that appropriate training has been conducted for each flagman prior to their being utilised on public highways.

### 9.5 Flagging Traffic

It is important for the flagman to remain in full view of all vehicles and to avoid standing in congested areas. Under no circumstances should flagman stand in the lane being used for moving traffic. Flagman should stand adjacent to lanes where vehicles and equipment are travelling.

### 9.6 Flagging Procedures

The following methods of flagging shall be used:

- To stop traffic, the flagman shall face approaching traffic and extend the flag horizontally across the traffic lane in a stationary position so that the full area of the flag hanging below the staff is visible. The free arm may be raised with the palm turned toward approaching traffic.
- When it is safe for the vehicle operator to proceed, the flagman shall turn parallel to the traffic movement.
- When the flag is used, drop the arm with the flag to lower it from the view of the vehicle operator and motion traffic ahead with the free arm. The orange flag shall never be used to signal traffic to proceed.
- To slow traffic with the flag, the flagman shall give the stop signal and then change to the signal to proceed before the vehicle comes to a stop.

## 10 Restricted Areas and Escort Vehicles

### 10.1 Restricted Areas

Site personnel will be informed as to the restricted areas of the project. These areas are not to be accessed without authority from the Project Manager.

The speed limit for the project is to be limited to a maximum of 60Kph on site. National road rules apply to all roads.

## 10.2 Escort Vehicles

For large or non-routine loads, an escort vehicle provided by the Contractors should be used in front of and when necessary, behind the vehicle or mobile equipment. Other vehicles must be escorted at the Project Manager's discretion. Drivers entering site must wear the correct PPE.

In order to delineate the paths of the earth moving machinery, a "*Scraper and Mobile Equipment Circuit*" or similar signs shall be erected 100m (325ft) prior to the circuits.

To minimize the potential of light vehicles entering the blind spots of heavy vehicles, all other equipment and light vehicles and mobile equipment are to give way to heaving vehicles operating on any infrastructure road or facility.

## 11 Vehicle Speed

Unless otherwise stated (i.e. by means of memo or signage), the following speed restrictions shall apply at all times:

- General speed limit – 60 kph; and
- Areas of increased hazard (i.e. road works and work groups) – 20 kph.

Personnel operating a vehicle on any road within the boundaries of facilities, including access roads, **MUST ALWAYS DRIVE TO THE CONDITIONS**, regardless of the posted speed limit signage, e.g. slower in wet weather or poor visibility, lights on.

## 12 Excavations

For excavations on roads, barriers will be put in place to prevent vehicle access to the trench.

The barriers must be a suitable height and constructed of high visibility material to make them easily seen by the largest vehicles driving through.

## 13 Light Vehicle Driver Training

All personnel operating a light vehicles shall have the required authorized license.

Light vehicle driver assessments will include both theory and practical competencies and personnel must pass in order to be deemed competent to operate a vehicle on any project facility.

### 13.1 Vehicle Safety Standards

Where required, approved Roll Over Protection Structures (ROPS) are to be installed in light vehicles and mobile equipment.

Seatbelts must be installed for each seat in a vehicle and worn at all times by all personnel

travelling in the vehicle. Vehicle capacity, stability and terrain capabilities will be considered when selecting suitable light vehicles and mobile equipment for the project facilities.

The responsible vehicle operator shall, at the commencement of each day and when taking over a vehicle, complete a pre-use inspection checklist.

#### **14 Journey Management**

Where a journey is to be made to another site or remove site, the vehicle operator shall make arrangements with the Vehicle Coordinator and fill in the Journey Board and Travel Log, with details of travel route, ETA, number of passengers and names of operator and point of origin/home.

Contact by radio or similar where available at regular and pre-arranged times shall be arranged. Where contact is not made on schedule, the Vehicle Coordinator shall:

- Attempt to make radio contact with the vehicle operator;
- In the event that communications is not established by the Vehicle Coordinator, shall continue trying until the next scheduled contact (not greater than 2 hours);
- If no radio or satellite phone is available and the vehicle operator has not returned by their original estimated time of arrival (ETA) plus two hours, the Vehicle Coordinator shall contact the relevant emergency services to initiate a coordinated search and rescue operation; and
- In most cases the Vehicle Coordinator will have a more detailed knowledge of the area of travel and should liaise closely with the relevant emergency services group to assist with the search.

#### **15 Defective Light Vehicles and Mobile Equipment**

Any safety related fault or defect in a vehicle or mobile equipment must be reported immediately to the responsible Mechanic and/or Supervisor/ Immediate Line Manager.

An unsafe vehicle or unsafe mobile equipment must have a completed "Out of Service" tag attached to the ignitions witch, steering wheel or controls in the Operator's cabin.

Light vehicles and mobile equipment with an "Out of Service" tag shall not be driven by any persons other than Maintenance Personnel required and authorised to move them for repairs.

##### **15.1 No Go Conditions**

Under no circumstances may a vehicle be driven if any of the following no-go conditions exist:

- a) Defective brakes
- b) Defective steering
- c) Radiator water leaks
- d) Oil leaks
- e) Defective or no head lights
- f) Defective or no brake lights
- g) Defective or no reverse lights
- h) Smooth or incorrectly inflated tyres
- i) Indicators not working
- j) Mirrors damaged or missing

The driver must report all no-go conditions immediately to the responsible Mechanic.

**16 Signage**

All signage must, as a minimum:

- a) Give clear direction;
- b) Be visible and not obscured;
- c) Be maintained;
- d) Be reviewed regularly for relevance;
- e) Pictograms may be required where tourists' numbers are high;
- f) Flashing lights will be placed to warn drivers of any hazards present at night or in poor visibility;
- g) All side roads to be signed(STOP and NOENTRY); and
- h) No red signage to be erected within 5 meters of any railway.

**17 Records**

None

**18 Work Instruction Maintenance**

Any deviation from this work instruction should be discussed with the [Person name]. Such discussion should be documented, using the [Document], detailing the reason for the deviation as well clear instructions of the alternative process to follow. [Person name] or designated person is to approve the alternative process.

Any change required to this work instruction should be done in accordance with [Document].

**19 Attachments**

None

**20 Document Revisions**

Date	Revision	Description of change

## Common conditions regarding traffic control

### Flagman, Stop and goes

Labour used: Foreman, Supervisors, Operators, Drivers and working employees.

### CONTROL OF ENVIRONMENTAL IMPACTS:

LIKELY IMPACT	MITIGATION/PRECAUTIONARY ACTIVITY – (relevant Environmental Specifications)	FREQUENCY
<b>Reducing risk accidents (flagman)</b>		
<b>Vehicle accident</b>	<ul style="list-style-type: none"> <li>• Properly trained personnel/flagman operating stop and go's</li> <li>• Visible flagman present to and from the construction site</li> <li>• Correct visible signage on site at every possible access and exit</li> <li>• Visible lighting after dark</li> </ul>	<b>At all times</b>
<b>Pedestrian and vehicle accident</b>	<ul style="list-style-type: none"> <li>• Properly trained personnel operating stop and go's</li> <li>• Visible flagman present to and from the construction site</li> <li>• Correct visible signage on site at every possible access and exit</li> <li>• Visible lighting after dark</li> </ul>	<b>At all times</b>

LIKELY IMPACT	MITIGATION/PRECAUTIONARY ACTIVITY – (relevant Environmental Specifications)	FREQUENCY
<b>In the event of an accident</b>		
<b>Vehicle accident</b>	<ul style="list-style-type: none"> <li>• Immediately offer first aid where necessary</li> <li>• Immediately inform the Traffic Department and the S.A.P.S</li> <li>• Immediately inform the supervisor on duty</li> <li>• Do not attempt to move the vehicles until a member of the Traffic Department or S.A.P.S. is present and authorizers you to do so.</li> <li>• Call for an ambulance if some person is injured</li> </ul>	<b>When required</b>

LIKELY IMPACT	MITIGATION/PRECAUTIONARY ACTIVITY – (relevant Environmental Specifications)	FREQUENCY
Pedestrian and vehicle accident	<ul style="list-style-type: none"> <li>• Immediately offer first aid where necessary</li> <li>• Immediately inform the Traffic Department and the S.A.P.S</li> <li>• Immediately inform the supervisor on duty</li> <li>• Do not attempt to move the vehicles until a member of the Traffic Department or S.A.P.S. is present and authorizers you to do so.</li> <li>• Call for an ambulance if some person is injured</li> </ul>	When required

**Road work after dark or in poor visibility**

Labour used: Foreman, Supervisors, Operators, Drivers and working employees.

**CONTROL OF ENVIRONMENTAL IMPACTS:**

LIKELY IMPACT	MITIGATION/PRECAUTIONARY ACTIVITY – (relevant Environmental Specifications)	FREQUENCY
<b>Reducing risk accidents</b>		
<b>Vehicle accident</b>	<ul style="list-style-type: none"> <li>• Properly trained personnel/flagman operating stop and go's</li> <li>• Correct reflective safety vests to be worn at all times</li> <li>• Visible flagman present to and from the construction site</li> <li>• Visible reflective signage to be placed before the work place to warn oncoming traffic</li> <li>• Visible reflective signage to alert traffic of the end of the danger/work zone</li> <li>• The use of bright white strobe lights is not recommended as they can temporary blind oncoming traffic at night</li> <li>• Visible lighting after dark</li> </ul>	<b>At all times</b>
<b>Pedestrian and vehicle accident</b>	<ul style="list-style-type: none"> <li>• Properly trained personnel operating stop and go's</li> <li>• Visible flagman present to and from the construction site</li> <li>• Correct visible signage on site at every possible access and exit</li> <li>• Visible lighting afer dark</li> <li>• Visible signage displaying emergency numbers in case of an accident</li> </ul>	<b>At all times</b>
<b>In the event of an accident</b>		

<p><b>Vehicle accident</b></p>	<ul style="list-style-type: none"> <li>• <b>Immediately offer first aid where necessary</b></li> <li>• <b>Immediately inform the Traffic Department and the S.A.P.S</b></li> <li>• <b>Immediately inform the supervisor on duty</b></li> <li>• <b>Do not attempt to move the vehicles until a member of the Traffic Department or S.A.P.S. is present and authorizers you to do so.</b></li> <li>• <b>Call for an ambulance if some person is injured</b></li> </ul>	<p><b>When required</b></p>
<p><b>Pedestrian and vehicle accident</b></p>	<ul style="list-style-type: none"> <li>• <b>Immediately offer first aid where necessary</b></li> <li>• <b>Immediately inform the Traffic Department and the S.A.P.S</b></li> <li>• <b>Immediately inform the supervisor on duty</b></li> <li>• <b>Do not attempt to move the vehicles until a member of the Traffic Department or S.A.P.S. is present and authorizers you to do so.</b></li> <li>• <b>Call for an ambulance if some person is injured</b></li> </ul>	<p><b>When required</b></p>

**Administrative matters**

Labour used: Foreman, Supervisors, Operators, Drivers and working employees.

**CONTROL OF ENVIRONMENTAL IMPACTS:**

LIKELY IMPACT	MITIGATION/PRECAUTIONARY ACTIVITY – (relevant Environmental Specifications)	FREQUENCY
<b>Reducing risk accidents</b>		
<b>Traffic law legislation</b>	<ul style="list-style-type: none"> <li>• Every person driving any vehicle must be in possession of a valid driver’s license for the vehicle he/she is driving</li> <li>• No talking on a mobile telephonic device whilst driving, you must pull off the road when safe to do so.</li> <li>• Vehicle and personnel inspections for signs of alcohol abuse</li> <li>• Correct signage indicating no alcohol usage on site</li> </ul>	<b>At all times</b>
<b>In event of discrepancies</b>	<ul style="list-style-type: none"> <li>• Correct disciplinary procedure followed</li> </ul>	<b>At all times</b>

**Vehicle roadworthiness**

Labour used: Foreman, Supervisors, Operators, Drivers and working employees.

**CONTROL OF ENVIRONMENTAL IMPACTS:**

LIKELY IMPACT	MITIGATION/PRECAUTIONARY ACTIVITY – (relevant Environmental Specifications)	FREQUENCY
<b>Reducing risk accidents</b>		
<b>Vehicle accident</b>	<ul style="list-style-type: none"> <li>• <b>Vehicle checklist to be drawn up</b></li> <li>• <b>All vehicles to have a road worthy certificate</b></li> <li>• <b>Regular vehicle inspections conducted: brake fluid, oil tyre pressure, handbrake etc.</b></li> <li>• <b>Visual aspects checked: indicators, brake lights etc</b></li> <li>• <b>Driving environment: road too dangerous to travel on, hidden excavations, oil on road surface etc.</b></li> <li>• <b>Check that vehicle has a spare usable spare tyre</b></li> </ul>	<b>At all times</b>
<b>If vehicle accident occurs</b>	<ul style="list-style-type: none"> <li>• <b>Immediately offer first aid where necessary</b></li> <li>• <b>Immediately inform the Traffic Department and the S.A.P.S</b></li> <li>• <b>Immediately inform the supervisor on duty</b></li> <li>• <b>Do not attempt to move the vehicles until a member of the Traffic Department or S.A.P.S. is present and authorizers you to do so.</b></li> <li>• <b>Call for an ambulance if some person is injured</b></li> </ul>	<b>At all times</b>

# ANNEXURE K - WASTE MANAGEMENT PLAN

## WASTE MANAGEMENT PLAN

120MW Golden Valley I Wind Energy Facility near Cookhouse, Eastern Cape Province

<p>Prepared for:</p>  <p><b>BioTherm Energy</b></p> <p>Building 1 Design Quarter Fourways 2055</p> <p>South Africa</p>	<p>Prepared by:</p>  <p><b>EOH Coastal &amp; Environmental Services</b></p> <p>67 African Street, Grahamstown, 6139</p> <p>South Africa</p>
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SEPTEMBER 2015

**Waste Management Plan**

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**Coastal and Environmental Services**

**Report Title: Waste Management Plan**  
**Report Version: Final**  
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<b>Name</b>	<b>Responsibility</b>	<b>Date</b>
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## TABLE OF CONTENTS

<b>1</b>	<b>INTRODUCTION.....</b>	<b>4</b>
1.1	Objectives.....	4
1.2	Scope.....	4
1.3	South African legal framework.....	4
1.3.1	<i>The Constitution of South Africa (1996).....</i>	<i>4</i>
1.3.2	<i>National Environmental Management Act (107 of 1998).....</i>	<i>5</i>
1.3.3	<i>The National Environmental Management: Waste Act No 59 of 2008.....</i>	<i>5</i>
1.3.4	<i>The National Domestic Waste Collection Standard of 2008.....</i>	<i>5</i>
1.4	Relevant international standards and guidelines.....	6
1.4.1	<i>Basel Convention.....</i>	<i>6</i>
1.4.2	<i>Bamako Convention.....</i>	<i>6</i>
1.4.3	<i>IFC Performance Standards on Environmental and Social Sustainability (2012).....</i>	<i>7</i>
1.4.4	<i>IFC General Environmental, Health and Safety Guidelines (2007).....</i>	<i>7</i>
<b>2</b>	<b>WASTE MANAGEMENT PHILOSOPHY.....</b>	<b>9</b>
2.1	Introduction.....	9
2.2	General waste.....	9
2.2.1	<i>Definition.....</i>	<i>9</i>
2.2.2	<i>Management.....</i>	<i>9</i>
2.3	Hazardous waste.....	10
2.3.1	<i>Definition.....</i>	<i>10</i>
2.3.2	<i>Management.....</i>	<i>10</i>
<b>3</b>	<b>MONITORING.....</b>	<b>13</b>

## LIST OF TABLES

Table 3.1: Monitoring of the waste management plan.....	13
Table 3.2: Template waste quantification sheet.....	13

# 1 INTRODUCTION

Amstilite (RF) Proprietary Limited was awarded as a Preferred Bidder under the fourth round of the Department of Energy's Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) and as such will be constructing a 120MW wind energy facility consisting of 48 wind turbines, each with a maximum generating output of 2.55MW. The following ancillary infrastructure will be necessary:

- Internal access roads;
- A building to house the control instrumentation and backup power support, as well as a store room for the maintenance equipment
- Underground and overhead electrical cabling connecting the turbines and the project substation;
- On-site 33/132kV substation
- An overhead 132kV line connecting the on-site substation to the Preferred Bidder Amakhala Emoyeni on-site Kopleegte substation;
- Turbine foundations and hardstand areas.

The facility will cover 8 farm portions over an area of approximately 9,200ha in the Blue Crane Route Local Municipality within the Cacadu District Municipality of the Eastern Cape Province of South Africa. The land is currently used for agricultural purposes, with livestock production and hunting being the primary economic activities. The area is relatively undeveloped and rural.

This Waste Management Plan has been drafted in compliance with the requirements of the National Environmental Management: Waste Act, No. 59 of 2008.

## 1.1 Objectives

The objective of this management plan is to provide clear instructions in waste management with the aim of minimising risk to human health and the environment. This document describes the procedure for the management of waste generated during the construction and operational phase of the project. In addition, the document describes the correct procedure for the disposal of different waste types and Key Performance Indicators (KPI) against which to assess the level of compliance with this plan.

## 1.2 Scope

This waste management plan covers all waste streams generated during the construction and operation of the Golden Valley I Wind Energy Facility. It stipulates the process from the collection of different waste products at all the identified locations until the disposal by identified external agents if applicable.

Wastes covered in this management plan include the following:

- Scrap metal;
- Oil and grease;
- Scrap wood (e.g. pallets and crates);
- Paper;
- Redundant equipment;
- Glass;
- Hydrocarbon contaminated materials e.g. oil rags, paint tins, solvent cleaner rags;
- Empty cement bags;
- General waste.

## 1.3 South African legal framework

### 1.3.1 *The Constitution of South Africa (1996)*

The Constitution is the supreme law of the land and any act or conduct inconsistent with it is invalid and will have no force of law. The Constitution addresses matters relating to the environmental protection and quality of life within the country. Section 152(d) of the Constitution designates the local government as responsible for promoting a safe and healthy environment for all and s24 stipulates that everyone has the right:

- a) *to an environment that is not harmful to their health or well-being; and*
- b) *to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that-*
  - (i) *prevent pollution and ecological degradation;*
  - (ii) *promote conservation; and*
  - (iii) *secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.*

### **1.3.2 National Environmental Management Act (107 of 1998)**

The National Environmental Management Act 107 of 1998 (NEMA 107 of 1998) provides for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote cooperative governance and procedures for co-ordinating environmental functions exercised by organs of state. The Act also provides certain aspects of the administration and enforcement of other environmental management laws.

The NEMA 107 of 1998 consists of 53 Sections divided into 10 Chapters. Section of 2 (Chapter 1) of the Act sets out in detail the national environmental management principles that shall apply throughout the Republic to the actions of all organs of state that may significantly affect the environment. Sections 23 and 24 (Chapter 5) promotes the application of appropriate environmental management tools in order to ensure the integrated environmental management of activities, defining the objectives of such management and providing for its implementation.

The purpose of Chapter 5 is to promote the application of appropriate environmental management tools in order to ensure the "integrated environmental management" of activities. It defines the objectives of such management and provides for its implementation in sections 23 and 24.

### **1.3.3 The National Environmental Management: Waste Act No 59 of 2008**

In order to fulfil the requirements of s24 of the Constitution of South Africa, the Waste Act through the relevant Organs of State, sought to implement uniform measures that seek to reduce the amount of waste that is generated and, where waste is generated, to ensure that waste is re-used, recycled and recovered in an environmentally sound manner before being safely treated and disposed of. The NEM: Waste Act must be read with the NEMA 107 of 1998, unless the context of the NEM: Waste Act indicates that the NEMA 107 of 1998 does not apply. The interpretation and application of the NEM: Waste Act must be guided by the national environmental management principles set out in s2 of the NEMA 107 of 1998. Excluded from the NEM: Waste Act are:

- residue deposits and residue stockpiles that are regulated under the Mineral and Petroleum Resources Development Act, 2002 (Act No.28 of 2002);
- the disposal of explosives that is regulated by the Explosives Act, 2003 (Act No.15 of 2003).

The NEM: Waste Act, 2008 (Act No.59 of 2008) stipulates that standards are required to "give effect to the right to an environment that is not harmful to health and well-being, and that this right has to be applied "uniformly throughout the Republic".

Government Notice 921 (November 2013) lists those waste-related activities that could have a detrimental activity on the environment and therefore require a waste management licence.

### **1.3.4 The National Domestic Waste Collection Standard of 2008**

The National Domestic Waste Collection Standard (2008) serves to redress past imbalances in the provision of waste collection services in the country in order to provide acceptable, affordable and sustainable waste collection services. The setting of National Domestic Waste Collection Standards was informed by the Constitution of the Republic of South Africa (1996), the NEM: Waste Act, 2008 (Act No.59 of 2008), the current international waste management standards and good practices in both developed and developing countries, the current waste collection practices in South African municipalities as well as stakeholder consultations.

## 1.4 Relevant international standards and guidelines

### 1.4.1 Basel Convention

The main objectives of the Basel Convention are the reduction of the production of hazardous waste and the restriction of trans-boundary movement and disposal of such waste. It also aims to ensure that any trans-boundary movement and disposal of hazardous waste, when allowed, is strictly controlled and takes place in an environmentally sound and responsible way. Its scope of application covers a wide range of wastes defined as “hazardous wastes” based on their origin and/or composition and their characteristics (Article 1 and Annexes I, III, VIII and IX), as well as types of wastes defined as “other wastes” (household waste and incinerator ash; Article 1 and annex II).

In particular, the convention prohibits the trans-boundary movement of wastes and is applicable to wastes that belong to the following categories:

- Hazardous wastes that are subject to trans-boundary movement and they include:
  - a. Wastes that belong to any category contained in Annex I, unless they do not possess any of the characteristics contained in Annex III of the Convention; and
  - b. Wastes that are not covered under paragraph (a) but are defined as, or are considered to be, hazardous wastes by the legislation of South Africa for export, import or transit.
- Wastes that belong to any category contained in Annex II that are subject to trans-boundary movement shall be “other wastes” for the purposes of this Convention.
- Wastes which, as a result of being radioactive, are subject to other international control systems, including international instruments, applying specifically to radioactive materials are excluded from the scope of this Convention.
- Wastes which derive from the normal operations of a ship, the discharge of which is covered by another international instrument, are excluded from the scope of this Convention.

For the purpose of this Convention, any trans-boundary (export and import) movement of the described wastes without due authorization by the relevant authority is deemed illegal. It should be noted that the illegal trafficking of wastes also applies to damage due to an incident occurring during an authorized trans-boundary movement of hazardous wastes and their disposal.

### 1.4.2 Bamako Convention

Impetus for the Bamako Convention arose from the failure of the Basel Convention to prohibit trade of hazardous waste to less developed countries, and from the realization that many developed nations were exporting toxic wastes to Africa. Though the Bamako Convention uses a format and language similar to that of the Basel Convention, it is much stronger in prohibiting all imports of hazardous waste. Additionally, it does not make exceptions on certain hazardous wastes (like those for radioactive materials) made by the Basel Convention.

Article 9 (*Illegal Traffic*) of the Bamako Convention prohibits any trans-boundary movement of hazardous wastes under the following conditions:

- if carried out without notification, pursuant to the provisions of this Convention, to all States concerned; or
- if carried out without the consent, pursuant to the provisions of this Convention, of a State concerned; or

- if consent is obtained from States concerned through falsification, misrepresentation or fraud; or
- if it does not conform in a material way with the documents; or
- if it results in deliberate disposal of hazardous wastes in contravention of this Convention and of general principles of international law.

The Convention requires its signatories to introduce national legislation to criminalise and impose high punitive measures on all persons who have planned, carried out, or assisted in the illegal trans-boundary movement of hazardous wastes.

### **1.4.3 IFC Performance Standards on Environmental and Social Sustainability (2012)**

In 2005 the IFC, which is the private sector arm of the World Bank Group, embarked on an extensive review of its environmental assessment procedures and Performance Standards (PS). A revised and slightly more rigorous and more clearly defined PS as well as its associated Guidance Notes were published in January 1, 2012. These PS (Box 1) usually form the back-bone of Environmental, Social & Health Impact Assessments (ESHIA) and environmental management for large projects in developing countries and can be used to identify and manage risk in proposed developments.

#### **Box 1: IFC Performance Standards (January, 2012)**

<b>Performance Standard 1:</b>	Assessment and Management of Environmental and Social Risks and Impacts
<b>Performance Standard 2:</b>	Impacts
<b>Performance Standard 3:</b>	Labour and Working Conditions
<b>Performance Standard 4:</b>	Resource Efficiency and Pollution Prevention
<b>Performance Standard 5:</b>	Community Health, Safety, and Security
<b>Performance Standard 6:</b>	Land Acquisition and Involuntary Resettlement Biodiversity Conservation and Sustainable Management of Living Natural Resource.
<b>Performance Standard 7:</b>	Resource.
<b>Performance Standard 8:</b>	Indigenous Peoples Cultural Heritage

Of specific relevance to this report is Performance Standard 3 (PS3) which deals with resource efficiency and pollution prevention. The primary objectives of PS3 are to:

- Avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities.
- Promote more sustainable use of resources, including energy and water.
- Reduce project-related Greenhouse Gas emissions.

The primary requirement of PS3 is that technologies and practices that avoid or minimise detrimental impacts of pollution are applied throughout the lifecycle of the project.

In addition to the IFC PS, the General Environmental, Health and Safety Guidelines (2007) described below are of equal relevance.

### **1.4.4 IFC General Environmental, Health and Safety Guidelines (2007)**

The IFC General EHS Guidelines (2007) are technical reference documents with general and industry specific examples of Good International Industry Practice (GIIP) as defined in the IFC's PS3 on Resource Efficiency and Pollution Prevention. The IFC uses the EHS Guidelines as a technical source of information during project appraisal activities as described in the IFC's Environmental and Social Review Procedures (2006).

According to the General EHS Guidelines, facilities that generate and store wastes should practice the following:

- Establishing waste management priorities at the outset of activities based on an understanding of potential EHS risks and impacts and considering waste generation and its consequences;
- Establishing a waste management hierarchy that considers prevention, reduction, re-use, recovery, recycling, removal and finally disposal of wastes;
- Avoiding or minimizing the generation of waste materials, as far as practicable;
- Where waste generation cannot be avoided but has been minimized, recovering and reusing waste, and;
- Where waste cannot be recovered or reused, treating, destroying and disposing of it in an environmentally sound manner.

Section 1.3 of the IFC General EHS Guidelines (2007) provides specific recommendations related to the management of wastewater and includes indicative values for treated sanitary sewage discharges.

## 2 WASTE MANAGEMENT PHILOSOPHY

### 2.1 Introduction

Waste prevention and minimisation is the first approach to be taken in the development of a waste management strategy. The “3 R’s” waste philosophy, stipulates that waste should be:

1. Reduced;
2. Reused if reduction is not possible, and
3. Recycled if reuse is not possible.

According to this hierarchical approach, generation of waste should be prevented or minimised as a priority. Any waste that is produced should be reused or recycled with disposal being regarded as a last resort. Waste minimisation comprises any activity to prevent the formation or to reduce the volume and/or the environmental impact of the waste that is generated, treated, stored or disposed of.

The objectives of waste prevention and minimisation are to:

- i. Reduce the amount of waste disposed of within the environment by avoiding or reducing waste generation at source,
- ii. Save money by reducing waste treatment and disposal costs,
- iii. Meet the national waste minimisation goals and protect the environment and reduce potential environmental liabilities.

The site Environmental Officer (EO) will investigate opportunities for the prevention, minimization, re-use and recycling of wastes. Where disposal of waste is unavoidable, this will be done in accordance with national legislation and, where practical, international best practice.

Detailed requirements for the management of waste streams originating from the development are described below.

### 2.2 General waste

#### 2.2.1 Definition

General waste is a generic term for waste that does not pose a significant threat to public health or the environment, if properly managed. Examples include domestic, commercial wastes and certain non-radioactive industrial wastes and may include:

- Cardboard;
- Paper;
- Metal;
- Wood;
- Glass;
- Rags / Material;
- Plastic;
- Rubber;
- Cleared vegetation;
- Waste soil / rock.

#### 2.2.2 Management

- All wastes will be managed according to the requirements of legislation of South Africa;
- Littering on site is prohibited;

- As far as practicable, the philosophy of the waste management hierarchy will be applied to the management of all waste streams;
- General and hazardous wastes will be separated at source;
- All general wastes that cannot be reused or recycled will be stored temporarily in a dedicated area and then transported regularly by a licenced waste collector for final disposal at a registered waste disposal facility;
- All bins for temporary storage of waste that are located outdoors will be covered to prevent ingress of water and access by animals;
- The Key Performance Indicators detailed in this document will be adhered to for auditing purposes; and
- All employees, contractors and visitors to the site will be informed of correct waste management procedures, including separation of general and hazardous waste at source.

All waste, other than soil and vegetation, will be separated at source into clearly demarcated skips or bins located around the site. Separate bins or skips should be available for the following waste groups:

- Hazardous solid waste;
- Non-recyclable general wastes (including food waste);
- Glass;
- Wood;
- Recyclable waste (plastic, cans, paper and cardboard etc);
- Oil and other hydrocarbons.

All bins and skips will be maintained in good condition to ensure that any leachate or liquid waste does not pollute the environment. It is the responsibility of the EO to ensure that appropriate bins are available and are kept in good condition. All bins should be located in a position to minimise the risk that they may be knocked over or damaged, and should not be located close to drains, storm water gutters, ponds or any natural water courses. All external bins will be fitted with lids. Where bins or skips are fitted with lids, these should be closed after use to prevent access by vermin or introduction of water during rainfall events.

Topsoil should be set aside for use during rehabilitation, it should be stored and maintained according to the specifications of the Rehabilitation and Topsoil Management Plan. Waste rock should, if feasible, be crushed and used as wearing course on the site access roads. Cleared vegetation can be mulched, stockpiled, and then used in the rehabilitation phase.

## **2.3 Hazardous waste**

### **2.3.1 Definition**

Hazardous waste is that with characteristics of flammability, irritability, ignitability, corrosivity or toxicity. It may be wastes containing heavy metals or asbestos, batteries, pesticide containers or hydrocarbon wastes. These include oils, grease and hydrocarbon contaminated materials such as oil rags and paint tins from maintenance activities. Batteries and fluorescent light tubes are also regarded as hazardous and must be disposed of according to prescribed procedures.

### **2.3.2 Management**

Unless otherwise specified, all hazardous wastes must be disposed of in the appropriate bins located around the facility. Where there is uncertainty as to the correct disposal procedure, queries should be referred to the EO of the site. The procedures for the disposal of key hazardous waste types are described below.

- All hazardous waste will be disposed of offsite through a licensed hazardous waste disposal agent who will collect hazardous waste on a regular schedule;

- Certificates of safe disposal at a licenced facility will be retained and should be readily available if required for the purposes of audits.
- All the hazardous waste on site will be stored in sealed plastic drums in a secured and bunded area before removal from site. This facility will be designed to include secondary containment and will be covered to protect the contents from weather (sunlight and rain). If wastes are corrosive, the base of the storage facility should be lined with an acid-resistant coating;
- Where possible, empty containers for hazardous chemicals will be returned to suppliers. Where empty containers for hazardous chemicals (hydrocarbons, herbicides, degreasing agents etc.) cannot be returned to the suppliers, they must be triple-rinsed, punctured and stored in a secure area until such time as they can be disposed of safely. Rinse water may not be discharged directly to the environment;
- Empty herbicide containers should be disposed of according to the Food and Agricultural Organisation's Guidelines on Management Options for Empty Pesticide Containers (Food and Agriculture Organisation (FAO) 2008);
- As per the FOA (2008) guidelines, burning of empty pesticide containers should be strongly discouraged. Specific guidance on the management of empty pesticide containers is provided by the FAO (2008);
- Hydrocarbon contaminated soil will be immediately removed and disposed of as hazardous wastes to be removed from site;
- All staff must be trained on the correct management of bunded facilities, including the discharge of collected liquids;
- Spill kits will be readily available at strategic points throughout the site and staff must be trained on the correct use of these kits;
- If there is a first aid station, all medical waste will be collected and disposed of in a safe and approved manner and, to the extent practicable in accordance with the management procedure described in Annex 3 of the International Committee of the Red Cross (ICRC) Medical Waste Management (2011);
- MSDS for all chemicals will be readily available on site and the precautions stipulated in these must be adhered to at all times.

The management of specific types of hazardous wastes is described below:

### ***Electronic waste (e-waste)***

Certain electrical and electronic equipment contain substances, such as heavy metals, that could pose a threat to environmental and human health if such equipment is not disposed correctly. Waste falling into this category includes computer components, TV monitors, circuit boards, radios, microwave ovens and electronic monitoring and measuring devices. Electronic waste will be stored on site in a secure location until such time as it can be disposed offsite through an approved recycling or disposal agent.

### ***Batteries***

Once the battery life has been exhausted, disposal of batteries creates a contamination risk. Used batteries will be stored in plastic drums in weather proof hazardous storage containers until sufficient quantities have been collected for transport to a recycling agent or licenced disposal site.

### ***Fluorescent Tubes***

When lamps are disposed of in a hazardous waste landfill, rather than recycled, a substantial percentage of the lamps will be broken and virtually all of the mercury contained in the lamps is released into the environment. To avoid this all florescent tubes will be disposed through a specialised drum fitted with a crusher. Full drums will be stored in a weatherproof hazardous storage container until sufficient quantities have been achieved for transport off site.

### ***Empty containers (Hazardous materials)***

As far as practicable, all empty containers that contained hazardous material (paints, hydrocarbons, herbicides etc.) will be managed according to international best practice. In the first instance, these will be placed in the appropriate bins and stored until such time as they can be returned to the suppliers. Where this is not practical, after collection the containers will be stored in a central secure location until such time as they can be removed from site and disposed of at a licensed hazardous waste facility or cleaned and re-used.

Empty chemical containers are not to be burned or buried. Safe, hazard-free burning techniques require a good understanding of pesticide chemistry while safe pesticide burial requires knowledge of local hydrology as well as of the environmental behaviour of pesticides. Many end users of pesticides do not have such knowledge or cannot apply it to their particular circumstances. It is, therefore, strongly recommended that the burying or burning of pesticide-related waste and empty containers be discouraged.

It may be possible to re-use certain containers (although not those that previously contained pesticides), provided that they have been cleaned appropriately. Cleaning will always be undertaken under the guidance of the EO who will then need to provide written permission for the release of a container for re-use. Gate security will be responsible for ensuring that no empty containers leave the site without this written permission.

### ***Medical Waste***

It is anticipated that the medical waste from the site will be small. All medical waste, including sharps (needles, glass and scalpels), human or animal tissue, body fluids infected with pathogens, medical dressings, contaminated articles such as urine containers and tubing will be generated on site from the clinic. These wastes will be collected and handled according to the ICRC Medical Waste Management (2011) recommendations.

### ***Sewage***

Informal ablutions at the project site will be prohibited. Consequently, ablution facilities will need to be made available on the site during the construction of the WEF. These will take the form of mobile chemical toilets. The precise number and location of these toilets and wash facilities will be agreed with the EO and will need to ensure relatively easy access by the construction team. The following specific requirements are applicable:

- All toilet facilities and washrooms must be maintained in a hygienic condition;
- All VIPs must be lined and situated at least 50m from any water course or drainage line;
- All sanitation facilities must be maintained in good working order.
- The toilet facilities must be emptied regularly by a registered service provider and records of maintenance must be retained;
- All mobile toilet facilities must be secured to ensure that they cannot blow over during periods of high winds.

### 3 MONITORING

The waste management plan will be implemented and monitored by the EO and all records relating to the waste management plan will be kept by the EO. The monitoring programme is as shown in Table 3.1 below.

**Table 3.1: Monitoring of the waste management plan**

Key Performance Area	Key Performance Indicators	Checking Procedure	Frequency
Compliance with the prescribed procedures for the management of waste streams	<ul style="list-style-type: none"> <li>➤ Score for quantity of litter on site</li> <li>➤ % incorrect usage of colour-coded bins</li> <li>➤ Score for accessibility, location and integrity of bins</li> <li>➤ Incorrect storage of wastes at the temporary storage site</li> <li>➤ Visual evidence of waste-related pollution of soil or water</li> <li>➤ Unauthorised presence of containers from the Wind Energy facilities in the neighbouring communities</li> <li>➤ Number of reported waste-related non-conformances</li> </ul>	The EO shall complete a visual inspection of the various solid waste collection locations and identify if the waste stream is being appropriately segregated. Inappropriate disposal practices will be noted and an attempt will be made to locate the offending party and re-educate them as to the necessity for following the appropriate protocols. A record of the inspections and any follow-up/enforcement actions shall be kept and reported in the annual audit.	Monthly
Waste minimization and resource efficiency	<ul style="list-style-type: none"> <li>➤ Quantity of general waste requiring off-site disposal</li> <li>➤ Quantity of hazardous waste requiring disposal off-site</li> </ul>	The EO will establish a baseline for the quantity of different waste types produced on site and will then monitor the volumes of waste relative to this baseline.	<u>Construction:</u> Weekly  <u>Operation:</u> Monthly

The sheet below must be completed **weekly** throughout the construction phase and **monthly** during the operational phase.

**Table 3.2: Template waste quantification sheet**

Waste Type	Units	Disposal Route			Notes
		Landfill	Recycling / Re-use	Other	
General waste					

## **REFERENCES**

Food and Agricultural Organisation (2008): Guidelines on Management Options for Empty Pesticide Containers

International Committee of the Red Cross (2011): Medical Waste Management

International Finance Corporation (2007): Environmental, Health and Safety General Guidelines

International Finance Corporation (2010): Environmental, Health and Safety Guidelines for Waste Management Facilities