



Draft Environmental Management Plan

**Proposed Richtersveld Wind Farm, Northern Cape
DEA Ref: 12/12/20/1967**

G7 Renewable Energies

Revision 1

October 2011

Draft Environmental Management Plan

*Proposed Richtersveld Wind Farm,
Northern Cape*

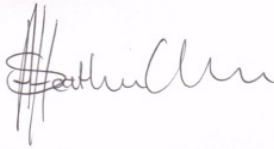
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For and on behalf of Environmental Resources Management
Approved by: Stuart Heather-Clark

Signed:
Position: Partner

This report has been prepared by Environmental Resources Management the trading name of Environmental Resources Management Southern Africa (Pty) Limited, with all reasonable skill, care and diligence.

Revision Number	Date
Revision 1	October 2011

1.1

INTRODUCTION

An Environmental Management Programme (EMP) is a set of guidelines and actions aimed at ensuring that construction and/or installation activities, and subsequent management of facilities, are undertaken in a manner that minimises environmental risks and impacts.

The following EMP has been prepared by ERM Southern Africa (Pty) Ltd, for RWP Richtersveld Wind Power, hereafter referred to as RWP, for the proposed construction and operation of a wind energy facility at the Richtersveld Wind Farm Site. This EMP addresses potential impacts associated with the installation, operation and decommissioning phases of the project.

The EMP is required in order to:

- assist in ensuring continuing compliance with South African legislation and RWP Environmental Health and Safety Policy (this policy is currently being developed for the Wind Industry);
- provide a mechanism for ensuring that measures identified in the EIA designed to mitigate potentially adverse impacts, are implemented;
- provide a framework for mitigating impacts that may be unforeseen or unidentified until construction is underway;
- provide assurance to regulators and stakeholders that their requirements with respect to environmental and socio-economic performance will be met; and
- provide a framework for compliance auditing and inspection programs.

The EMP will remain a draft document until after it has been updated with the conditions stipulated in the environmental authorisation.

The EMP specifies the following:

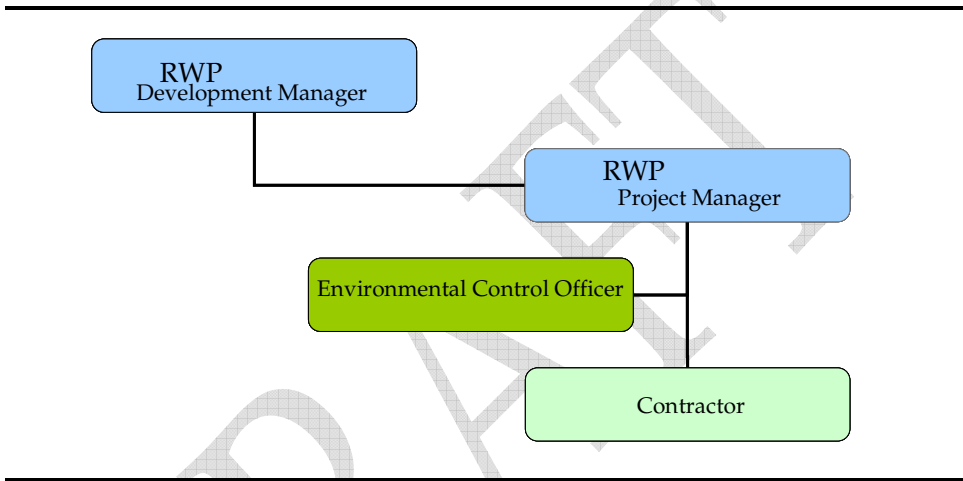
- roles and responsibilities for implementation of the EMP (*Section 1.2*);
- subsidiary plans and policies (*Section 1.3*);
- stakeholder engagement (*Section 1.4*);
- requirements for micro-siting of turbines (*Section 1.5*);
- permit requirements (*Section 2*);
- biological monitoring requirements for pre-construction, construction and operation (*Section 3*);

- mitigation and compliance monitoring measures (*Section 4*); and
- contractor compliance standards (*Section 5*)

1.2 ROLES AND RESPONSIBILITIES

The following section outlines the roles and responsibilities of those involved in the proposed installation, operation and decommissioning of the wind energy facility. An organogram showing reporting structures is provided in *Figure 1.1*.

Figure 1.1 *Reporting Structures*



1.2.1 RWP Development Manager

RWP's Development Manager will have the ultimate responsibility for ensuring the measures outlined in the EMP are delivered and that the measures are implemented by their contractors and subcontractors. In this respect the Development Manager will review and approve contractor plans for delivery of the actions contained in the EMP during construction and ensure that during operation performance will be evaluated through monitoring and auditing.

The Development Manager's responsibilities will encompass the following:

- Liaison with the project engineers to ensure that the Wind Farm is designed to meet all the specified environmental parameters and legal requirements as specified in the EMP and Environmental Authorisation;
- Authority to stop works in emergency situations;
- Approval of method statements; and
- Liaison with authorities.

The Project Manager, Nicolas Rolland, or any other person appointed to the role, is responsible for the implementation of the EMP, and will report directly to the Development Manager on environmental, health and safety matters.

Project Manager

The Project Manager, Kilian Hagemann, or any other person appointed to the role, is the designated person responsible for the implementation of the EMP and therefore the person responsible for managing the environmental issues that arise during the construction phase of the project.

The Project Manager's main role is to regularly inspect and manage the construction activities on site in order to ensure compliance with the EMP. The Project Manager will liaise with the Environmental Control Officer (ECO) and Contractor and report to the Development Manager.

The Project Manager's responsibilities will encompass the following:

- Training of contractors on environmental matters;
- Inspect the site at least once every two weeks for the duration of the construction phase;
- Management of the contractors in terms of the EMP;
- Review of contractor method statements and ensure alignment with the EMP;
- Reporting on environmental problems to the Development Manager;
- Record keeping of:
 - environmental incidents;
 - contractors non-compliance to the EMP; and
 - contractor fines and penalties.
- Making recommendations or implementing actions relating to a contractor's failure to comply with the EMP, which may include enforcement of penalties and even contract termination and removal of contractor from the site;
- Recommend the suspension of work activities where such activities contravene the EMP requirements; and
- The authority to stop works in emergency situations when the Development Manager is not available and construction activities seriously threaten the environment.

The Project Manager will also be responsible for implementing the community engagement plan. The Project Manager will be required to participate in community meetings that will be held in affected communities prior to, during and upon completion of construction.

During the construction phase an Environmental Control Officer (ECO) will be responsible for ensuring the overall environmental and socio-economic objectives of the EMP are met. Specialists such as palaeontologists, bird

specialists etc. will be employed as required. When working on site, the ECO will report to the Project Manager.

1.2.2 *Environmental Control Officer*

RWP will appoint an independent Environmental Control Officer (ECO) prior to commencement of construction and throughout the construction phase of the project until such time as rehabilitation is complete and the site is ready for operation. The ECO shall hold a relevant environmental degree or diploma and have suitable experience in ECO work.

The primary role of the ECO will be to monitor the construction activities and ensure that the mitigation measures of the EMP and Environmental Authorisation (EA) are implemented.

The ECO's responsibilities will encompass the following:

- Brief the Contractor on EMP requirements and site layout;
- Retain a copy of the EMP and EA and all records relating to monitoring and auditing on site, and keep these available for inspection;
- Visit the site at least once a day during construction, particularly for the following activities:
 - Site clearance;
 - Excavation;
 - Turbine arrival, assembly and placement;
 - Set up of concrete batching (if required);
 - Establishment of all works areas including latrines and wash areas.
- Specific tasks of the ECO will include ensuring:
 - Sensitive areas are demarcated and cordoned off;
 - Activities are restricted to demarcated works areas;
 - No sensitive features are damaged or disturbed;
 - Any notifiable features (eg fossils or other heritage remains) are recorded and work stopped where the find was made or redirected to avoid such areas. The ECO will ensure that the appropriate authorities are informed;
 - All incidents are recorded in a logbook and appropriate remedial action taken;
 - Site visit reports are kept and feedback provided to the Project Manager and other senior management, as required;
 - Liaise with DEA regarding implementation of the EMP, if and when required;
 - Possible development of the Residents Monitoring Committee, if required by the Department of Environmental Affairs and the community.

The ECO will be expected to be contactable telephonically in case of emergencies at all times.

1.2.3 *Contractors and Site Personnel*

During site preparation and construction, the contractor will be responsible for ensuring compliance with all relevant legislation as well as adherence to all environmental and socio-economic mitigation measures specified in the EMP. The contractor is also responsible under the contract for managing the potential environmental, socio-economic, safety and health impacts of all contracted activities whether these are undertaken by themselves or by their subcontractors. The contractor has overriding responsibility for the activities of all direct staff and subcontractors.

Adherence to the provisions of the EMP will be a condition of contract with the Contractor. The contractor will need to demonstrate to RWP's satisfaction how compliance with the requirements of the EMP will be met. The contractor will also be expected to demonstrate commitment to the EMP at all levels in the contractor's management structure and will be required to identify individuals responsible for overall environment, socio-economic, safety and health management.

The contractor will be required to undertake regular environmental and socio-economic inspections and provide reports to RWP to monitor and evaluate performance against the measures and objectives established in the EMP. In this regard, the contractor's performance in complying with the EMP will be monitored and audited by the ECO, Project Manager and Development Manager.

1.3 *ALLOCATION OF RESOURCES*

Financial and personnel resources must be allocated to the implementation of the EMP, including provisions for contractor training and environmental awareness, contingencies to deal with environmental emergencies, monitoring and auditing. Such resources must be available during the operational and closure, as well as the construction phase.

Environmental requirements requiring cost allocation must be clearly identified the terms of reference for contractors and suppliers to ensure these service providers budget effectively.

1.4 *TRAINING AND HSE AWARENESS*

Training and awareness raising around HSE issues is essential for ensuring that the EMP is effectively implemented and that unforeseen HSE incidents

are managed timeously and appropriately. The ultimate responsibility for HSE training and awareness-raising rests with RWP. It is suggested that the following be included in the approach to training and awareness raising:

- Induction course/briefing for all contractors including a description of RWP's expectations, specific responsibilities of wind farm workers with regard to HSE issues. The briefing will usually take the form of an on site talk and demonstration by the ECO. The education / awareness programme should be aimed at all levels of personnel within the contractor team;
- Refresher courses as and when required;
- Focused training sessions in relation to specific tasks, such as the erection of turbines; and
- Toolbox talks to alert workers to particular HSE concerns associated with their tasks for the day/period and to encourage generally responsible behaviour on site.

Courses should be provided by a qualified person and in a language and medium understood by contractors/employees.

1.5

DOCUMENTATION AND RECORD KEEPING

All documentation relevant to the implementation of the EMP during construction, operation and closure must be maintained on site in a structured and ordered manner. These documents should be distributed in a controlled manner to affected personnel and must also be made available for public / authority inspection, if requested.

The type of documents that should be managed and retained include, at minimum:

- Method statements;
- Policies and plans;
- Project specific HSE audit reports;
- Training material and records of attendance;
- Incident reports;
- Emergency preparedness and response procedures (in accordance with IFC Performance Standard 2);
- Monitoring reports; and
- Minutes of key meetings with service providers and project team members.

1.6

AUDITING AND REPORTING

Auditing by an external, independent auditor should be undertaken at the end of both the construction and rehabilitation phases, as well as regular audits thereafter during operation, subject to DEA requirements. After each audit a report should be submitted to the DEA and other relevant authorities. The audit must cover compliance with any specific conditions included in the Environmental Authorisation as well as specific management actions included in this EMP. The completed audit reports must be accurately dated and form part of the document control system. Report back to registered stakeholders should be undertaken after each audit.

A monthly audit should be undertaken by the independent ECO during construction and the resultant independent audit reports will be communicated with senior management within RWP and sent to the DEA and other relevant authorities as required.

1.7

REVISION OF THE EMP

This EMP has been formulated in draft so as to allow for appropriate changes and modifications subject to inclusion of final requirements as per the EA and specific measures identified during pre-construction monitoring. The EMP should be subject to review by senior management responsible for the project at the following stages of the project:

- Prior to the initiation of the construction phase (post pre-construction monitoring) to ensure that all relevant management actions have been included;
- Following the construction and rehabilitation phase and after the start of operation, to capture additional and unforeseen mitigation measures that are identified during these activities, and would be relevant to the operational phase;
- Prior to final decommissioning and closure.

1.8

SUBSIDIARY PLANS AND POLICIES

Environmental and socio-economic management issues at various stages in the life of the project from detailed design through to decommissioning, are governed or guided by a number of standards, including:

- those contained in South African legislation;
- those established by industry codes of practice;
- those required by RWP policy or manufactures specifications;

- those within relevant international standards (e.g. World Bank environmental guidelines, IFC Performance Standards, World Health Organisation, International Labour Organisation); and
- commitments made in the EIA.

Prior to construction a number of subsidiary plans, policies and monitoring programmes will be required to manage various activities or potential risks. These are summarised in *Box 1.1*.

Box 1.1 *Summary of Subsidiary Plans, Policies and Programmes required for the EMP*

Policies, Plans and programmes to be developed
• Environmental Policy
• Recruitment Policy
• Local Procurement Policy
• Health and Safety Policy
• Human Resources Policy
• Bat Monitoring Programme
• Bird Monitoring Programme
• Code of Conduct
• Emergency Preparedness and Response Plan (in accordance with IFC Performance Standard 2)
• Health and Safety Plan
• Traffic Management Plan
• Waste Management Plan
• Community Development Trust Plan
• Community Engagement Plan (CEP)

1.9 *STAKEHOLDER ENGAGEMENT*

RWP will continue to engage with stakeholders throughout project construction and operation. Communication with local communities and other local stakeholders will be a key part of this engagement process and will require RWP and the contractor to work closely during the construction period. Development of a Community Engagement Plan (CEP) will be important to facilitate this communication.

The objectives of communication and liaison with local communities are the following.

- To provide residents in the vicinity of the wind farm (e.g. neighbouring landowners/ farmers and other residents) and other interested stakeholders, with regular information on the progress of work and its implications.
- To monitor implementation of mitigation measures and the impact of construction on communities via direct monitoring and feedback from

those affected in order to ensure that mitigation measures are implemented and the mitigation objectives achieved.

- To manage any disputes that may arise between RWP, the contractors and local people.

This engagement process can serve to inform the establishment and provisions of the Community Development Trust linked to the project.

1.9.1 *Grievance Procedure*

RWP should develop a grievance procedure to ensure fair and prompt resolution of problems that may arise from the project. The grievance procedure should be underpinned by the following principles and commitments:

- Implement a transparent grievance procedure, and disseminate key information to directly impacted stakeholders.
- Seek to resolve all grievances timeously.
- Maintain full written records of each grievance case and the associated process of resolution and outcome for transparent, external reporting.

The responsibility for resolution of grievances will lie with RWP and its contractors. The ECO should ensure that the grievance procedure is made accessible to the local community and other relevant stakeholder.

1.9.2 *Residents Monitoring Committee*

As part of the Community Engagement Plan and in order to facilitate the Grievance Procedure a Residents Monitoring Committee (RMC) could be established by the ECO, as required by the DEA. The aim of this RMC would be to inform them of progress and discuss any matters of concern. It would allow the RMC to observe construction activities and ensure that committed mitigation actions in the EMP are enforced.

This committee would comprise willing and informed members of the local community. The ECO would facilitate setting up the RMC and arrange meetings and site visits as required.

1.10 *MICRO-SITING OF TURBINES*

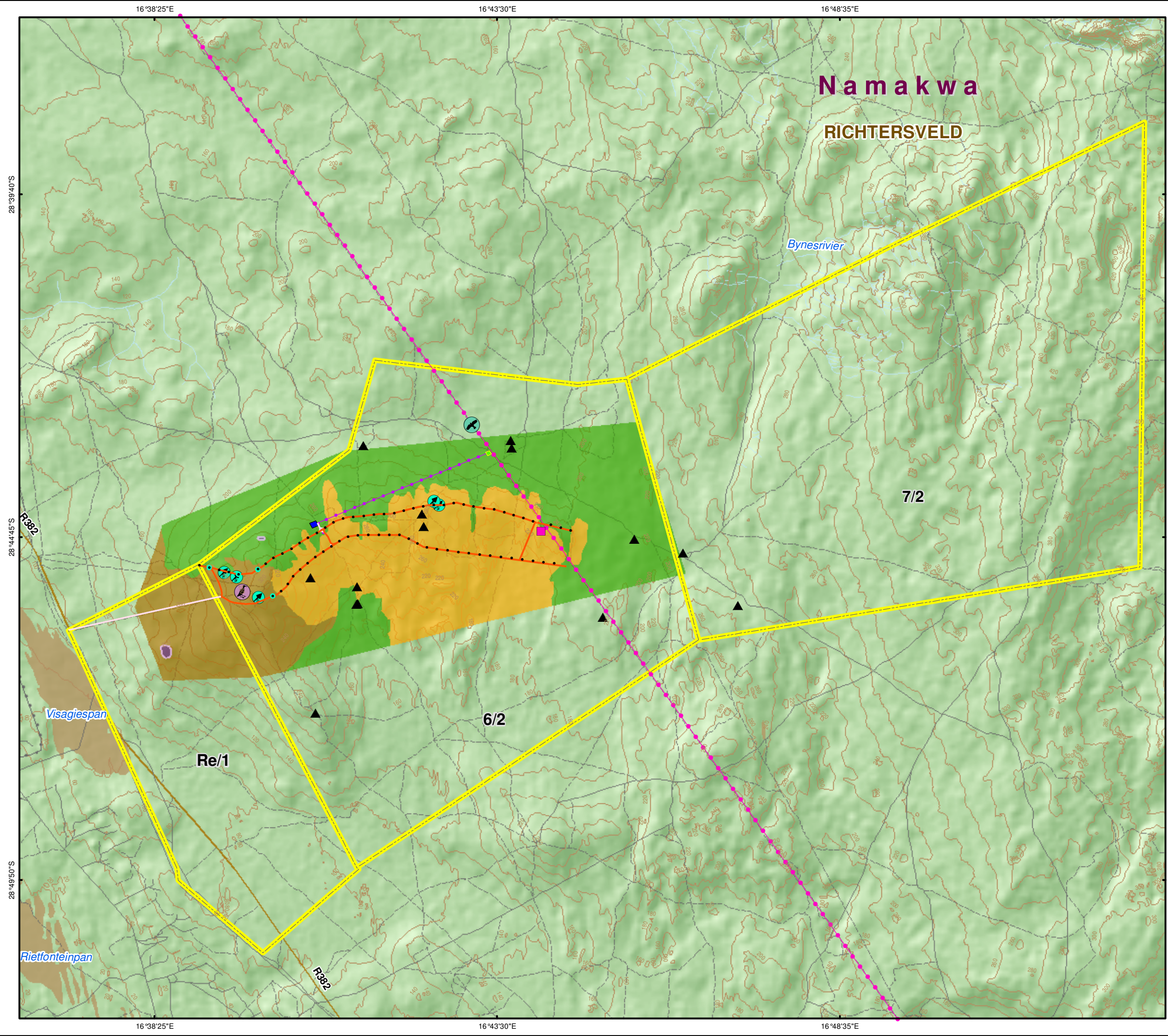
The preferred and Final Site Layout (Alternative 2) has been designed based on a combination of the sensitivity constraints mapping of the site identified by specialists during the EIA process and available wind resource mapping and data from RWP.

The turbine positions may possibly be micro-sited based on additional site data from the following sources:

- pre-construction monitoring data;
- full geotechnical investigation (one for each turbine position)
- choice of turbine model; and
- specific site checks by ecologist and heritage specialist.

Micro-siting will be done as part of the detailed site planning process to ensure that the environmental risks are minimised while the technical requirements of the project can be achieved. Micro-siting will ensure that the turbine positions will be located in areas assigned a medium sensitivity as per EIR and Specialist findings (*Annex E*) and that any environmental, social and cultural heritage constraints (as identified in the EIR and specialist reports) at the specific turbine positions and road alignments are identified, avoided or managed. *Figure 1.1* below reflects the constraints on the Richtersveld site.

In the event of changes to the turbine siting, the final turbine positions will be submitted to the Department of Environmental Affairs (DEA) before construction with an indication of the extent of change from the approved layout, and associated amendments in significance ratings of impacts where applicable.



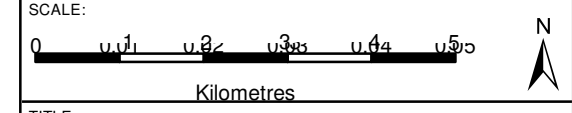
- Legend**
- Richtersveld Land Parcel
 - Transmission Line
 - Secondary Road
 - Other Access
 - Track/Footpath
 - Contours (20m)
 - Non-Perennial River
 - Dry Pan
 - Linking Station
 - Substation Alternative 2
 - 220kV Substation
 - Existing Transmission Lines (Gromis/Oranjemund 1)
 - Substation alternative
 - Access Roads
 - Wind Turbine Generator
 - WTGs to be Re-Sited
 - Internal Roads

- Bird Locations**
- Barlow's Lark
 - Lanner Falcon

- Bat Sensitivity**
- Sensitive Areas
 - 50m Buffer

- Heritage/Cultural Sites**
- Archaeological Site
 - Stock-Posts

- Ecological Sensitivity**
- Very High
 - High
 - Medium



TITLE:
Figure 1.1: Alternative 2 on the Constraints Map

CLIENT:

DATE: SEPT 2011	CHECKED: TS	PROJECT: 0134745
DRAWN: AB	APPROVED: SHC	SCALE: 1 : 100 000
DRAWING: Constraints Map Alt2.mxd		REV: 0

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Projection: Geographic, Datum: WGS84
 Source: NGI, EnPAT, PPF, Natural Scientific Services
 Ecology Impact Assessment - Simon Todd
 Inset Map, Eri Data & Maps

SIZE: A3

Activities undertaken during site preparation, construction and operation may require additional permits, over and above the Environmental Authorisation. RWP is responsible for ensuring that the necessary permits are in place in order to comply with national and local regulations. Additional permit requirements are described below.

2.1

HERITAGE

The protection and management of South Africa's heritage resources is controlled by the National Heritage Resources Act (NHRA), 1999 (Act No. 25 of 1999). The objective of the NHRA is to introduce an integrated system for the management of national heritage resources.

Archaeology, Palaeontology and Meteorites

According to Section 35 (Archaeology, Palaeontology and Meteorites) and Section 38 (Heritage Resources Management) of the South African National Heritage Resources Act, palaeontological heritage impact assessments (PIAs) and archaeological impact assessments (AIAs) are required by law in the case of developments in areas underlain by potentially fossiliferous (fossil-bearing) rocks, especially where substantial bedrock excavations are envisaged, and where human settlement is known to have occurred during prehistory and the historic period. Depending on the sensitivity of the fossil and archaeological heritage, and the scale of the development concerned, the palaeontological, and archaeological impact assessment required may take the form of (a) a stand-alone desktop study, or (b) a field scoping plus desktop study leading to a consolidated report. In some cases these studies may recommend further palaeontological and archaeological mitigation, usually at the construction phase. These recommendations would normally be endorsed by the responsible heritage management authority, Heritage Western Cape (HWC), to whom the reports are submitted for review. *Table 2.1* outlines when a permit is required depending on the sensitivity of the heritage resources.

Table 2.1 *Permitting requirements for fossil, built environment and Stone Age archaeology*

PERMIT APPLICATION SECTION 35 – FOSSILS, BUILT ENVIRONMENT FEATURES, SHIPWRECKS & STONE AGE ARCHAEOLOGY (Ref : NHRA 1999: 58):
(a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;
(b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;
(c) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite.

Burial Grounds and Graves

A Section 36 permit application is made to the South African Heritage Resources Agency (SAHRA) which protects burial grounds and graves that are older than 60 years, and must conserve and generally care for burial grounds and graves protected in terms of this section, and it may make such arrangements for their conservation as it sees fit. SAHRA must also identify and record the graves of victims of conflict and any other graves which it deems to be of cultural significance and may erect memorials associated with these graves and must maintain such memorials. A permit is required under the conditions listed in *Table 2.2*.

Table 2.2 *Permitting requirements for burial grounds and graves older than 60 years to SAHRA and historic burials to the South African Heritage Resources Agency (SAHRA)*

**PERMIT APPLICATION SECTION 36 – BURIAL GROUNDS & GRAVES
(REF: NHRA 1999 : 60)**

- (a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves
 - (b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or
 - (c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals
 - (d) SAHRA or a provincial heritage resources authority may not issue a permit for The destruction or damage of any burial ground or grave referred to in subsection (3)(a) unless it is satisfied that the applicant has made satisfactory arrangements for the exhumation and re-interment of the contents of such graves, at the cost of the applicant
-

Table 2.3 *Permitting requirements for heritage resources management*

PERMIT APPLICATION SECTION 38 (Ref: NHRA 1999 : 62)

- (a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
 - (b) the construction of a bridge or similar structure exceeding 50 m in length;
 - (c) any development or other activity which will change the character of a site exceeding 5 000 m² in extent; or
 - (ii) involving three or more existing erven or subdivisions thereof; or
 - (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
 - (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
 - (d) the re-zoning of a site exceeding 10 000 m² in extent; or
 - (e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.
-

2.2 *BORROW PITS*

A borrow pit refers to an open pit where material (soil, sand or gravel rock) is removed for use at another location. RWP are likely to require the use of borrow pits for certain earthworks operations, such as the construction of roads, embankments, bunds, berms, and other structures.

The establishment of borrow pits is regarded as a mining activity and is legislated in terms of the Mineral and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA). A mining permit must be obtained from the Department of Minerals and Energy prior to the establishment of borrow pits on the site.

2.3 *WATER USE*

There are licensing procedures that need to be followed for particular “water uses”. Water uses that may be of relevance to the development of wind farms and associated road construction include the following:

- Taking of water from a water resource, including a water course, surface water, estuary or aquifer (i.e. borehole)
- altering the bed, banks, course or characteristics of a water course; and/or
- impeding or diverting of a flow in a water course.

2.4 *ABNORMAL VEHICLE LOADS*

Wind turbine components will be delivered to site using road transport and due to the size of the components, the vehicles used to deliver turbine components will be considered abnormal loads in terms of the Road Traffic Act (Act No 29 of 1989). A permit for a vehicle carrying an abnormal load must be obtained from the relevant Provincial Authority. The vehicle must comply with the Administrative Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads, issued by the Department of Transport, 2009.

2.5 *ACCESS TO THE SITE*

Access to the Richtersveld Wind Farm will be off the R382, secondary road. Should the R382 require upgrading, approval will be sought from the relevant municipality, the Namakwa District Municipality.

2.6

AVIATION COMMUNICATIONS

Written approval or a permit must be obtained from the South African Civil Aviation Authority that the wind farm will not interfere with the performance of aerodrome radio Communication, Navigation and Surveillance (CNS) equipment, especially radar. The approval or permit must be submitted to the Director: Environmental Impact Evaluation.

DRAFT

3.1 INTRODUCTION

Specific biological monitoring requirements that are required to be undertaken through the various phases of the Richtersveld Wind Farm have been identified through specialist studies and are identified in this section. Biological monitoring is required during the pre-construction, construction and operational phases of the project, particularly for birds and bats.

Table 3.1 provides a summary of what monitoring is required at the various phases of the development. RWP is responsible for ensuring that all monitoring measures described in this section are undertaken by appointing the relevant specialists where necessary.

Table 3.1 *Monitoring Requirements*

	Ecology	Bats	Birds
Pre-construction	X	X	X
Construction	X		
Operational	X	X	X

3.2 PRE-CONSTRUCTION PHASE

Pre-construction monitoring is an essential requirement prior to construction in order to validate within reason that final turbine placement and arrangement, as well as mitigation and management measures as included in this EMP, will minimize potential impacts on birds, bats and other terrestrial ecological components and also in order to gain consequential knowledge for future wind farm projects to be developed in the country. A year of monitoring prior to wind farm development, design and construction is a legal requirement in Europe for wind farm development.

3.2.1 Ecological Monitoring (excluding Bats and Birds)*Monitoring Impacts on Rare or Endangered Plant Species*

The primary concern in terms of endangered plant species at the site is the potential impact on geophytes and succulents. Therefore, the potential for successful translocation is high. The following monitoring actions are recommended during the pre-construction phase:

- Prior to construction the turbine sites within the natural vegetation should be searched for rare geophytes and succulents, as well as any other plant species of conservation concern that may occur in the area. Individuals of listed species should be marked so that they can be relocated to a nearby

similar environment. Monitoring for such species should occur during the late winter and spring, when the geophytes at the site are in flower and can be identified.

- If any listed species are located, they should be relocated in the winter or spring. The relocated individuals should be marked and monitored for at least a year after transplanting to establish the success rate of the relocation exercise.

In addition, an unidentified aloe species on the site should be identified during flowering season to determine its status and whether any actions are required.

3.2.2 *Bat Monitoring*

Due to the large extent of the site and the relative diversity of habitats, two different monitoring regimes are recommended for the Richtersveld Wind Farm.

- By means of installing a few passive ultrasonic recorders for bats designed for long-term out-door usage.
- Data from these machines can be downloaded monthly for a monitoring period of one calendar year.

Pre-construction passive bat monitoring programme would provide quantitative information on the effects of the Richtersveld Wind Farm on bats and inform decision-making around reducing potential risks during the construction and operational phases.

Monitoring should be conducted throughout the Richtersveld Wind Farm site for a full year across seasons to straddle the times that bats migrate (predicted to be April/May and August/September) and during mid-summer (November to February) to reasonably inform the sitings of turbines and to determine if additional mitigation measures shall be implemented.

Monitoring should be done over extended periods within each season, e.g. several weeks at 3-4 days per week. Research on seasonal and diurnal activity rhythms is sorely needed for all of the bat fauna in South Africa due to current general lack of information.

Bat activity should be assessed with detectors placed at ground level, as well as 30 m above ground. The pre-construction 80 m wind measuring masts are important monitoring points and allow for elevated sampling to record bats that may fly at heights similar to the of the rotor reach.

It is assumed that most bat detectors have a detection range of approximately 20 – 30 m and therefore many monitoring sites would be required to cover the site completely. However, since this is unlikely to be financially feasible, it is

suggested that the number of stations be finalised through discussions with a bat specialist to adequately allow for a refined impact assessment and to adequately inform turbine sitings over the proposed site length. The final number of monitoring points will be determined closer to starting the monitoring study.

Various passive monitoring systems are available and the different options can be investigated to determine the most technically and cost efficient ultrasonic recording equipment for the job. Such systems include:

- ANABAT SD2 (Titley Electronics PO Box 19Ballina NSW 2478, Australia info@titley.com.au, <http://www.titley.com.au/batdetection.htm>) that enables the remote downloading of echolocation data would allow the collection of data over extended periods.
- Song Meter SM2BAT Terrestrial Ultrasonic Recorder (http://www.wildlifeacoustics.com/sm2_bats.php)

The sound data will be recorded and saved into several files. These sound files (usually .WAV files) will be analysed using sound analysis software, such as Bat Sound Pro, Bat Scan 9, Sonobat, etc.

In order to supplement the information obtained from passive monitoring, regular bat netting will take place at key habitat features during the year. Any bats that are captured by the mist nets will be weighed, measured (e.g. forearm length, noseleaf dimensions, etc.), photographed and released. Release calls will be recorded for comparison with the passive data.

Voucher specimens or samples will only be taken, if there is doubt with regard to the species type (as approved by an existing Cape Nature permit). All appropriate data collected will undergo statistical analysis for input into the monitoring report.

3.2.3 *Bird Monitoring*

A long term monitoring programme has been recommended to confirm the potential impacts on birds and to identify additional mitigation measures that may be required to ameliorate these impacts. Pre-construction bird monitoring is recommended to extend over the course of a year (ideally) or for at least six months prior to construction to provide an understanding of bird densities, presence and abundance and movement patterns and potential impacts of the wind facility. The primary aims of a long-term pre-construction monitoring programme are to determine the densities of birds resident within the impact area, document patterns of bird activity and movements in the vicinity of site, monitor patterns of bird activity and movement in relation to weather conditions, time of day and season and share key findings with the industry and other relevant stakeholders to ensure that the collective knowledge and

understanding of the interface between South African birds and wind energy development is advanced as quickly and accurately as possible.

Pre-construction monitoring should determine the need for any additional mitigation requirements to be implemented during the construction or operational phases of the development and should be undertaken in the 6-12 months preceding construction.

Avian densities

A set of walk-transect routes (the number of which will be finalised in discussions with an appointed avifauna specialist), each of at least 1000 m in length, should be established in areas representative of all the avian habitats present within a 10 km radius of the centre of the Richtersveld site. Each of these should be walked at least once every two months over the 6-12 months preceding construction. The transects should be walked after 06h00 and before 09h00, and the species, number and perpendicular distance from the transect line of all birds seen should be recorded for subsequent analysis and comparison. In addition:

- The cliff-lines within or close to the development area should be surveyed for cliff-nesting raptors at least every six months using documented protocols (Malan 2009).
- Known large eagle nest sites should also be checked twice annually for signs of occupation and breeding activity.
- All sightings of key species at or near the site (Table 6.1 of *Annex G* of EIR) should be carefully plotted and documented.

Bird activity monitoring

Monitoring of bird activity in the vicinity of the Wind Farm by should be done over a 2-3 day period at least every two months for the 6-12 months preceding construction. Each monitoring day should involve:

- Half-day counts of all priority species flying over or past the wind farm impact area (see passage rates below, and note the stipulated use of radar as a companion to active pre-construction monitoring).
- Opportunistic surveys of bustards (and cranes) and raptors seen when travelling around the Richtersveld site.

Passage rates of priority bird species

Counts of bird traffic over and around the proposed Wind Farm should be conducted from suitable vantage points (and a number of these should be selected and used to provide coverage of avian flights in relation to all areas of

the wind farm), and extend alternately from an hour before dawn to midday, or from midday to an hour after dusk, so that the equivalent of four full days of counts is completed each count period. This should provide an adequate (if minimal) sample of bird movements around the facility in relation to a representative cross-section of conditions and times of day, for all seasons of the year.

Once in position at the selected count station, the observer should record (preferably on a specially designed data sheet) the date, count number, start-time and conditions at start - extent of cloud cover, temperature, wind velocity and visibility – and proceed with the count. The counts should detail all individuals or flocks of the stipulated priority bird species, all raptors, and any additional species of particular interest or conservation concern, seen flying within 500 m of the envisaged or actual periphery of the wind farm. Each record should include the following data: time, updated weather assessment, species, number, mode of flight (flapping, gliding, soaring), flight activity (commuting, hunting other), direction of flight, vertical zoning relative to the envisaged or actual turbine string (low – below the rotor arc, medium – within the rotor arc, medium-high - within c.100 m of the upper rotor arc, high – >100 m above the upper rotor arc), and horizontal zoning relative to the envisaged or actual turbine array (near – through the turbine string or within the outer rotor arc, middle – within c.100 m of the outer rotor arc, distant - >100 m beyond the outer rotor arc). The time and weather conditions should again be noted at the end of each count.

3.3 CONSTRUCTION PHASE

Mammals, reptiles and amphibians are most likely to be exposed to impacts during the construction phase of the Richtersveld Wind Farm primarily through loss of habitat and impacts associated with construction vehicles and workforce. This section describes the biological monitoring measures that should be undertaken during the construction phase.

3.3.1 Ecological Monitoring (excluding Bats and Birds)

In general, during the construction phase, monitoring should be used to ensure that the development takes place within the guidelines provided by this document to ensure that construction minimises or avoids impacts on adjacent natural vegetation, fauna and ecosystems. This monitoring could be undertaken by the ECO.

Monitoring Loss of Habitat and Habitat Fragmentation

Habitat loss and fragmentation is primarily a concern during the construction phase since this is when the majority of disturbance will take place. Specific areas that should be monitored include:

- Any deviations from the final construction plan, including the location, extent and nature of vegetation impact and transformation.
- The location and extent of temporary lay-down areas.
- Any inadvertent or otherwise unintended destruction of natural vegetation and the remediation steps taken to encourage the recovery of the impacted areas.
- Monitoring of borrow pit sites to ensure that the minimum required area is disturbed and that the appropriate remediation and rehabilitation steps are taken once the pit is no longer required.
- Monitoring frequency would need to be high, at least weekly during the construction phase.

Monitoring Impacts on Sensitive Environments

The sensitive environments at the site require specific attention to avoid and mitigate negative impacts to these areas. Sensitive areas include the rocky outcrops as well as the drainage areas. These areas will be particularly vulnerable to negative impact during the construction phase while the major infrastructure associated with the development is laid down. During the construction phase, monitoring should largely be directed towards enforcement to ensure that these areas are not negatively impacted. As such monitoring of these aspects should be on a continuous basis.

Recommendations include:

- Where roads traverse rivers and drainage lines, the sites should be monitored to ensure that the presence of the road does not result in changes to the stream morphology such as bank erosion or the deposition of large amounts of silt. This may be a particular problem during the construction phase when large amounts of heavy traffic leave these areas vulnerable to erosion. Monthly monitoring during the construction phase would be adequate.
- The rocky outcrops at the site also represent a sensitive environment, largely due to the listed species which occur here. Construction monitoring should ensure that the rocky outcrops are not impinged upon by the development. The listed reptile species which occur in the rocky outcrops are vulnerable to collection for the pet trade, recommendations for monitoring this impact is dealt with below.

Monitoring Impacts on Rare or Endangered Plant Species

As mentioned in *Section 3.2*, the primary concern in terms of endangered plant species at the site are geophytes. The measures identified for pre-construction should be undertaken during the construction phase. In particular to the following monitoring actions are relevant during construction:

- The relocated individuals should be marked and monitored for at least a year after transplanting to establish the success rate of the relocation exercise.

During flowering season an unidentified aloe species on the site should be identified if not already done so during pre-construction, to determine its status and whether any actions are required.

Monitoring Direct Faunal Impacts

Direct faunal impacts, particularly of listed reptile species, are of concern during the construction phase as a result of habitat clearance and road kills by construction vehicles, and possibly collection or death by construction workers. Construction phase monitoring should monitor the extent of human-animal interactions and to identify additional measure that can help to minimize such impacts. Specific recommendations include:

- The traffic on the access and service roads poses a significant risk to many animals, particularly during the construction phase when traffic volumes on the roads are likely to be heavy. Any fauna accidentally killed during construction should be reported and a log of such mortalities maintained. Where possible the species killed should be collected and frozen by the ECO and shown to an ecologist periodically for identification. Species identified should be recorded. Monitoring should be on an ad-hoc basis, as incidents occur.
- The activities of construction staff should be monitored to ensure that undesirable activities such as hunting, illegal collecting of plants, seeds or any other biological material does not occur, and that fires are not made outside of the designated and demarcated areas. Any incidents or transgressions relating to these aspects should be logged, as well as the remedial steps taken to rectify the situation.
- As part of mitigation, monitoring studies on potentially vulnerable species or groups of species such as tortoises, by students or universities could be encouraged and funded. There is a general paucity of knowledge on the ecological impacts of renewable energy facilities in South Africa and better knowledge will enable improved understanding of the nature of impacts as well as improve mitigation strategies.

3.4

OPERATIONAL PHASE

Birds and bats are likely to be impacted during the operational phase of the Richtersveld Wind Farm, primarily through collisions with the wind turbines or electrocutions with existing power lines. This section describes the monitoring measures to be undertaken during the operational phase of the Richtersveld Wind Farm. The monitoring requirements presented here may

be modified based on the results of pre-construction monitoring and should therefore be regarded as provisional.

3.4.1 *Ecological Monitoring (Excluding Birds and Bats)*

During the operational phase, monitoring should be focused on ensuring that there are no residual impacts such as soil erosion and alien plant invasion resulting from the construction phase, and on reducing the day to day impact of the Richtersveld Wind Farm.

Operational monitoring can be undertaken by the ECO on a monthly basis throughout the first year after construction (or more frequently after storm or extended rainfall events to check for erosion). After the first year, monitoring of rehabilitation measures could be checked twice annually for the next two years, and thereafter construction monitoring could be restricted to annual checks.

Specific aspects to be monitored during operation by the ECO would include:

Disturbance of sensitive habitat during maintenance:

Habitat damage caused by movement of vehicles and equipment during turbine or infrastructure maintenance activities.

Erosion

Erosion has been identified as one of the major risks to the terrestrial ecology associated with the development, and therefore construction monitoring of the development should focus on checking the presence and persistence of erosion at the site, and identifying additional erosion control measures. Erosion on or leading from the site may result from inadequate drainage measures along the roads or base of turbines, as well as wind erosion from inadequate rehabilitation. The site should be checked for erosion at least quarterly during the first three years and after major storm events or extended rainfall periods. Monitoring should continue until all erosion-related problems are rectified; vegetative cover restored, and the drainage measures functioning effectively. Photographs and a record of erosion measures and interventions should be logged.

Alien Plant Invasion

The large amount of disturbance at the site is likely to render it highly vulnerable to alien plant invasion, particularly in the first few years post-construction. The roads and disturbed areas around the turbines are likely to be the major invasion foci. Monitoring for aliens should include the following:

- An alien monitoring system should be set up which allows for the occurrence, persistence and treatment of alien plants to be monitored in a manner which allows the data to be interrogated in a GIS.
- Monitoring for alien plants could be done simultaneously with erosion monitoring and at a similar interval.
- The system should record the species present, their location, the control measures used and their success rate.

3.4.2 *Bat Monitoring*

Post-construction bat monitoring will be required to monitor the actual impact of the turbines on bats, specifically to assess the degree of collision and injury caused by the turbines. The extent and frequency of monitoring during the operation phase will be defined during the pre-construction monitoring phase.

By identifying spatial patterns of bat fatalities among turbines within a facility is important for developing mitigation strategies to reduce or eliminate fatalities. For example, if fatalities are concentrated at specific turbines, then turbine specific mitigation strategies, such as curtailment may reduce bat fatalities; however, if fatalities are broadly distributed, then facility-wide mitigation strategies may need to be considered.

3.4.3 *Bird Monitoring*

The primary aims of long term bird monitoring during the operational phase of the Wind Farm are similar to those of the pre-construction monitoring (see *Section 3.2.3*). In addition, monitoring during the operational phase seeks to register and as far as possible document the circumstances surrounding all avian collisions with the turbines for at least a full calendar year after the facility becomes operational.

Avian densities

A set of at least 10 walk-transect routes, each of at least 1000 m in length, should be established in areas representative of all the avian habitats present within a 10 km radius of the centre of the Richtersveld site. Each of these should be walked at least 6-12 months after the wind farm is commissioned. The transects should be walked after 06h00 and before 09h00, and the species, number and perpendicular distance from the transect line of all birds seen should be recorded for subsequent analysis and comparison.

In addition:

- The cliff-lines within or close to the development area should be surveyed for cliff-nesting raptors at least every six months using documented protocols (Malan 2009).

- Known large eagle nest sites should also be checked twice annually for signs of occupation and breeding activity.
- All sightings of key species (*Table 6.1 of Annex G of EIR*) on site should be carefully plotted and documented.

Bird activity monitoring

Monitoring of bird activity in the vicinity of the Wind Farm should be done over a 2-3 day period at least once per quarter for a full calendar year starting at least six months after the Wind Farm is commissioned. Each monitoring day should involve:

- Half-day counts of all priority species flying over or past the wind energy facility impact area; and
- Opportunistic surveys of bustards and raptors seen when travelling around the Richtersveld site.

Passage Rates of Priority Bird Species

Counts of bird traffic over and around the operational wind farm should be conducted from suitable vantage points (and a number of these should be selected and used to provide coverage of avian flights in relation to all areas of the wind farm), and extend alternately from an hour before dawn to midday, or from midday to an hour after dusk, so that the equivalent of four full days of counts is completed each count period. This should provide an adequate (if minimal) sample of bird movements around the facility in relation to a representative cross-section of conditions and times of day, for all seasons of the year. Details regarding specific measures to be undertaken post construction are identical to those listed for monitoring of passage rates of priority bird species during the pre-construction phase as described in *Section 3.4* above.

Avian collisions

Collision monitoring should have two components:

- experimental assessment of search efficiency and scavenging rates of bird carcasses on the site; and
- regular searches of the vicinity of the wind farm for collision casualties.

Assessing search efficiency and scavenging rates

The value of surveying the area for collision victims only holds if some measure of the accuracy of the survey method is developed (Morrison 2002). To do this, a sample of suitable bird carcasses (of similar size and colour to the priority species – e.g. Egyptian Goose *Alopochen aegyptiacus*, domestic waterfowl and pigeons) should be obtained and distributed randomly around the site without the knowledge of the surveyor, some time before the site is surveyed. This process should be repeated opportunistically (as and when

suitable bird carcasses become available) for the first two months of the monitoring period, with the total number of carcasses not less than 20. The proportion of the carcasses located in surveys will indicate the relative efficiency of the survey method.

Simultaneous to this process, the condition and presence of all the carcasses positioned on the site should be monitored throughout the initial two-month period, to determine the rates at which carcasses are scavenged from the area, or decay to the point that they are no longer obvious to the surveyor. This should provide an indication of scavenge rate that should inform subsequent survey work for collision victims, particularly in terms of the frequency of surveys required to maximize survey efficiency and/or the extent to which estimates of collision frequency should be adjusted to account for scavenge rate (Osborn *et al.* 2000, Morrison 2002). Scavenger numbers and activity in the area may vary seasonally so, ideally, scavenge and decomposition rates should be measured twice during the monitoring year, once in winter and once in summer.

Collision victim surveys

The area within a radius of at least 50 m of the outer arc of the blades of each of the turbines at the facility should be checked regularly for bird casualties (Anderson *et al.* 1999, Morrison 2002). The frequency of these surveys should be informed by assessments of scavenge and decomposition rates conducted in the initial stages of the monitoring period (see above), but they should be done at least weekly for the first two months of the study, and surveys should commence as soon as possible after construction is completed.. The area around each turbine, or a larger area encompassing the entire Wind Farm, should be divided into quadrants, and each should be carefully and methodically searched for any sign of a bird collision incident (carcasses, dismembered body parts, scattered feathers, injured birds). All suspected collision incidents should be comprehensively documented, detailing the precise location (preferably a GPS reading), date and time at which the evidence was found, and the site of the find should be photographed with all the evidence *in situ*. All physical evidence should then be collected, bagged and carefully labelled, and refrigerated or frozen to await further examination. If any injured birds are recovered, each should be contained in a suitably-sized cardboard box. The local conservation authority (failing this inform the monitoring project specialist) should be notified and requested to transport casualties to the nearest reputable veterinary clinic or wild animal/bird rehabilitation centre. In such cases, the immediate area of the recovery should be searched for evidence of impact with the turbine blades, and any such evidence should be fully documented (as above).

Mitigation and compliance monitoring measures required to be undertaken by the developer, RWP or the ECO, are presented in this section under the following headings:

- Pre-Construction Planning Phase;
- Construction Phase; and
- Operational Phase.

Mitigation and compliance monitoring measures listed in this section must be implemented by RWP during the various phases of the project. These measures are based on best practice and specialist recommendations to minimise impacts on the Richtersveld site.

A separate document, containing Contractor Compliance Standards has been drafted (Section 5) in order to clearly identify the roles and responsibilities of contractors appointed during the various phases of the project. These standards should be included as part of the contract documentation between RWP and the contractor, and RWP is responsible for ensuring the Contractor Compliance Standards are fully implemented by the contractor.

4.1

PRE-CONSTRUCTION PLANNING PHASE

In order to ensure compliance with environmental legislation and best practice guidelines the following actions are applicable to the pre-construction planning phase for the wind farm. The persons responsible for implementation of the actions are listed in the table below, the majority of which are the responsibility of RWP.

Key activities during the pre-construction planning phase will include:

- Pre-construction monitoring (see Section 3.2);
- Micro-siting of the turbines based on geotechnical investigation (one for each turbine) and detailed site checks by archaeologist and ecologist (Section 1.5);
- Notification of DEA of final turbine positions (if required) and additional mitigation / management measures, where needed;
- Drafting of subsidiary plans, policies and procedures;
- Developing with the contractor the following:
 - A Site Layout Plan
 - Method Statements

These activities are described in more detail in the matrix below.

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PRE-CONSTRUCTION PLANNING PHASE							
Aspect		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Aspect		#	Commitment / Actions Required / Key Controls			
1.	Stakeholder engagement	Notify all registered Interested and Affected Parties of Environmental Authorisation (EA).	1.1	Notify all registered I&APs and key stakeholders of the Environmental Authorisation opportunity and appeal procedure.	Notices sent to relevant parties on the stakeholder database. List of those to whom it was sent on file	ERM	Within 12 days from the issuing of the Environmental Authorisation.
2	Permit Requirements	Ensure compliance with legal and other permitting requirements.	2.1	Ensure that all relevant legal requirements have been met.	Permits	RWP	Prior to construction
3	Finalisation of EMP and Contractor Compliance Standards	Update EMP with EA conditions and other mitigation measures from monitoring	3.1	Incorporate additional mitigation measures specified by DEA in the EA into the EMP and Contractor Compliance Standards.	EMP and Contractor Compliance Standards	RWP	Prior to construction
4	Notification to DEA: Director of Compliance Monitoring	Ensure that DEA are notified of commencement date.	4.1	Notify DEA prior to commencement of construction.	DEA notification.	RWP	14-days in advance of commencement of construction.
		Keep DEA informed of any aspects of non-compliance with EMP or ROD	4.2	Notify DEA with reasons if any provisions of the EMP or EA cannot be implemented, and provide alternative	DEA notification	RWP	Prior to construction
		Keep DEA informed of current contact details of applicant	4.3	Notify DEA of any change of contact details of the applicant	DEA notification	RWP	Prior to construction
		Provide Site Layout Plan to DEA	4.4	Submit the detailed Site Layout Plan (see section 5.1 below) to DEA prior to construction	DEA notification	RWP	Prior to construction
		Keep DEA informed of contact details of ECO	4.5	Submit the name and contact details of the appointed ECO prior to construction	DEA notification	RWP	Prior to construction
		Submit copies of all permits to DEA	4.6	Copies of all permits and written approvals obtained by relevant authorities should be submitted to DEA and shall include but not necessarily limited to: <ul style="list-style-type: none"> Removal of protected plants Non-interference with aerodrome 			

PRE-CONSTRUCTION PLANNING PHASE							
Aspect		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Aspect		#	Commitment / Actions Required / Key Controls			
				communications (from SACAA) <ul style="list-style-type: none"> • Permit to transport abnormal loads (Road Traffic Act) • Approval from SAHRA relating to disturbance of heritage features 			
5.	Site Layout Plan	Ensure final site layout minimises environmental and social risks and complies with EMP	5.1	Prepare a detailed Site Layout Plan that demarcates the following: <ul style="list-style-type: none"> • Turbine positions, lay down areas, cables, substation locations, roads, etc • Borrow pits, spoil heaps, cut and fill areas • No Go areas, including sensitive features such as ridges, drainage lines, vegetation patches • Stormwater drainage measures • Waste disposal and storage areas • Offices, works areas and ablutions • Cement/concrete batching • Storage of materials and equipment • Vehicle maintenance and storage 	Final Site Layout Plan	RWP	Prior to construction
6.	Subsidiary plans	Develop Subsidiary Plans to minimise environmental and social risks	6.1	The following subsidiary plans will be required prior to construction: <ul style="list-style-type: none"> • Health and Safety Plan • Traffic Management Plan • Transport Study • HIV Policy and Awareness Plan • Rehabilitation Plan • Policy for assessing all damages and losses • Community Development Trust • Recruitment Policy • Procurement Policy 	Subsidiary plans	RWP	Prior to construction

PRE-CONSTRUCTION PLANNING PHASE							
Aspect		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Aspect		#	Commitment / Actions Required / Key Controls			
				<ul style="list-style-type: none"> • Code of Conduct • Grievance Procedure These are referred to below, where relevant.			
7.	Health and Safety	Ensure the health and safety of site personnel during construction.	7.1	<p>A Health and Safety Plan must be developed prior to the commencement of construction to identify and avoid work related accidents. This shall include:</p> <ul style="list-style-type: none"> • Specific requirements of Performance Standard 2 and World Bank Guideline on Wind Farms regarding Occupational Health and Safety. • Safety zones from residences, roads, right of way. • Buffer zone to minimise electromagnetic interference with communication (eg microwave, radio and television transmissions). • Chemical ablution facilities. • Approval from the South African Civil Aviation Authority that the wind farm will not interfere with the performance of aerodrome radio Communication, Navigation and Surveillance equipment. Such approval must be submitted to the Director of Environmental Impact Evaluation. <p>Turbines must be spaced at least a turbine and a half's distance from another. Standard buffer zones around roads, houses, and any other structures must be observed.</p>	Health and Safety Documentation Final Site Layout Plan Final Site Layout Plan	RWP	Prior to construction

PRE-CONSTRUCTION PLANNING PHASE							
Aspect		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Aspect		#	Commitment / Actions Required / Key Controls			
8	Socio-Economic Impact: Community Development	Enhance benefits associated with the Community Development Trust	8.1	Establish a Community Development Trust for the advancement of local development needs; specifically at the farm and local municipality levels.	Community Development Trust	RWP	Prior to and during operation.
			8.3	Projects will be identified in collaboration with the local Municipality and community representatives to ensure alignment with the key needs identified through the Integrated Development Planning process.			
			8.4	Ensure projects are aligned with RWP's policies.			
9	Procurement of Services and Tender Procedures	Ensure that procurement of local, regional and national services is maximised:	9.1	Establish a procurement policy which sets reasonable targets for the procurement of goods and services from South African residents /suppliers, particularly local residents as far as possible.	Procurement policy	RWP	Prior to construction
			9.2	Procurement should advertise tenders in local and national newspapers.	Local and national advertisements		
			9.3	Procurement processes should identify and invite bids from local suppliers.	Invited bids from local suppliers		
			9.4	Adopt transparent adjudication process for local suppliers.	Demonstrate transparent process of adjudicating tenders		
10.	Employment & Recruitment	Ensure that employment of local people is maximised	10.1	Work closely with relevant local authorities, community representatives and organisations to ensure that the use of local labour and is maximised and stipulate this as part of contractors	Meeting minutes	RWP	Prior to construction

PRE-CONSTRUCTION PLANNING PHASE							
Aspect		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Aspect		#	Commitment / Actions Required / Key Controls			
				contract. 10.2 All skill requirements to be communicated to the local communities via appointed people prior to the commencement of the construction phase. 10.3 Work closely with the wind turbine suppliers to provide the requisite training to the workers. 10.4 Ensure that the appointed project contractors and suppliers have access to Health, Safety, Environmental and Quality training as required by the Project.	Meeting minutes / advertisements Training material and records of training		
11.	Social Ills and disruption	To limit, where possible, social ills brought about by the construction and operation of the renewable energy facility	11.1	Develop an induction programme, including a Code of Conduct, for all workers.	Code of Conduct	RWP	Prior to construction
			11.2	All workers will agree to the Code of Conduct and be aware that contravention of the Code could lead to dismissal.	Code of Conduct		
			11.2	A grievance procedure will be established whereby complaints are recorded and responded to.	Grievance Procedure		
			11.3	A HIV Policy and Awareness Plan must be developed and implemented.	HIV Policy		
			11.4	Ensure contractor does not undertake recruitment of casual labour at the project site (to avoid workers camping and queuing at the site).			

PRE-CONSTRUCTION PLANNING PHASE							
Aspect		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Aspect		#	Commitment / Actions Required / Key Controls			
12.	Disruption to and loss of agricultural land	Minimise disruption to agricultural activities and loss of agricultural land	12.1	All directly affected and neighbouring farmers will be able to lodge grievances with RWP using the Grievance Procedure.	Grievance Procedure	RWP	Prior to construction
			12.2	RWP to design the infrastructure layout in a manner that limits the footprint of the facility and all associated infrastructure.	Final Site Layout Plan		
			12.3	RWP to plan construction activities to minimise disruption of farming practices.	Final Site Layout Plan		
13.	Traffic Impact	Minimise negative effects associated with the increase in traffic.	13.1	A Transport Study must be undertaken at least one year prior to construction to determine the most appropriate route from port to site.	Transport Study	RWP	Prior to construction
			13.2	RWP will develop a Traffic Management Plan including strict controls over driver training, vehicle maintenance, speed restrictions, appropriate road safety signage, and vehicle loading and maintenance measures.	Traffic Management Plan		
			13.3	RWP will develop a policy and procedure for assessing all damages and losses (e.g. damage to property, injury or death of people or livestock) resulting from project vehicles.	Policy		
			13.4	All necessary transportation permits will be applied for at this stage and obtained from the relevant authorities, including permits for abnormal loads. Oversee development of permits required by	Permits		

PRE-CONSTRUCTION PLANNING PHASE							
Aspect		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Aspect		#	Commitment / Actions Required / Key Controls			
				contractors.			
14.	Damage or Destruction of Cultural Heritage Interests	Avoid damage or destruction of cultural heritage aspects	14.1	Since the preferred layout design may undergo micro-siting prior to construction, if there are any changes to the final layout design, a field survey must be undertaken by an archaeology and cultural heritage specialist	Final Site Layout Plan	RWP	Prior to construction
			14.2	The substation should be designed in the typical architectural style of the region and / or screened if possible.			
15.	Waste and effluent	Prevent soil and/or groundwater contamination from waste and effluent.	15.1	A suitable area for waste skips must be selected, away from water courses, and included in the site layout plan.	Waste Management Plan	RWP	Prior to construction
16.	Soil compaction and erosion	Minimise soil compaction and erosion	16.1	Roads should be upgraded where possible and only essential roads should be built e.g. between turbines.	Final Site Layout Plan	RWP	Prior to construction
17.	Loss of Vegetation	Minimise impacts associated with vegetation loss	17.1	Contractor/ ecologist appointed to undertake long-term monitoring (see <i>Section 3 above</i>).	Appropriate contractor for monitoring	RWP	Prior to construction
			17.2	Where feasible, the re-routing or relocating some of the other infrastructure such as the underground cabling to avoid excessive disturbance in the Very High Sensitivity area should be considered.	Final Site Layout Plan		
			17.3	Avoid the development of new roads where possible to minimise impact to natural vegetation.			

PRE-CONSTRUCTION PLANNING PHASE							
Aspect		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Aspect		#	Commitment / Actions Required / Key Controls			
			17.4	Temporary construction lay-down areas should be sited on croplands, preferably in flat areas. As little natural vegetation as possible should be transformed for temporary activities.			
			17.5	Restricting service roads and underground cabling for the turbines to previously disturbed lands, avoiding natural vegetation as far as possible.			
			17.6	Prior to construction, the exact layout of the turbines and associated lay-down areas must be inspected by an ecologist and if necessary adjusted to avoid unnecessary impact.			
18.	Faunal Impacts	Minimise impacts to onsite fauna	18.1	Measures of habitat loss above should be implemented to minimise impacts to fauna.	Final Site Layout Plan	RWP	Prior to construction
			18.2	Contractor/ ecologist appointed to undertake long-term monitoring (see Section 3).	Appropriate contractor for monitoring		
19.	Disturbance of avifauna habitat and collision	Mitigate the potential impact on avifauna	19.1	Contractor/ bird specialist appointed to undertake long-term monitoring (see Section 3).	Final turbines selected	RWP	Prior to construction
			19.2	Ensure design of turbine lighting is minimised to reduce confusion effects for nocturnal migrants.			
29.	Bat Habitat Loss:	Mitigate impacts on bats	20.1	Contractor/ bat specialist appointed to	Appropriate contractor for	RWP	Prior to construction

PRE-CONSTRUCTION PLANNING PHASE							
Aspect		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Aspect		#	Commitment / Actions Required / Key Controls			
	Destruction, Disturbance and Displacement			undertake long-term monitoring (see Section 3).	monitoring		
21.	Visual Impacts	Minimise visual impacts	21.1	Surface disturbance for roads, laydown areas and construction camp should be minimized and erosion control and dust suppression undertaken to minimize exposed soil.	Final Site Layout Plan and building designs	RWP	Prior to commencement of construction.
			21.2	Disturbance of areas of indigenous vegetation should be minimized and disturbed areas should be prioritized for construction facilities.			
			21.3	Lighting should be designed to minimize visual impacts without compromising safety.			
			21.4	No advertising billboards will be permitted and any signs limited to those informing the public on wind turbines, their functioning and safety aspects.			
			21.5	The design of the buildings should be compatible in scale and form with buildings of the surrounding area and yards and storage areas to be enclosed by masonry walls.			
			21.6	Cables should be located underground where possible to minimise visual clutter.			

4.2

CONSTRUCTION PHASE

In order to ensure compliance with environmental legislation requirements and NEMA best practise the following actions are applicable to the construction phase and are the responsibility of RWP. Standard construction phase compliance standards that need to be implemented by the contractor are contained in section 5.

CONSTRUCTION PHASE										
Activity		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing			
#	Description of Activity		#	Commitment / Actions Required / Key Controls						
1.	Compliance with EMP and ROD	Confirm RWP commitment to adherence to EMP and Contractor Compliance Standards	1.1	Ensure that the EMP; Contractor Compliance Standards and EA are available at the site throughout construction and implemented by the contractor.	Copy of signed EMP and EA with subcontractor	RWP	Prior to construction			
			1.2	An audit report must be undertaken by an independent auditor at the end of the construction and rehabilitation phase, and shall be submitted to DEA.				Audit report and proof of submission to DEA	RWP	End of Construction
			1.3	The audit report shall indicate the date of the audit, name of auditor; and outcome of audit in terms of compliance with the environmental authorisation and conditions of the EMP.						
2.	Health and Safety	Ensure the health and safety of subcontractors and site users	2.1	A Health and Safety Plan must be developed prior to the commencement of construction to identify and avoid work related accidents. This plan must be adhered to by the appointed construction contractors and meet Occupational Health and Safety Act (OHSAAct), Act 85 of 1993, requirements.	Signed Health and Safety Plan	RWP	During construction			
			2.2	Potentially hazardous areas must be clearly demarcated (i.e. unattended foundation excavations).				Signage		
			2.3	Appropriate Personal Protective Equipment (PPE) must be worn by all construction personnel. This shall include the use of ear protection in areas where the 8-hour ambient noise levels exceed 75dBA.					Signed Health and Safety Plan	

CONSTRUCTION PHASE							
Activity		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Activity		#	Commitment / Actions Required / Key Controls			
3.	Dust and emissions	Limit fugitive dust and exhaust emissions	3.1	Dust abatement should be implemented especially during windy conditions and in areas prone to generation of airborne dust. This shall include covering of stockpiled and transported materials.	ECO records	RWP	During construction
			3.2	RWP Project Manager to keep records of any complaints regarding dust.	Grievance procedure documentation/logbook		
4.	Noise pollution	Avoid disturbing surrounding land-users	4.1	Vehicles must to adhere to speed limits on site, and not exceed 40km/hr	Signage on site	RWP	During construction
			4.2	A grievance procedure will be established whereby complaints are recorded and responded to.	Grievance procedure logbook		
5.	Vegetation loss	Prevent unnecessary disturbance and damage to natural vegetation and topsoil loss	5.1	Construction vehicles to remain on demarcated roads. If vehicles must leave the road for construction purposes, they should utilize a single track and should not take multiple paths.	Training materials and records of attendance	RWP	On appointment of contractor
			5.2	Educate all contractors as to the importance of the undisturbed conservations areas and prohibitions on fires, and collection of plant material.			
6.	Traffic Impact	Mitigate traffic impacts	6.1	The traffic management plan will be adhered to including adherence to speed limits and 'rules of the road'.	Traffic Management Plan	RWP	During construction
			6.2	Schedule delivery of turbines outside of peak traffic hours, or according to permit regulations.	Traffic Management Plan		
			6.3	Notify the land owners of date and time of turbine delivery to minimise effects on herding activities.	Notification of farmers		
			6.4	All directly affected and neighbouring farmers and local	Grievance Procedure		

CONSTRUCTION PHASE							
Activity		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Activity		#	Commitment / Actions Required / Key Controls			
				residents will be able to lodge grievances with RWP using the Grievance Procedure regarding dangerous driving or other traffic violations that could be linked to the Project.			
7.	Damage or Destruction of Cultural Heritage Interests	Minimise damage to cultural heritage interests	7.1	SAHRA to be notified immediately if a burial/human remains is uncovered during the construction of the wind farm.	ECO Report & SAHRA response	RWP	Prior to and throughout construction
			7.2	All directly affected and neighbouring farmers will be able to lodge grievances with RWP using the Grievance Procedure.	Grievance procedure and logbook		
			7.3	Trenches and excavations should be inspected by a palaeontologist and a report submitted to SAHRA.	Palaeontologist Report and HWC Response		
			7.4	No-go areas identified in the EIA must be observed.	Final Site Layout Plan		
8.	Socio-cultural issues	Minimize impacts associated with influx of jobseekers.	8.1	RWP code of conduct developed prior to the construction phase must be adhered to.	Code of conduct must be available on site.	RWP	During construction
			8.2	The HIV Policy and Awareness Plan developed prior to the commencement of construction must be adhered to by RWP employees.	HIV policy must be available on site.		
9.	Faunal Impacts	Mitigate impacts on fauna	9.1	Poaching or hunting should be strictly forbidden and control poaching by banning dogs on site and enclosing worker compounds.	ECO Report and photographic evidence	RWP	During construction
			9.2	Fauna must have 'right of way' on the roads. Slow moving animals such as tortoises which may be in the way, should be placed at the side of the road in the direction the animal was seen travelling.			
			9.3	All vehicles must stick to designated and prepared roads and a speed limit (up to 40 km/hr) must be enforced.	Road signage and ECO reports & grievance logs		

CONSTRUCTION PHASE							
Activity		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Activity		#	Commitment / Actions Required / Key Controls			
			9.4	No harvesting or collecting of plants, seeds, animals or their parts to be allowed.	Worker training & awareness records		
			9.5	It should be mandatory for staff of RWP to attend an environmental briefing and training session with respect to the guidelines outlined in this EMP.	Training material and records of training		
10.	Visual Impacts	Minimise visual impacts	10.1	Measures to control wastes and litter should be included in the contract specification documents.	Evidence in contract specification documents.	RWP	Throughout construction
			10.2	Signage related to the Wind Farm must be discrete and confined to entrance gates. No other corporate or advertising signage, particularly billboards, to be permitted.			

4.3

OPERATIONAL PHASE

In order to ensure compliance with environmental legislation requirements and recommendations specified by specialists during the EIA process, the following generic and specific requirements are applicable during the operational phase of the Richtersveld Wind Farm. It is likely that DEA will require a separate operational EMP prior to the start of operation which should be informed by pre-construction and construction monitoring results and other new information from geotechnical studies or technological improvements. The operational mitigation and monitoring measures specified here provide a foundation for further development of the Operational EMP.

OPERATIONAL PHASE							
Activity		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Activity		#	Commitment / Actions Required / Key Controls			
1.	Visual impacts	Minimize the visual impacts during the operation phase.	1.1	Signage related to the wind farm must be discrete and confined to entrance gates. No advertising will be permitted.	Photographic evidence	RWP	Throughout operation
			1.2	Footprint of the facilities, as well as parking and vehicular circulation, should be clearly defined.			
			1.3	Operations and maintenance areas should be screened by buildings, walls or hedges, where feasible and should be kept in a tidy state.			
			1.4	The navigation lights on the wind turbines should be fitted with reflectors.			
2.	Health and Safety	Maintain health and safety standards	2.1	Regular maintenance of turbines and all other infrastructure must be undertaken to ensure optimal functioning and reducing the chance of gearbox failure.	Maintenance records	RWP	Throughout operation
			2.2	Regular inspections of the turbine foundations, towers, blades, spinners and nacelle must be undertaken in order to check for early signs structural fatigue.			
3.	Dust and emissions	Limit fugitive dust and exhaust emissions.	3.1	Vehicles travelling on unpaved or gravel roads should not exceed a speed of 40 km/hr.	Signage	RWP	Throughout operation
4.	Waste and Effluent	Prevent soil and	4.1	Used oil stored on site must be stored in an impervious	Photographic evidence	RWP	Throughout

OPERATIONAL PHASE							
Activity		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Activity		#	Commitment / Actions Required / Key Controls			
		groundwater pollution	4.2	container, within a bunded area. General waste must be removed from site by a licensed contractor.	Waste manifest documents		operation
			4.3	Areas disturbed during construction will be re-vegetated with indigenous vegetation to prevent erosion.	Photographic evidence		
5.	Traffic	Minimise traffic impacts	5.1	During operation, if abnormal loads are required for maintenance, the appropriate arrangements will be made to obtain the necessary transportation permits and the route agreed with the relevant authorities to minimise the impact of other road users.	Permits	RWP	Throughout operation
			5.2	All internal and access roads that will be used by RWP during the operational phase of the project will be maintained by RWP throughout the life of the Project.	Inspection reports		
6.	Damage or Destruction of Cultural Heritage Interests	Minimise damage to cultural heritage interests	6.1	No-go areas identified in the EIA must be observed.	Monitoring data	RWP	Throughout operation
7.	Loss of Topsoil, Soil Compaction and Erosion	Minimise erosion	7.1	Long-term monitoring to be undertaken (see Section 3).	Monitoring reports and photographic evidence	RWP	Biannually
			7.2	Temporary laydown areas will be re-vegetated with indigenous vegetation.			
			7.3	Erosion control measures should be initiated as soon as signs of erosion problems become apparent.			
			7.4	Should any erosion develop which cannot be remedied by simple erosion control measures, then the services of a rehabilitation and erosion control consultant with experience in semi-arid zones should be brought in to provide guidance.			

OPERATIONAL PHASE							
Activity		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Activity		#	Commitment / Actions Required / Key Controls			
8.	Loss of Vegetation	Minimise impacts associated with loss of vegetation	8.1	On-site employees, farm workers and visitors to the site will be educated about the conservation of vegetation. This will include strict guidelines for remaining on existing roads while on site to avoid unnecessary destruction or damage to undisturbed and rehabilitated vegetation.	Signage	RWP	Throughout operation
			8.2	It is understood that lease agreements are in place but it is recommended that landowners are encouraged to ensure livestock numbers are kept at or below densities recommended by the Department of Agriculture to prevent over-grazing.			
			8.3	A Fire Management Policy and guidelines will be developed to ensure that the operation of the Wind Farm is compatible with the long-term fire ecology of the site.	Fire Management Policy		
			8.4	Remove alien vegetation from any disturbed areas.			
9.	Fauna	Minimise impacts to fauna on site	9.1	Poaching or hunting should be strictly forbidden and control poaching by banning dogs on site and enclosing worker compounds.	ECO reports and photographic evidence	RWP	Throughout operation
			9.2	Fauna must have 'right of way' on the roads. Slow moving animals such as tortoises which may be in the way, should be placed at the side of the road in the direction the animal was seen travelling.			
			9.3	All vehicles must stick to designated and prepared roads and a speed limit (up to 40 km/hr) must be enforced.			
			9.4	No harvesting or collecting of plants, seeds, animals or their parts to be allowed.			

OPERATIONAL PHASE							
Activity		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Activity		#	Commitment / Actions Required / Key Controls			
			9.5	It should be mandatory for staff of RWP to attend an environmental briefing and training session with respect to the guidelines outlined in this EMP.	Training material and records of training		
10.	Bird Habitat Loss: Destruction, Disturbance and Displacement	Minimise disturbance to birds	10.1	Maintenance activities should, as far as possible, be scheduled to avoid disturbances to sensitive areas (identified through operational monitoring) during breeding season.	Maintenance schedules	RWP	Throughout operation
11.	Birds: Avian collisions	Loss of habitat-disturbance or destruction and monitor potential injury to avifauna and fatalities	11.1	Implementing a rigorous monitoring programme (see <i>Section 3</i>) and findings of the proposed monitoring schedule, should be implemented.	Monitoring reports	RWP	Initial 12 to 24 month period at which time whether or not additional monitoring is required.
			11.2	Lighting on the turbines to kept to a minimum (but in line with aviation regulations), coloured red or green and intermittent.	Inspection reports		
12.	Bat collisions and barotrauma	Monitor fatalities	12.1	Long-term monitoring to be undertaken (see <i>Section 3</i>).	Monitoring reports	RWP	Initial 12 to 24 month period at which time whether or not additional monitoring is required.
			12.2	A register must be maintained of injuries to bats, complaints or queries received as well as any action taken.	Register of collisions/ injured bat species		
			12.3	Undertake feasible mitigation measures identified informed by monitoring.			
13.	Tourism Impacts	Enhance tourism impacts	13.1	Work with the Local Municipality and local tourism organisations to raise awareness about the wind farm.	Brochures and posters	RWP	Throughout operation
			13.2	Information brochures and posters will be made available at the local libraries to provide more information about the wind farm. These should be presented in the appropriate languages to maximise the benefits.			
14.	Electromagnetic	Prevent EMI effects	14.1	Mitigation measures might include the replacement of	Installation reports	RWP	Throughout

OPERATIONAL PHASE							
Activity		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Activity		#	Commitment / Actions Required / Key Controls			
	Interference			receiving aerial installations, replacement by satellite dishes or the provision of a private transmitter.			operation
15.	Shadow flicker	Assess potential shadow flicker impacts	15.1	Should shadow flicker be experienced at any of the stock posts, RWP must assist the Nama herders in relocating the stock posts.	Shadow flicker study	RWP	Throughout operation
16	Notification of landowners	Inform landowners on maintenance activities	16.1	Landowners should be informed at least 48 hours in advance of scheduled maintenance activities to ensure that provision can be made to avoid conflicting land uses and to ensure access to the site (eg relocate grazing animals form the area)	Notification of landowners	RWP	Prior to maintenance activities.

DECOMMISSIONING PHASE

A detailed decommissioning and rehabilitation plan should be developed prior to decommissioning of the Wind Farm. This plan should include, but should not be limited to, conditions regarding removal of infrastructure, management of waste and/or contaminated soil, dust suppression and re-vegetation.

DRAFT

The following Contractor Compliance Standards have been drafted for use by any Contractors appointed by RWP during the construction of the Richtersveld Wind Farm. Guidelines for Contractors developed for the Cape Metropolitan Council by Ninham Shand (2002) and relevant to the expected construction phase of wind farm were extracted and modified as the basis for this schedule of Contractor Compliance Standards. The Contractor appointed will use these as a basis for guiding all construction activities. RWP will retain overall responsibility during all stages of any construction activity and ensure that all construction activities are in compliance with the EMP. The contractors shall with due care and diligence execute and complete the works in accordance with the provisions of the Contractor Compliance Standards and any other requirements set out by RWP.

Identification of targets helps to identify the desired outcome of implementing the management measure can assist in deriving an audit report.

As far as possible, the contractor compliance standards are set out in accordance with the following phasing, typical of a construction project:

- Pre-Construction Planning;
- Construction; and
- Post-Construction.

PRE-CONSTRUCTION							
Aspect		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Aspect		#	Commitment / Actions Required / Key Controls			
1.	EMP and Contractor Compliance Standards legally binding on contractor	Contractor compliance with EMP	1.1	<p>Contractor requirement to implement the EMP and Contractor Compliance Standards is legally binding through the contract with RWP.</p> <p>Contractor to keep copy of EMP and Contractor Compliance Standards on site and to provide ECO with a copy.</p>	EMP provisions relevant to contractor	Contractor	Prior to construction
2.	General Environmental Protection- Method Statements	Contractor activities comply with approved method statements to minimise impacts to the environment	2.1	<p>The contractor shall prepare the following method statements:</p> <ul style="list-style-type: none"> • Access routes: Location of proposed access routes, rehabilitation of temporary access routes • Blasting (if required): details of all methods and logistics • Camp establishment: layout and preparation; method of installing fences for no go areas; working areas and construction camp areas • Cement/concrete batching (if applicable): Location, layout, and preparation of cement/ concrete batching facilities including methods employed for mixing concrete and management of run off water • Contaminated water: including containment of runoff and disposal of polluted water • Dust control methods • Clearance of vegetation: method during site establishment • Earthworks: method for control of erosion during bulk earthwork operations, and method of undertaking earthworks, including hand excavation and spoil management • Emergency: response to possible emergencies on site • Environmental awareness: logistics for environmental awareness for contractors' employees and management staff • Fire and hazardous substances: handling and storage of hazardous wastes; emergency spillage procedures and compounds to be used; emergency procedures for fire; use of herbicides and other poisonous substances; 	Method statements	Contractor	Prior to construction

Aspect		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Aspect		#	Commitment / Actions Required / Key Controls			
				<ul style="list-style-type: none"> • Fire and fuel spills: methods of refuelling vehicles; methods for cleaning up fuel spills; refuelling of construction vehicles • Rehabilitation: methods for disturbed areas, and revegetation after construction is complete • Solid waste management: solid waste control and removal of waste from the site • Sources of material: details of materials to be imported to the site • Traffic safety measures: entry and exit off public roads 			
3.	Health and Safety	Ensure the health and safety of site personnel during construction.	3.1 3.2	<p>A Health and Safety Plan developed by RWP must be adhered to.</p> <p>Buffer zones around roads, houses, and any other structures must be observed.</p>	Health and Safety Documentation and Method Statements Final Site Layout Plan	Contractor	Prior to construction
4.	Construction site layout plan	General environmental protection	4.1	<p>The contractor shall provide input into the Site Layout Plan to be presented to the DEA by RWP for approval prior to starting construction activities. This plan shall take account of provisions of the EMP and this Contractor Compliance Standards and shall demarcate the different works areas including:</p> <ul style="list-style-type: none"> • Turbine positions, lay down areas, cables, substation locations, roads, etc. • All buildings and structures including;; contractors' camp and lay down areas, site offices, laboratory, fuel stores, toilets and ablutions, construction materials stores, vehicle and equipment stores, wash bays and solid waste storage and disposal sites • Works areas such as batching plants (if required) • Roads and access routes • Gates and fences • Essential services (permanent and temporary water, electricity and sewage and substation) • Rubble and waste rock storage and disposal sites 	<p>Layout plan shows different work areas.</p> <p>Plan approved by DEA</p>	Contractor and ECO	Prior to construction

Aspect		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Aspect		#	Commitment / Actions Required / Key Controls			
				<ul style="list-style-type: none"> • Firebreaks • Excavations and trenches, borrow pits, rubble and waste rock storage and disposal sites and topsoil stockpiles. • Features and plants to be conserved. • No Go areas (e.g. ecological sensitive areas, and cultural heritage site) 			
5.	Procurement and Tender	Ensure that procurement of local, regional and national services is maximised:	5.1	Establish a Procurement Policy which sets reasonable targets for the procurement of goods and services from South African residents /suppliers, particularly local residents as far as possible.	Procurement Policy	Contractor	Throughout construction
			5.2	Procurement should advertise tenders in local and national newspapers.	Local and national advertisements		
			5.3	Procurement processes should identify and invite bids from local suppliers.	Invited bids from local suppliers		
			5.4	Adopt transparent adjudication process for local suppliers.	Demonstrate transparent process of adjudicating tenders		
6.	Employment & Recruitment	Ensure that employment of local people is maximised	6.1	No employment will take place at the entrance to the site. Only formal channels for employment will be used.	Recruitment Policy	Contractor	Prior to construction
			6.2	All skill requirements to be communicated to the local communities via appointed people prior to the commencement of the construction phase.	Evidence of recruitment		
			6.3	Work closely with the wind turbine suppliers to provide the requisite training to the workers.	Training material and records of training		
			6.4	Ensure that the appointed project contractors and suppliers have access to Health, Safety, Environmental and Quality training as required by the project.			
7.	Good community relations	Minimise raised expectations in local	7.1	Information boards: containing background information on the construction activity and the relevant contact details for	Large info board erected at the site and correct	Contractor	Prior to construction

Aspect		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Aspect		#	Commitment / Actions Required / Key Controls			
		community and limit social disruption	7.2	complaints shall be erected near the entrance to the site. Notification of onset of construction: Notify Employer, relevant authorities and local community in writing as well as verbally of the onset of construction activities, including contact details for complaints.	information provided (contact details) Proof of notification of onset of construction to RWP, relevant authorities and local community		
			7.3	Community liaison assistants to inform the local community members of the recruitment process and onset of construction and schedule.	Recruitment records of community liaison assistance		
8.	Social Ills and disruption	To limit, where possible, social ill brought about by the construction and operation of the renewable energy facility	8.1	Develop an induction programme, including a Code of Conduct, for all workers. All workers will agree to the Code of Conduct and be aware that contravention of the Code could lead to dismissal.	Code of Conduct	Contractor	Prior to construction
			8.2	HIV Policy and Awareness Plan developed by RWP must be adhered to.	HIV Policy and Awareness Plan		
9.	Traffic Impact	Minimise negative effects associated with the increase in traffic.	9.1	All necessary transportation permits will be applied for at this stage and obtained from the relevant authorities, including permits for abnormal loads.	Permits	Contractor	Prior to construction
10.	Damage or Destruction of Cultural Heritage Interests	Avoid damage or destruction of cultural heritage aspects	10.1	Construction work must not commence until turbines have been micro-sited and final positions are fixed and checked by an archaeologist and approval given to go-ahead.	Archaeological study and approval	Contractor	Prior to construction
			10.2	Adhere to buffers around sensitive features set out in the EIR and EMP.			
11.	Waste and effluent	Prevent soil and/or groundwater contamination from waste and effluent.	11.1	A suitable area for waste skips must be selected, away from water courses, and included in the site layout plan.	Waste Management Plan	Contractor	Prior to construction
12.	Loss of Vegetation	Minimise impacts	12.1	Ensure that infrastructure and construction activities are	Final Site Layout Plan	Contractor	Prior to construction

Aspect		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Aspect		#	Commitment / Actions Required / Key Controls			
		associated with vegetation loss		<p>confined to previously disturbed areas as far as possible.</p> <p>12.2 Avoid the development of new roads where possible to minimise impact to natural vegetation.</p> <p>12.3 Temporary construction lay-down areas should be sited on croplands, preferably in flat areas. No natural vegetation should be transformed for temporary activities.</p> <p>12.4 Restricting service roads and underground cabling for the turbines to previously disturbed lands, avoiding natural vegetation.</p> <p>12.6 Areas containing <i>Pelargonium crassipes</i> should be avoided, but where not possible, individuals should be relocated within the site.</p> <p>12.7 Prior to construction, the exact layout of the turbines and associated lay-down areas must be inspected by an ecologist and if necessary adjusted to avoid unnecessary impact.</p>			
13.	Faunal Impacts	Minimise impacts to onsite fauna	13.1	Measures to minimise habitat loss listed above should be implemented to minimise impacts to fauna.	As above	Contractor	Prior to construction
14.	Bat Habitat Loss: Destruction, Disturbance and Displacement	Mitigate impacts on bats	14.1	Install passive ultrasonic recorders for bats designed for long-term outdoor usage.	Monitoring data	Contractor	Prior to construction
		14.2	Identify spatial patterns of bat fatalities among turbines.	Monitoring data			
		14.3	Keep road development to a minimum where possible, upgrade existing roads rather than developing new road infrastructure.	Final Site Layout Plan			
		14.4	<ul style="list-style-type: none"> Project infrastructure to be located away from waterways, known cave roosts or any areas considered to be of bat importance, should as the granite outcrops. 	Final Site Layout Plan			

Aspect		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Aspect		#	Commitment / Actions Required / Key Controls			
CONSTRUCTION PHASE							
1.	Compliance with EMP	Confirm contractors commitment to adherence to EMP.	1.1	Ensure that the EMP and ROD are available at the site during installation.	Copy of signed EMP and ROD.	Contractor	Outset of construction
			1.2	Ensure that equipment is in place to meet EMP requirements and Contractor Compliance Standards.	Checklist of EMP requirements		
			1.3	Signed commitment from subcontractors to compliance with EMP and Contractor Compliance Standards.	Copy of signed EMP with subcontractor		
2.	Health and Safety	Ensure the health and safety of subcontractors and site users	2.1	A Health and Safety Plan developed by RWP must be adhered to by the appointed construction contractors and meet Occupational Health and Safety Act (OHSAct), Act 85 of 1993, requirements.	Signed Health and Safety Plan	Contractor	During construction
			2.2	Potentially hazardous areas must be clearly demarcated (i.e. unattended foundation excavations).	Signage	ECO	
			2.3	Appropriate PPE must be worn by all construction personnel.	ECO Reports	Contractor	
			2.4	No smoking to be allowed near the fuel storage area and notices depicting "No Smoking", "No Naked Lights" and "Danger" to be erected at the fuel storage site.	Signed Health and Safety Plan		
3.	General environmental damage	Environmental awareness training of workers	3.1	The contractor will be required to employ a full-time ECO at the construction site until rehabilitation is complete.	ECO on site full-time	ECO	Prior to construction
			3.2	The contractor or his representative (e.g. ECO) shall provide training and guidance to site workers before commencing work on relevant components of the EMP, including any new site workers taken on during the course of work.	Proof of training of workers / Signed attendance register	Contractor	
			3.3	Workers shall understand the dos and don'ts of working on the	Information posters		

Aspect		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Aspect		#	Commitment / Actions Required / Key Controls			
			3.4	<p>site and controls on causing environmental damage. This should include notification of regulations on harvesting wild fauna and flora from the surrounding area, damage to cultural heritage, littering, use of formal latrines, sexual engagement with locals, etc.</p> <p>Information posters should be put up in worker eating areas depicting typical prohibited activities that should be complied with on and off site.</p>	displayed in social areas on site		
4.	Construction area maintenance	General Environmental Protection	4.1	Construction area to be kept neat and clean at all times.	Camp clean and neat	Contractor	During construction
			4.2	Refuse and waste storage to be positioned away from buildings.	Refuse stored away from buildings		
			4.3	Drip trays to be inspected and emptied daily and closely monitored during rain events.	Drip trays emptied daily & monitored		
5.	Access roads	General environmental protection and control of nuisances	5.1	Access to the site and works area shall use existing roads or tracks wherever possible.	ECO Report	Contractor and appointed engineer	During construction
			5.2	Induction and training shall include the use of permitted roads and highlight prohibition of making new tracks.	Proof of training of workers / Signed attendance register		
			5.3	All temporary access roads shall be rehabilitated to the satisfaction of the Engineer.	ECO Report		
			5.4	Erect and maintain marker pegs or painted stones along the boundaries of work areas, access roads or tracks to prevent unauthorised movement outside designated areas.	Site pegged and marked		
			5.5	Mud and sand deposited onto public roads shall be cleared regularly.	Site well maintained		
			5.6	Upgrading of access roads should limit activities as far as	Deviations of road alignment avoided		

Aspect		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Aspect		#	Commitment / Actions Required / Key Controls			
			5.7	possible within the existing confines of the road Implement dust control measures where windblown dust can create a nuisance.	Dust control implemented & no grievances noted		
			5.8	The contractor shall repair any damage caused to the existing access road as a result of construction activities.	No damage visible and any damage repaired		
			5.9	Install and maintain appropriate traffic warning signs.	Traffic warning signs		
			5.10	Trained and equipped flagmen shall be used in the event that construction activities (e.g. delivery of abnormal loads) may create a traffic hazard on public roads.	Flagmen contracted for turbine delivery		
6.	Fencing and site access	Minimise impacts to human health and safety	6.1	Access to the site should be off-limits to the public at all times.	Site suitably fenced	Contractor	Throughout construction
			6.2	Fencing shall be maintained throughout construction.	Public access restricted.		
			6.3	Temporary fencing shall be removed and loose wire removed from the site.			
7.	Fire protection	Fire prevention.	7.1	No fires are allowed around the construction area.	Adequate fire fighting equipment with the contractor	Contractor	During construction
			7.2	Adequate fire fighting equipment must be available on site and maintained in good working order.			
			7.3	Welding, gas cutting or cutting of metal will only be permitted in an area designated as safe by the contractor.			
			7.3	Smoke free areas should be declared and appropriate signage erected.	Appropriate signage		
8.	Damage or Destruction of Cultural Heritage Interests	Minimise damage to cultural heritage interests	8.1	Ensure that trenches and excavations are checked by a palaeontologist.	ECO reports	Palaeontologist	Prior to and throughout construction
			8.2	No turbines located in areas of high sensitivity.	Final turbine micro-siting	Contractor	

Aspect		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Aspect		#	Commitment / Actions Required / Key Controls			
			8.3	SAHRA to be notified immediately if a burial/human remains is uncovered during the construction of the wind farm.	Minutes/ communications		
			8.4	Apply all mitigation measures to reduce the noise and visual impacts as presented in <i>Chapters 11 and 12</i> of the EIR.	ECO reports		
			8.5	The construction activities will be undertaken in accordance with a schedule that will be developed by RWP and approved by the landowners.			
9.	Refuse, waste (refers to all solid waste, including installation debris, timber, cans etc.) and effluent	Limit the potential for site pollution and the accumulation of waste materials on site. Prevent soil and/or groundwater contamination from waste and effluent.	9.1	Minimise, reduce, reuse and recycle waste material where possible. All waste must be separated into clearly marked skips for recycling, reuse and disposal.	Waste manifest documents Relevant documentation for waste disposal must be prepared and filed (e.g. certificates of safe disposal).	Contractor	Throughout construction
			9.2	Steel off-cuts will be re-used or recycled, as far as possible.	Visual inspection of site-ECO Report.		
			9.3	Vegetative material will be kept on site and mulched after construction to be spread over the disturbed areas to enhance rehabilitation of the natural vegetation.			
			9.4	All solid and liquid waste that cannot be reused or recycled will be placed in a skip and must be removed off site and disposed of at a licensed municipal disposal site. Any hazardous waste must be removed by a licensed waste disposal operator.			
			9.5	Disposal of any waste and/or construction debris by burning or burying to be forbidden.			
			9.6	The skips shall be kept in a sheltered place and covered to prevent contents blowing out.			
			9.7	Effluent and stormwater run-off will be discharged away from any water courses (e.g. drainage lines and Groenkloof gully). Effluent from construction site offices and staff facilities will be collected in storage tanks, which will be removed by a licensed sanitary contractor.			

Aspect		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Aspect		#	Commitment / Actions Required / Key Controls			
			9.8	Effluent from the batching plant (if applicable) will be contained within a bunded area and not be allowed to drain into water courses. Effluent will be recycled or removed.			
			9.9	Effluent from temporary staff facilities will be collected in storage tanks, which will be emptied by a sanitary contractor.			
10.	Solid waste management	Limit the potential for site pollution and the accumulation of waste materials on site.	10.1	The contractor shall set up a solid waste control and removal system in accordance with the Waste Method Statement.	ECO Reports	Contractor and ECO	During construction
			10.2	Bins shall be emptied on a daily basis and shall not be left in an overflowing state.			
			10.3	Waste and litter shall be disposed of in scavenger and weatherproof bins stored in a fenced and covered area.			
			10.4	Waste shall be collected and removed from the site at least once a week			
			10.5	Hazardous waste to be separated from general waste stream.			
			10.6	Waste disposed of in suitable landfill site to be confirmed and approved by the regulatory authority.			
			10.7	Workers must clean up the contractor's camp and work areas once a week.			
			10.8	If recycling facilities available, the contractor is encouraged to separate waste into glass, paper and tins and dispose of these at recycling depots.			
			10.9	No waste, including plastic waste, is to be burned on site			
11.	Pollution controls from ablution	Minimise environmental impacts from toilet	11.1	Adequate ablution facilities must be provided for staff.	Adequate toilets provided with toilet	Contractor and ECO	During construction

Aspect		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Aspect		#	Commitment / Actions Required / Key Controls			
	facilities	facilities for temporary workers	11.2	Excretion or urination will be prohibited other than at provided facilities.	paper Site layout plan Toilets kept clean and no sign of sewage spills		
			11.3	Facilities for washing hands to be provided as part of or immediately next to all toilet facilities.			
			11.4	Toilet facilities to be situated at least 50m away from water courses or drainage lines.			
			11.5	Discharge of waste from toilets and burial of waste is strictly prohibited.			
			11.6	Ensure no spillage occurs when toilets cleaned or emptied.			
			11.7	Portable toilets shall be properly secured to prevent toppling in wind.			
			11.8	At least 1 toilet per 20 workers to be provided.			
			11.9	Toilets to be maintained in hygienic state and serviced and emptied regularly. Toilet paper to be provided.			
12.	Concrete Works	Prevent contamination of soil and groundwater through management of concrete	12.1	If concrete is to be batched on site the following measures apply:			
			12.2	Excess or spilled concrete or aggregate to be confined within the work area and then removed to a licensed landfill site.			
			12.3	Concrete to be mixed on mortar boards or in bunded area, away from drainage channels and water courses.			
			12.4	Visible remains of the mixing of concrete, either solid or from washings, to be physically removed and disposed of as waste at a licensed landfill site.			

Aspect		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Aspect		#	Commitment / Actions Required / Key Controls			
13.	Earthworks	Minimise impact of earthworks on general environment	13.1	All earthworks shall be undertaken in such a manner so as to minimise the extent of any impacts caused by such activities and shall be limited to demarcated areas.	ECO Report	Contractor and appointed engineer	During construction
			13.2	No earthworks equipment shall be allowed outside demarcated areas unless permitted by the engineer.			
14.	Impact on Surface and Groundwater	Minimise impacts on surface and groundwater	14.1	Soil stockpiles will be protected from wind or water erosion through placement, vegetation or appropriate covering.	Site inspection and photographic evidence	Contractor	Throughout construction phase
			14.2	Proper drainage controls such as culverts, cut-off trenches will be used to ensure proper management of surface water runoff to prevent erosion.			
			14.3	Cleared or disturbed areas will be rehabilitated as soon as possible to prevent erosion.			
			14.4	Fuel, oil and used oil storage areas will have appropriate secondary containment (ie bunds).			
			14.5	Spill containment and clean up kits will be available onsite and clean-up from any spill will be appropriately contained and disposed of to a licensed landfill by a licensed operator.			
			14.6	Construction vehicles and equipment will be serviced regularly and provided with drip trays, if required.			
			14.7	Workshop areas will be lined to prevent subsurface ingress of contaminants and drainage from these areas will not be allowed to drain into water courses.			
			14.8	Works including foundations for the turbine and substation will be a minimum of 20 m from any watercourse.			
15.	Loss of Topsoil, Soil Compaction and	Minimise erosion and loss of topsoil	15.1	Restrict removal of vegetation and soil cover to the development footprint.	Site inspection and photographic evidence-	Contractor	Throughout construction phase

Aspect		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Aspect		#	Commitment / Actions Required / Key Controls			
	Erosion		15.2	Implement soil conservation measures such as stockpiling top soil for remediation of disturbed areas. Topsoil storage should be as brief as possible and rehabilitation areas must be fenced off to protect plants until plant communities are adequately developed.	ECO Report		
			15.3	Proper drainage controls such as culverts, cut-off trenches will be used to ensure proper management of surface water runoff to prevent erosion.			
			15.4	Soil stockpiles should be vegetated or appropriated covered to reduce soil loss as a result of wind or water to prevent erosion.			
			15.5	Disturbed areas will be rehabilitated as soon as possible to prevent erosion.			
			15.6	Construction vehicles will remain on designated and prepared roads.			
			15.7	Work areas will be clearly defined and demarcated to avoid unnecessary disturbance of areas outside the development footprint.			
			15.8	Construction vehicles will remain on designated and prepared roads.			
16.	Dust and emissions	Limit fugitive dust and exhaust emissions.	16.1	Vehicles travelling on gravel roads should not exceed a speed of 40km/hr.			
			16.2	Where appropriate, dust abatement measures should be implemented to restrict airborne dust, especially during windy conditions.			
			16.3	Containers for dusty materials will be enclosed or covered by suitable tarpaulins / nets to prevent escape of dust during			

Aspect		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Aspect		#	Commitment / Actions Required / Key Controls			
				loading and transfer from site. 16.4 Where necessary, stock piles of soil must be covered by suitable shade cloth or netting to prevent erosion, fugitive dust and to prevent the escape of dust during loading and transfer from site. 16.5 Vehicles are too kept in good working order and serviced regularly to minimise emissions. 16.6 Any complaints received from neighbours or site users must be reported to the RWP Project Manager and measures must be taken to limit dust.	Service records. Grievance procedure documentation/logbook		
17.	Noise pollution	Avoid disturbing surrounding land-users.	17.1	Vehicles and equipment used on site must be in good condition and serviced regularly.	Service and maintenance records for equipment and vehicles. ECO Report Signage on site	Contractor	During construction
			17.2	Mechanical equipment with lower sound power levels must be selected to ensure that permissible occupation noise-rating limit of 85 dBA is not exceeded.			
			17.3	Construction workers and personnel must wear hearing protection equipment when the 8-hour ambient noise levels exceed 75dBA.			
			17.4	Vehicles must to adhere to speed limits on site, and not exceed 40km/hr.			
18.	Vegetation loss	Prevent unnecessary disturbance and damage to natural vegetation and topsoil loss.	18.1	Subcontractors are to use existing roads and tracks as far as possible and construction vehicles must stick to the designated and prepared roads.	Photographic evidence ECO report	Contractor	Throughout construction
			18.2	Topsoil must be set aside to facilitate re-vegetation.	Site inspection		
			18.3	No vegetation should be collected for fire wood or other uses.			

Aspect		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Aspect		#	Commitment / Actions Required / Key Controls			
			18.4	During construction in areas classified as high sensitivity areas, a botanist or ecologist will be consulted to ensure micro-siting of turbines minimises damage to or loss of sensitive flora.	Final Site Layout Plan	Ecologist or botanist RWP	
			18.5	Clear demarcation during the construction phase of all undisturbed sensitive areas that are not within the direct footprint of the wind farm to ensure that there is no uncontrolled access by construction vehicles and labourers.	Signage	Contractor	
			18.6	Rehabilitation or ecological restoration during and after the construction phase will be undertaken with indigenous plants with input from a botanist with experience in restoration of semi- arid areas.	Rehabilitation reports	Contractor	
			18.7	Remove alien vegetation from disturbed areas.	ECO Report	Contractor	
			18.8	Distribution of the unusual Aloe species encountered at the site should be mapped and all individuals treated with caution until such time as its identity can be confirmed. Until the identity of the species is confirmed, the species and habitats should be removed or impacted. Should the Aloe prove to be a previously unknown species, then the area where the species is found to occur should receive an increased level of conservation protection.		Ecologist	
			18.9	Borrow pits, if required, should be constructed in previously disturbed areas and restricted to areas of quartzite rather than the sandstone-dominated areas to the southeast of the site;			
			18.10	Soil disturbance should be kept to an absolute minimum.			
			18.11	Where vegetation loss will occur before construction a qualified botanist is to ensure that rare, protected or endangered species are not being impacted by the road and if necessary identify alternative routes or relocate plants to a similar nearby environment.	Training attendance records		

Aspect		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Aspect		#	Commitment / Actions Required / Key Controls			
			18.12	All contractors must undertake training provided by RWP to educate them on the importance of the undisturbed conservations areas.			
19.	Bird Habitat Loss Destruction, Disturbance and Displacement	Minimise impacts on birds	19.1	Habitat loss and disturbance can be mitigated during the construction phase by on-site demarcation of 'no-go' areas. These areas should be identified during pre-construction monitoring.	Photographic evidence ECO Report	Contractor	Throughout construction
20.	Bat Habitat Loss: Destruction, Disturbance and Displacement	Mitigate impacts on bats	20.1	Minimise blasting requirements and coordinate blasting events to minimise number of events required.	Site Layout Plan	Contractor	Throughout construction
			20.2	Caution should be taken to ensure construction footprints are kept to an absolute minimum, including storage of materials, stockpiling etc.	Site Layout Plan		
			20.3	Construction activities should avoided as far as possible during early summer (November to February) when it is peak bat breeding season and young bats may not be able to leave the roost.	ECO Report		
			20.4	If pre-construction monitor reveals that sensitive roosts are located near the development area (to be determined during pre-construction monitoring), construction activities should be avoided as far as possible during early to mid summer (November to February) when it is peak bat breeding season and young bats may not be able to leave the roost.	Monitoring records		
			20.5	If pre-construction monitor reveals that sensitive roosts are located near the development area (to be determined during pre-construction monitoring), construction activities should be minimised during the coldest winter months (June/ July/ August), when bats go into a state of prolonged torpor and may not be able to escape the roost.			
			20.6	Any roosting caves identified by a bat specialist during pre-			

Aspect		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Aspect		#	Commitment / Actions Required / Key Controls			
				construction bat monitoring, should have a buffer, with no development occurring within this buffer zone. The size of the buffer should be determined by the bat specialist, pending the outcome of further investigation.			
21.	Traffic Impact	Mitigate traffic impacts	21.1	The Traffic Management Plan will be adhered to including adherence to speed limits and 'rules of the road'.	Traffic Management Plan and ECO reports	Contractor	During construction
22.	Socio-cultural issues: Influx of job seekers	Minimize impacts associated with influx of jobseekers and labour.	22.1	RWP code of conduct and HIV Policy developed by RWP must form part of contractual agreement and must be adhered to.	Code of conduct and HIV policy must be available on site.	Contractor	During construction
			22.2	No recruitment of workers shall be permitted at the site	Employment records	Contractor	During construction
			22.3	The construction workers (from outside the area) should be allowed to return home over the weekends or on a regular basis to visit their families; the contractor should make the necessary arrangement to facilitate these visits.	Employment records	Contractor	During construction
23.	Loss of Agricultural Land	Minimise loss to agricultural land	23.1	Ensure compliance with construction plans and worker 'Code of Conduct' developed by RWP.	Photographic evidence and ECO report	Contractor	During construction
			23.2	Any damage to vegetation will be rehabilitated in accordance with mitigation proposed for the rehabilitation of natural vegetation.			
			23.3	Ensure that the gates are closed as far as possible, and that any damage to the infrastructure is repaired immediately or compensated for.			
			23.4	Animals will be able to continue grazing on the land between the wind turbines; the area should be treated as one of the grazing camps.			
			23.5	Any damage to vegetation will be rehabilitated in accordance with mitigation proposed for the rehabilitation of natural vegetation.			
24.	Faunal Impacts	Mitigate impacts on	24.1	During construction in areas classified as high sensitivity areas,	ECO reports and	Ecologist	During construction

Aspect		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Aspect		#	Commitment / Actions Required / Key Controls			
		fauna		an ecologist should be consulted to ensure micro-siting of turbines minimises damage to or loss of sensitive habitat.;	photographic evidence	Contractor	
			24.2	Clear demarcation during the construction phase of all undisturbed sensitive areas that are not within the direct footprint of the wind energy facility to ensure that there is no uncontrolled access by construction vehicles and labourers.			
			24.3	All vehicles must stick to designated and prepared roads.			
			24.4	Temporary construction lay-down or assembly areas should be sited on transformed areas where possible.			
			24.5	Rapid regeneration of plant cover must be encouraged by setting aside topsoil during earthmoving and replacing onto areas where the re-establishment of plant cover is desirable to prevent erosion.			
			24.6	Control poaching by banning dogs on site and enclosing worker compounds.			
			24.7	Fauna must have 'right of way' on the roads. Slow moving animals such as tortoises which may be in the way, should be placed at the side of the road in the direction the animal was seen travelling.			
			24.8	All vehicles must stick to designated and prepared roads and a speed limit (up to 40 km/hr) must be enforced.			
			24.9	No fires should be allowed at the site anywhere other than within demarcated areas within the compound.			
			24.10	No dogs or other pets belonging to the contractor should be allowed at the site.			
			24.11	All staff at the site should remain within the compound at night.			

Aspect		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Aspect		#	Commitment / Actions Required / Key Controls			
			24.12	No harvesting or collecting of plants, seeds, animals or their parts should be allowed.	Training material and records of training		
			24.13	Poaching or hunting should be strictly forbidden.			
			24.14	Littering should be strictly forbidden and waste generated by staff or at the compound should be disposed of in an appropriate manner, preferably off-site.			
			24.15	The compound and other temporary lay-down areas should be fenced-off to reduce human-wildlife interactions.			
			24.16	All chemical, fuel and oil spills should be cleaned up in the appropriate manner.			
			24.17	It should be mandatory for all contractors to attend an environmental briefing and training session with respect to the guidelines outlined in the EIR and this EMP.			
25.	Visual Impacts	Minimise visual impacts	25.1	Measures to control wastes and litter should be included in the contract specification documents and contractor must agree to these.	ECO report	Contractor Botanist	Throughout construction
			25.2	Rehabilitate/ re-vegetate areas damaged by construction activities.			
			25.3	Borrow pits for the construction (which have not been identified), would be subject to permits from the relevant authorities. Borrow pits on the site are to be rehabilitated and re-vegetated according to the botanist's recommendations.			
POST CONSTRUCTION PHASE							
1.	Temporary site closure	General environmental protection	1.1	During temporary site closure ensure: <u>Fuels and flammables:</u>	Temporary site closure complies with the specified provisions.	Contractor	During any temporary site closures

Aspect		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Aspect		#	Commitment / Actions Required / Key Controls			
				<ul style="list-style-type: none"> Fuel is stored in low volumes No leak, outlet secure / locked and adequate ventilation present Bund is empty Fire extinguishers serviced and accessible Area secured from accidental damage, e.g. vehicle collision Emergency contact numbers are displayed. Safety office checks the stores prior to closure of the site <p><u>Safety</u></p> <ul style="list-style-type: none"> All trenches secured and fencing and barriers in place Notice boards applicable and secured Emergency and management contact details displayed Security persons briefed and have facility for contact. Fire hazards identified and precautions taken to limit risks e.g. wood stockpiles, fuels Inspection schedule and log by security or contracts staff <p><u>Erosion</u></p> <ul style="list-style-type: none"> Wind and dust mitigation in place Slopes and stockpiles at stable angle Re-vegetated areas watering schedule in place <p><u>Water contamination and pollution</u></p> <ul style="list-style-type: none"> Cement and material stores secured Refuse bins and toilets emptied and secured Bunds clean and treated Drip trays empty and secure All structures secured against wind damage 			
2.	Permanent Construction site closure	General environmental protection	2.1	<p>All equipment, storage containers, temporary fencing, temporary services, fixtures and solid waste shall be removed from site at the end of construction. Specific measures include:</p> <ul style="list-style-type: none"> Clear and completely remove from site all equipment, storage containers, temporary fencing, temporary services, fixtures and any other temporary works. 	ECO Report	Contractor	Following permanent site closure

Aspect							
Aspect		Objective	Actions to be undertaken to Mitigate Environmental Impact		Parameters for Monitoring	Responsibility	Frequency / Timing
#	Description of Aspect		#	Commitment / Actions Required / Key Controls			
				<ul style="list-style-type: none"> • Ensure that all access roads utilised during construction are returned to a usable state and/or a state no worse than prior to construction. • Clear the site of all inert waste and rubble, including surplus rock, foundations and batching plant aggregates (if applicable). • Remove from site all domestic waste and dispose of in the approved manner at a registered waste disposal site. 			

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