

GREAT KAROO EGI, NORTHERN CAPE AND WESTERN CAPE PROVINCES

Environmental Management Programme for the
132kV collector substation

May 2022

savannah
environmental

GENERIC ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) FOR THE DEVELOPMENT AND EXPANSION OF SUBSTATION INFRASTRUCTURE FOR THE TRANSMISSION AND DISTRIBUTION OF ELECTRICITY



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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INTRODUCTION

1. Background

The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) requires that an environmental management programme (EMPr) be submitted where an environmental impact assessment (EIA) has been identified as the environmental instrument to be utilised as the basis for a decision on an application for environmental authorisation (EA). The content of an EMPr must either contain the information set out in Appendix 4 of the Environmental Impact Assessment Regulations, 2014, as amended (EIA Regulations) or must be a generic EMPr relevant to an application as identified and gazetted by the Minister in a government notice. Once the Minister has identified, through a government notice that a generic EMPr is relevant to an application for EA, that generic EMPr must be applied by all parties involved in the EA process, including but not limited to the applicant and the competent authority (CA).

2. Purpose

This document constitutes a generic EMPr relevant to applications for the development or expansion of substation infrastructure for the transmission and distribution of electricity, and all listed and specified activities necessary for the realisation of such infrastructure.

3. Objective

The objective of this generic EMPr is to prescribe and pre-approve generally accepted impact management outcomes and impact management actions, which can commonly and repeatedly be used for the avoidance, management and mitigation of impacts and risks associated with the development or expansion of substation infrastructure for the transmission and distribution of electricity. The use of a generic EMPr is intended to reduce the need to prepare and review individual EMPrs for applications of a similar nature.

4. Scope

The scope of this generic EMPr applies to the development or expansion of substation infrastructure for the transmission and distribution of electricity requiring EA in terms of NEMA. This generic EMPr applies to activities requiring EA, mainly activity 11 and 47 of the Environmental Impact Assessment Regulations Listing Notice 1 of 2014, as amended, and activity 9 of the Environmental Impact Assessment Regulations Listing Notice 2 of 2014, as amended, and all associated listed or specified activities necessary for the realization of such infrastructure.

5. Structure of this document

This document is structured in three parts with an Appendix as indicated in the table below:

Part	Section	Heading	Content
A		Provides general guidance and information and is not legally binding	Definitions, acronyms, roles & responsibilities and documentation and reporting.
B	1	Pre-approved generic EMPr template	<p>Contains generally accepted impact management outcomes and impact management actions required for the avoidance, management and mitigation of impacts and risks associated with the development or expansion of substation infrastructure for the transmission and distribution of electricity, which are presented in the form of a template that has been pre-approved.</p> <p>The template in this section is to be completed by the contractor, with each completed page signed and dated by the holder of the EA prior to commencement of the activity.</p> <p>Where an impact management outcome is not relevant, the words "not applicable" can be inserted in the template under the "responsible persons" column.</p> <p>Once completed and signed, the template represents the EMPr for the activity approved by the CA and is legally binding. The template is not required to be submitted to the CA as once the generic EMPr is gazetted for implementation, it has been approved by the CA.</p> <p>To allow interested and affected parties access to the pre-approved EMPr template for consideration through the decision-making process, the EAP on behalf of the applicant /proponent must make the hard copy of this EMPr available at a public location and where the applicant has a website, the EMPr should also be made available on such publicly accessible website.</p>
	2	Site specific information	Contains preliminary infrastructure layout and a declaration that the applicant/holder of the EA

Part	Section	Heading	Content
			<p>will comply with the pre-approved generic EMPr template contained in <u>Part B: Section 1</u>, and understands that the impact management outcomes and impact management actions are legally binding. The preliminary infrastructure layout must be finalized to inform the final EMPr that is to be submitted with the basic assessment report (BAR) or environmental impact assessment report (EIAR), ensuring that all impact management outcomes and impact management actions have been either pre-approved or approved in terms of <u>Part C</u>.</p> <p>This section must be submitted to the CA together with the final BAR or EIAR. The information submitted to the CA will be considered to be incomplete should a signed copy of <u>Part B: section 2</u> not be submitted. Once approved, this Section forms part of the EMPr for the development and is legally binding.</p>
C		Site specific sensitivities/ attributes	<p>If any specific environmental sensitivities/ attributes are present on the site which require site specific impact management outcomes and impact management actions, not included in the pre-approved generic EMPr, to manage impacts, these specific impact management outcomes and impact management actions must be included in this section. These specific environmental attributes must be referenced spatially and impact management outcomes and impact management actions must be provided. These specific impact management outcomes and impact management actions must be presented in the format of the pre-approved EMPr template (<u>Part B: section 1</u>)</p> <p>This section will not be required should the site contain no specific environmental sensitivities or attributes. However, if <u>Part C</u> is applicable to the site, it is required to be submitted together with the BAR or EIAR, for consideration of, and decision on, the application for EA. The information in this section must be prepared by an EAP and must contain his/her name and expertise including a curriculum vitae. Once</p>

Part	Section	Heading	Content
			<p>approved, Part C forms part of the EMPr for the site and is legally binding.</p> <p>This section applies only to additional impact management outcomes and impact management actions that are necessary for the avoidance, management and mitigation of impacts and risks associated with the specific development or expansion and which are not already included in <u>Part B: section 1</u>.</p>
		Appendix 1	<p>Contains the method statements to be prepared prior to commencement of the activity. The method statements are not required to be submitted to the competent authority.</p>

6. Completion of part B: section 1: the pre-approved generic EMPr template

The template is to be completed prior to commencement of the activity, by providing the following information for each environmental impact management action:

- For implementation
 - a 'responsible person',
 - a method for implementation,
 - a timeframe for implementation
- For monitoring
 - a responsible person
 - frequency
 - evidence of compliance.

The completed template must be signed and dated by the holder of the EA prior to commencement of the activity. The method statements prepared and agreed to by the holder of the EA must be appended to the template as Appendix 1. Each method statement must be signed and dated on each page by the holder of the EA. This template once signed and dated is legally binding. The holder of the EA will remain responsible for its implementation.

7. Amendments of the impact management outcomes and impact management actions

Once the activity has commenced, a holder of an EA may make amendments to the impact management outcomes and impact management actions in the following manner:

- Amendment of the impact management outcomes: in line with the process contemplated in Regulation 37 of the EIA Regulations; and
- Amendment of the impact management actions: in line with the process contemplated in Regulation 36 of the EIA Regulations.

8. Documents to be submitted as part of part B: section 2 site specific information and declaration

Part B: Section 2 has three distinct sub-sections. The first and third sub-sections are in a template format. Sub-section two requires a map to be produced.

Sub-section 1 contains the project name, the applicant's name and contact details, the site information, which includes coordinates of the property or farm in which the proposed substation infrastructure is proposed as well as the 21-digit Surveyor General code of each cadastral land parcel and, where available, the farm name.

Sub-section 2 is to be prepared by an EAP and must contain his/her name and expertise including a curriculum vitae. This sub-section must include a map of the site sensitivity overlaid with the preliminary infrastructure layout using the national web based environmental screening tool, when available for compulsory use at: <https://screening.environment.gov.za/screeningtool>. The sensitivity map shall identify the nature of each sensitive feature e.g. threatened plant species, archaeological site, etc. Sensitivity maps shall identify features both within the planned working area and any known sensitive features and within 50 m from the development footprint.

Sub-section 3 is the declaration that the applicant (s)/proponent (s) or holder of the EA in the case of a change of ownership must complete which confirms that the applicant/EA holder will comply with the pre-approved 'generic EMPr' template in Section 1 and understands that the impact management outcomes and impact management actions are legally binding.

(a) Amendments to Part B: Section 2 – site specific information and declaration

Should the EA be transferred, Part B: Section 2 must be completed by the new applicant/proponent and submitted with the application for an amendment of the EA in terms of regulations 29 or 31 of the EIA Regulations, whichever applies. The information submitted as part of such an application for an amendment to an EA will be considered to be incomplete should a signed copy of Part B: Section 2 not be submitted. Once approved, Part B: Section 2 forms part of the EMPr for the development and the EMPr becomes legally binding to the new EA holder.

PART A – GENERAL INFORMATION

1. DEFINITIONS

In this EMPr any word or expression to which a meaning has been assigned in the NEMA or EIA Regulations has that meaning, and unless the context requires otherwise –

"clearing" means the clearing and removal of vegetation, whether partially or in whole, including trees and shrubs, as specified;

"construction camp" is the area designated for key construction infrastructure and services, including but not limited to offices, overnight vehicle parking areas, stores, the workshop, stockpile and lay down areas, hazardous storage areas (including fuels), the batching plant (if one is located at the construction camp), designated access routes, equipment cleaning areas and the placement of staff accommodation, cooking and ablution facilities, waste and wastewater management;

"contractor" - The Contractor has overall responsibility for ensuring that all work, activities, and actions linked to the delivery of the contract, are in line with the Environmental Management Programme and that Method Statements are implemented as described.

"hazardous substance" is a substance governed by the Hazardous Substances Act, 1973 (Act No. 15 of 1973) as well as the Hazardous Chemical and Substances Regulations, 1995;

"method statement" means a written submission by the Contractor to the Project Manager in response to this EMPr or a request by the Project Manager and ECO. The method statement must set out the equipment, materials, labour and method(s) the Contractor proposes using to carry out an activity identified by the Project Manager when requesting the Method Statement. This must be done in such detail that the Project Manager and ECO is able to assess whether the Contractor's proposal is in accordance with this specification and/or will produce results in accordance with this specification;

The method statement must cover as a minimum applicable details with regard to:

- (i) Construction procedures;
- (ii) Plant, materials and equipment to be used;
- (iii) Transporting the equipment to and from site;
- (iv) How the plant/ material/ equipment will be moved while on site;
- (v) How and where the plant/ material/ equipment will be stored;
- (vi) The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
- (vii) Timing and location of activities;
- (viii) Compliance/ non-compliance; and
- (ix) Any other information deemed necessary by the Project Manager.

"slope" means the inclination of a surface expressed as one unit of rise or fall for so many horizontal units;

“solid waste” means all solid waste, including construction debris, hazardous waste, excess cement/ concrete, wrapping materials, timber, cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers);

“spoil” means excavated material which is unsuitable for use as material in the construction works or is material which is surplus to the requirements of the construction works;

“topsoil” means a varying depth (up to 300 mm) of the soil profile irrespective of the fertility, appearance, structure, agricultural potential, fertility and composition of the soil;

“works” means the works to be executed in terms of the Contract

2. ACRONYMS and ABBREVIATIONS

CA	Competent Authority
cEO	Contractors Environmental Officer
dEO	Developer Environmental Officer
DPM	Developer Project Manager
DSS	Developer Site Supervisor
EAR	Environmental Audit Report
ECA	Environmental Conservation Act No. 73 of 1989
ECO	Environmental Control Officer
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
ERAP	Emergency Response Action Plan
EMPr	Environmental Management Programme Report
EAP	Environmental Assessment Practitioner
FPA	Fire Protection Agency
HCS	Hazardous chemical Substance
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act ,2004 (Act No. 10 of 2004)
NEMWA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
MSDS	Material Safety Data Sheet
RI&AP's	Registered Interested and affected parties

3. ROLES AND RESPONSIBILITIES FOR ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) IMPLEMENTATION

The effective implementation of this generic EMPr is dependent on established and clear roles, responsibilities and reporting lines within an institutional framework. This section of the EMPr gives guidance to the various environmental roles and reporting lines, however, project specific requirements will ultimately determine the need for the appointment of specific person(s) to undertake specific roles and or responsibilities. As such, it must be noted that in the event that no specific person, for example, an environmental control officer (ECO) is appointed, the holder of the EA remains responsible for ensuring that the duties indicated in this document for action by the ECO are undertaken.

Table 1: Guide to roles and responsibilities for implementation of an EMPr

Responsible Person(s)	Role and Responsibilities
Developer's Project Manager (DPM)	<p><u>Role</u></p> <p>The Project Developer is accountable for ensuring compliance with the EMPr and any conditions of approval from the competent authority (CA). Where required, an environmental control officer (ECO) must be contracted by the Project Developer to objectively monitor the implementation of the EMPr according to relevant environmental legislation, and the conditions of the environmental authorisation (EA). The Project Developer is further responsible for providing and giving mandate to enable the ECO to perform responsibilities, and he must ensure that the ECO is integrated as part of the project team while remaining independent.</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> - Be fully conversant with the conditions of the EA; - Ensure that all stipulations within the EMPr are communicated and adhered to by the Developer and its Contractor(s); - Issuing of site instructions to the Contractor for corrective actions required; - Monitor the implementation of the EMPr throughout the project by means of site inspections and meetings. Overall management of the project and EMPr implementation; and - Ensure that periodic environmental performance audits are undertaken on the project implementation.

Responsible Person(s)	Role and Responsibilities
Developer Site Supervisor (DSS)	<p><u>Role</u> The DSS reports directly to the DPM, oversees site works, liaises with the contractor(s) and the ECO. The DSS is responsible for the day to day implementation of the EMPr and for ensuring the compliance of all contractors with the conditions and requirements stipulated in the EMPr.</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> - Ensure that all contractors identify a contractor's Environmental Officer (cEO); - Must be fully conversant with the conditions of the EA. Oversees site works, liaison with Contractor, DPM and ECO; - Must ensure that all landowners have the relevant contact details of the site staff, ECO and cEO; - Issuing of site instructions to the Contractor for corrective actions required; - Will issue all non-compliances to contractors; and - Ratify the Monthly Environmental Report.
Environmental Control Officer (ECO)	<p><u>Role</u> The ECO should have appropriate training and experience in the implementation of environmental management specifications. The primary role of the ECO is to act as an independent quality controller and monitoring agent regarding all environmental concerns and associated environmental impacts. In this respect, the ECO is to conduct periodic site inspections, attend regular site meetings, pre-empt problems and suggest mitigation and be available to advise on incidental issues that arise. The ECO is also required to conduct compliance audits, verifying the monitoring reports submitted by the cEO. The ECO provides feedback to the DSS and Project Manager regarding all environmental matters. The Contractor, cEO and dEO are answerable to the Environmental Control Officer for non-compliance with the Performance Specifications as set out in the EA and EMPr.</p> <p>The ECO provides feedback to the DSS and Project Manager, who in turn reports back to the Contractor and potential and Registered Interested & Affected Parties' (RI&AP's), as required. Issues of non-compliance raised by the ECO must be taken up by the Project Manager, and resolved with the Contractor as per the conditions of his contract. Decisions regarding environmental procedures, specifications and requirements which have a cost implication (i.e. those that are deemed to be a variation, not allowed for in the</p>

Responsible Person(s)	Role and Responsibilities
	<p>Performance Specification) must be endorsed by the Project Manager. The ECO must also, as specified by the EA, report to the relevant CA as and when required.</p> <p><u>Responsibilities</u></p> <p>The responsibilities of the ECO will include the following:</p> <ul style="list-style-type: none"> - Be aware of the findings and conclusions of all EA related to the development; - Be familiar with the recommendations and mitigation measures of this EMPr; - Be conversant with relevant environmental legislation, policies and procedures, and ensure compliance with them; - Undertake regular and comprehensive site inspections / audits of the construction site according to the generic EMPr and applicable licenses in order to monitor compliance as required; - Educate the construction team about the management measures contained in the EMPr and environmental licenses; - Compilation and administration of an environmental monitoring plan to ensure that the environmental management measures are implemented and are effective; - Monitoring the performance of the Contractors and ensuring compliance with the EMPr and associated Method Statements; - In consultation with the Developer Site Supervisor order the removal of person(s) and/or equipment which are in contravention of the specifications of the EMPr and/or environmental licenses; - Liaison between the DPM, Contractors, authorities and other lead stakeholders on all environmental concerns; - Compile a regular environmental audit report highlighting any non-compliance issues as well as satisfactory or exceptional compliance with the EMPr; - Validating the regular site inspection reports, which are to be prepared by the contractor Environmental Officer (cEO); - Checking the cEO's record of environmental incidents (spills, impacts, legal transgressions etc.) as well as corrective and preventive actions taken; - Checking the cEO's public complaints register in which all complaints are recorded, as well as action taken;

Responsible Person(s)	Role and Responsibilities
	<ul style="list-style-type: none"> - Assisting in the resolution of conflicts; - Facilitate training for all personnel on the site – this may range from carrying out the training, to reviewing the training programmes of the Contractor; - In case of non-compliances, the ECO must first communicate this to the Senior Site Supervisor, who has the power to ensure this matter is addressed. Should no action or insufficient action be taken, the ECO may report this matter to the authorities as non-compliance; - Maintenance, update and review of the EMPr; - Communication of all modifications to the EMPr to the relevant stakeholders.
<p>developer Environmental Officer (dEO)</p>	<p><u>Role</u></p> <p>The dEOs will report to the Project Manager and are responsible for implementation of the EMPr, environmental monitoring and reporting, providing environmental input to the Project Manager and Contractor’s Manager, liaising with contractors and the landowners as well as a range of environmental coordination responsibilities.</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> - Be fully conversant with the EMPr; - Be familiar with the recommendations and mitigation measures of this EMPr, and implement these measures; - Ensure that all stipulations within the EMPr are communicated and adhered to by the Employees, Contractor(s) ; - Confine the development site to the demarcated area; - Conduct environmental internal audits with regards to EMPr and authorisation compliance (on cEO); - Assist the contractors in addressing environmental challenges on site; - Assist in incident management: - Reporting environmental incidents to developer and ensuring that corrective action is taken, and lessons learnt shared; - Assist the contractor in investigating environmental incidents and compile investigation reports; - Follow-up on pre-warnings, defects, non-conformance reports;

Responsible Person(s)	Role and Responsibilities
	<ul style="list-style-type: none"> - Measure and communicate environmental performance to the Contractor; - Conduct environmental awareness training on site together with ECO and cEO; - Ensure that the necessary legal permits and / or licenses are in place and up to date; - Acting as Developer's Environmental Representative on site and work together with the ECO and contractor;
Contractor	<p><u>Role</u></p> <p>The Contractor appoints the cEO and has overall responsibility for ensuring that all work, activities, and actions linked to the delivery of the contract are in line with the EMPr and that Method Statements are implemented as described. External contractors must ensure compliance with this EMPr while performing the onsite activities as per their contract with the Project Developer. The contractors are required, where specified, to provide Method Statements setting out in detail how the impact management actions contained in the EMPr will be implemented during the development or expansion of substation infrastructure for the transmission and distribution of electricity activities.</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> - project delivery and quality control for the development services as per appointment; - employ a suitably qualified person to monitor and report to the Project Developer's appointed person on the daily activities on-site during the construction period; - ensure that safe, environmentally acceptable working methods and practices are implemented and that equipment is properly operated and maintained, to facilitate proper access and enable any operation to be carried out safely; - attend on site meeting(s) prior to the commencement of activities to confirm the procedure and designated activity zones; - ensure that contractors' staff repair, at their own cost, any environmental damage as a result of a contravention of the specifications contained in EMPr, to the satisfaction of the ECO.

Responsible Person(s)	Role and Responsibilities
contractor Environmental Officer (cEO)	<p><u>Role</u></p> <p>Each Contractor affected by the EMPr should appoint a cEO, who is responsible for the on-site implementation of the EMPr (or relevant sections of the EMPr). The Contractor's representative can be the site agent; site engineer; a dedicated environmental officer; or an independent consultant. The Contractor must ensure that the Contractor's Representative is suitably qualified to perform the necessary tasks and is appointed at a level such that she/he can interact effectively with other site Contractors, labourers, the Environmental Control Officer and the public. As a minimum the cEO shall meet the following criteria:</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> - Be on site throughout the duration of the project and be dedicated to the project; - Ensure all their staff are aware of the environmental requirements, conditions and constraints with respect to all of their activities on site; - Implementing the environmental conditions, guidelines and requirements as stipulated within the EA, EMPr and Method Statements; - Attend the Environmental Site Meeting; - Undertaking corrective actions where non-compliances are registered within the stipulated timeframes; - Report back formally on the completion of corrective actions; - Assist the ECO in maintaining all the site documentation; - Prepare the site inspection reports and corrective action reports for submission to the ECO; - Assist the ECO with the preparing of the monthly report; and - Where more than one Contractor is undertaking work on site, each company appointed as a Contractor will appoint a cEO representing that company.

4. ENVIRONMENTAL DOCUMENTATION REPORTING AND COMPLIANCE

To ensure accountable and demonstrated implementation of the EMPr, a number of reporting systems, documentation controls and compliance mechanisms must be in place for all substation infrastructure projects as a minimum requirement.

4.1 Document control/Filing system

The holder of the EA is solely responsible for the upkeep and management of the EMPr file. As a minimum, all documentation detailed below will be stored in the EMPr file. A hard copy of all documentation shall be filed, while an electronic copy may be kept where relevant. A duplicate file will be maintained in the office of the DSS (where applicable). This duplicate file must remain current and up-to-date. The filing system must be updated and relevant documents added as required. The EMPr file must be made available at all times on request by the CA or other relevant authorities. The EMPr file will form part of any environmental audits undertaken as prescribed in the EIA Regulations.

4.2 Documentation to be available

At the outset of the project the following preliminary list of documents shall be placed in the filing system and be accessible at all times:

- Full copy of the signed EA from the CA in terms of NEMA, granting approval for the development or expansion;
- Copy of the generic and site specific EMPr as well as any amendments thereof;
- Copy of declaration of implementing generic EMPr and subsequent approval of site specific EMPr and amendments thereof;
- All method statements;
- Completed environmental checklists;
- Minutes and attendance register of environmental site meetings;
- An up-to-date environmental incident log;
- A copy of all instructions or directives issued;
- A copy of all corrective actions signed off. The corrective actions must be filed in such a way that a clear reference is made to the non-compliance record;
- Complaints register.

4.3 Weekly Environmental Checklist

The ECOs are required to complete a Weekly Environmental Checklist, the format of which is to be agreed prior to commencement of the activity. The ECOs are required to sign and date the checklist, retain a copy in the EMPr file and submit a copy of the completed checklist to the DSS on a weekly basis.

The checklists will form the basis for the Monthly Environmental Reports. Copies of all completed checklists will be attached as Annexures to the Environmental Audit Report as required in terms of the EIA Regulations.

4.4 Environmental site meetings

Minutes of the environmental site meetings shall be kept. The minutes must include an attendance register and will be attached to the Monthly Report that is distributed to attendees. Each set of minutes must clearly record "Matters for Attention" that will be reviewed at the next meeting.

4.5 Required Method Statements

The method statement will be done in such detail that the ECOs are enabled to assess whether the contractor's proposal is in accordance with the EMPr.

The method statement must cover applicable details with regard to:

- development procedures;
- materials and equipment to be used;
- getting the equipment to and from site;
- how the equipment/ material will be moved while on site;
- how and where material will be stored;
- the containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
- timing and location of activities;
- compliance/ non-compliance with the EMPr; and
- any other information deemed necessary by the ECOs.

Unless indicated otherwise by the Project Manager, the Contractor shall provide the following method statements to the Project Manager no less than 14 days prior to the commencement date of the activity:

- Site establishment – Camps, Lay-down or storage areas, satellite camps, infrastructure;
- Batch plants;
- Workshop or plant servicing;
- Handling, transport and storage of Hazardous Chemical Substance's;
- Vegetation management – Protected, clearing, aliens, felling;
- Access management – Roads, gates, crossings etc.;
- Fire plan;
- Waste management – transport, storage, segregation, classification, disposal (all waste streams);
- Social interaction – complaints management, compensation claims, access to properties etc.;
- Water – use (source, abstraction and disposal), access and all related information, crossings and mitigation;
- Emergency preparedness – Spills, training, other environmental emergencies;
- Dust and noise management methodologies;
- Fauna interaction and risk management – only if the risk was identified – wildlife interaction especially on game farms; and
- Heritage and palaeontology management.

The ECOs shall monitor and ensure that the contractors perform in accordance with these method statements. Completed and agreed method statements between the holder of the EA and the contractor shall be captured in Appendix 1.

4.6 Environmental Incident Log (Diary)

The ECOs are required to maintain an up-to-date and current Environmental Incident Log (environmental diary). The Environmental Incident Log is a means to record all environmental incidents and/or all non-compliance notice would not be issued. An environmental incident is defined as:

- Any deviation from the listed impact management actions (listed in this EMPr) that may be addressed immediately by the ECOs. (For example a contractor's staff member littering or a drip tray that has not been emptied);
- Any environmental impact resulting from an action or activity by a contractor in contravention of the environmental stipulations and guidelines listed in the EMPr which as a single event would have a minor impact but which if cumulative and continuous would have a significant effect (for example no toilet paper available in the ablutions for an afternoon); and
- General environmental information such as road kills or injured wildlife.

The ECOs are to record all environmental incidents in the Environmental Incident Log. All incidents regardless of severity must be reported to the Developer. The Log is to be kept in the EMPr file and at a minimum the following will be recorded for each environmental incident:

- The date and time of the incident;
- Description of the incident;
- The name of the Contractor responsible;
- The incident must be listed as significant or minor;
- If the incident is listed as significant, a non-compliance notice must be issued, and recorded in the log;
- Remedial or corrective action taken to mitigate the incident; and
- Record of repeat minor offences by the same contractor or staff member.

The Environmental Incident Log will be captured in the EAR.

4.7 Non-compliance

A non-compliance notice will be issued to the responsible contractor by the ECOs via the DSS or Project Manager. The non-compliance notice will be issued in writing; a copy filed in the EMPr file and will at a minimum include the following:

- Time and date of the non-compliance;
- Name of the contractor responsible;
- Nature and description of the non-compliance;
- Recommended / required corrective action; and
- Date by which the corrective action to be completed.
- The contractors shall act immediately when a notice of non-compliance is received and correct whatever is the cause for the issuing of the notice. Complaints received regarding activities on the development site pertaining to the environment shall be

recorded in a dedicated register and the response noted with the date and action taken. The ECO should be made aware of any complaints. Any non-compliance with the agreed procedures of the EMPr is a transgression of the various statutes and laws that define the manner by which the environment is managed. Failure to redress the cause shall be reported to the relevant CA for them to deal with the transgression, as it deems fit. The contractor is deemed not to have complied with the EMPr if, inter alia, There is a deviation from the environmental conditions, impact management outcomes and impact management actions activities, as approved in generic and site specific EMPr as relevant as set out in the EMPr, which deviation has, or may cause, an environmental impact.

4.8 Corrective action records

For each non-compliance notice issued, a documented corrective action must be recorded. On receiving a non-compliance notice from the DSS, the contractor's cEO will ensure that the corrective actions required take place within the stipulated timeframe. On completion of the corrective action the cEO is to issue a Corrective Action Report in writing to the ECOs. If satisfied that the corrective action has been completed, the ECOs are to sign-off on the Corrective Action Report, and attach the report to the non-compliance notice in the EMPr file. A corrective action is considered complete once the report has signed off by the ECOs.

4.9 Photographic record

A digital photographic record will be kept. The photographic record will be used to show before, during and post rehabilitation evidence of the project as well used in cases of damages claims if they arise. Each image must be dated and a brief description note attached.

The Contractor shall:

1. Allow the ECOs access to take photographs of all areas, activities and actions.

The ECOs shall keep an electronic database of photographic records which will include:

1. Pictures of all areas designated as work areas, camp areas, development sites and storage areas taken before these areas are set up;
2. All bunding and fencing;
3. Road conditions and road verges;
4. Condition of all farm fences;
5. Topsoil storage areas;
6. All areas to be cordoned off during construction;
7. Waste management sites;
8. Ablution facilities (inside and out);
9. Any non-conformances deemed to be "significant";
10. All completed corrective actions for non-compliances;
11. All required signage;
12. Photographic recordings of incidents;
13. All areas before, during and post rehabilitation; and
14. Include relevant photographs in the Final Environmental Audit Report.

4.10 Complaints register

The ECOs shall keep a current and up-to-date complaints register. The complaints register is to be a record of all complaints received from communities, stakeholders and individuals. The Complaints Record shall:

1. Record the name and contact details of the complainant;
2. Record the time and date of the complaint;
3. Contain a detailed description of the complaint;
4. Where relevant and appropriate, contain photographic evidence of the complaint or damage (ECOs to take relevant photographs); and
5. Contain a copy of the ECOs written response to each complaint received and keep a record of any further correspondence with the complainant. The ECO's written response will include a description of any corrective action to be taken and must be signed by the Contractor, ECO and affected party. Where a damage claim is issued by the complainant, the ECOs shall respond as described in **(section 4.11)** below.

4.11 Claims for damages

In the event that a Claim for Damages is submitted by a community, landowner or individual, the ECOs shall:

1. Record the full detail of the complaint as described in **(section 4.10)** above;
2. The DPM will evaluate the claim and associated damage and submit the evaluation to the Senior Site Representative for approval;
3. Following consideration by the DPM, the claim is to be resolved and settled immediately, or the reason for not accepting the claim communicated in writing to the claimant. Should the claimant not accept this, the ECO shall, in writing report the incident to the Developer's negotiator and legal department; and
4. A formal record of the response by the ECOs to the claimant as well as the rectification of the method of making payments not amount will be recorded in the EMPr file.

4.12 Interactions with affected parties

Open, transparent and good relations with affected landowners, communities and regional staff are an essential aspect to the successful management and mitigation of environmental impacts.

The ECOs shall:

1. Ensure that all queries, complaints and claims are dealt within an agreed timeframe;
2. Ensure that any or all agreements are documented, signed by all parties and a record of the agreement kept in the EMPr file;
3. Ensure that a complaints telephone numbers are made available to all landowners and affected parties; and
4. Ensure that contact with affected parties is courteous at all times;

4.13 Environmental audits

Internal environmental audits of the activity and implementation of the EMPr must be undertaken. The findings and outcomes included in the EMPr file and submitted to the CA at intervals as indicated in the EA.

The ECOs must prepare a monthly EAR. The report will be tabled as the key point on the agenda of the Environmental Site Meeting. The Report is submitted for acceptance at the meeting and the final report will be circulated to the Project Manager and filed in the EMPr file. At a frequency determined by the EA, the ECOs shall submit the monthly reports to the CA. At a minimum the monthly report is to cover the following:

- Weekly Environmental Checklists;
- Deviations and non-compliances with the checklists;
- Non-compliances issued;
- Completed and reported corrective actions;
- Environmental Monitoring;
- General environmental findings and actions; and
- Minutes of the Bi-monthly Environmental Site Meetings.

4.14 Final environmental audits

On final completion of the rehabilitation and/or requirements of the EA a final EAR is to be prepared and submitted to the CA. The EAR must comply with Appendix 7 of the EIA Regulations.

PART B: SECTION 1: Pre-approved generic EMPr template

5. IMPACT MANAGEMENT OUTCOMES AND IMPACT MANAGEMENT ACTIONS

This section provides a pre-approved generic EMPr template with aspects that are common to the development of substation infrastructure for the transmission and distribution of electricity. There is a list of aspects identified for the development or expansion of substation infrastructure for the transmission and distribution of electricity, and for each aspect a set of prescribed impact management outcomes and associated impact management actions have been identified. Holders of EAs are responsible to ensure the implementation of these outcomes and actions for all projects as a minimum requirement, in order to mitigate the impact of such aspects identified for the development or expansion of substation infrastructure for the transmission and distribution of electricity.

The template provided below is to be completed by providing the information under each heading for each environmental impact management action.

The completed template must be signed and dated on each page by both the contractor and the holder of the EA prior to commencement of the activity. The method statements prepared and agreed to by the holder of the EA must be appended to the template as Appendix 1. Each method statement must also be duly signed and dated on each page by the contractor and the holder of the EA. This template, once signed and dated, is legally binding. The holder of the EA will remain responsible for its implementation.

5.1 Environmental awareness training

Impact management outcome: All onsite staff are aware and understands the individual responsibilities in terms of this EMPr.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All staff must receive environmental awareness training prior to commencement of the activities;	ECO / cEO / dEO	Hold environmental awareness training workshops	Pre-construction Construction and Operations	ECO dEO	Monthly and as and when required	Attendance register and training minutes / notes for the record
– The Contractor must allow for sufficient sessions to train all personnel with no more than 20 personnel attending each course;	Contractor	Scheduling of sufficient sessions through consultation with the ECO / cEO / dEO	Pre-construction Construction	ECO dEO	Monthly and as and when required	Attendance register and training minutes / notes for the record
– Refresher environmental awareness training is available as and when required;	cEO / dEO in consultation with the ECO	Hold refresher environmental awareness training workshops	During the construction phase	ECO dEO	Monthly and as and when required	Attendance register and training minutes / notes for the record
– All staff are aware of the conditions and controls linked to the EA and within the EMPr and made aware of their individual roles and responsibilities in achieving compliance with the EA and EMPr;	cEO / dEO	Hold training workshops and ensure that the EA and EMPr is readily available	During the construction phase	ECO dEO	Monthly and as and when required	Attendance register and training minutes / notes for the record

<ul style="list-style-type: none"> - The Contractor must erect and maintain information posters at key locations on site, and the posters must include the following information as a minimum: <ul style="list-style-type: none"> a) Safety notifications; and b) No littering. 	Contractor	Develop and place appropriate posters at key locations	Pre-construction Construction	ECO dEO cEO	Monthly	Photographic record
<ul style="list-style-type: none"> - Environmental awareness training must include as a minimum the following: <ul style="list-style-type: none"> a) Description of significant environmental impacts, actual or potential, related to their work activities; b) Mitigation measures to be implemented when carrying out specific activities; c) Emergency preparedness and response procedures; d) Emergency procedures; e) Procedures to be followed when working near or within sensitive areas; f) Wastewater management procedures; g) Water usage and conservation; h) Solid waste management procedures; i) Sanitation procedures; j) Fire prevention; and k) Disease prevention. 	cEO / dEO in consultation with the ECO	Develop environmental awareness training material which covers the minimum requirements	Pre-construction Construction	ECO dEO	Prior to the commencement of the environmental awareness training	Environmental awareness training material requirements checklist
<ul style="list-style-type: none"> - A record of all environmental awareness training courses undertaken as part of the EMPr must be available; 	ECO / cEO / dEO	Filing system including all proof of training (i.e. attendance register and training minutes / notes for the record)	During the construction phase	ECO dEO	Monthly	Completed and up to date filing system with proof of training
<ul style="list-style-type: none"> - Educate workers on the dangers of open and/or unattended fires; 	cEO / dEO in consultation with the ECO	Develop environmental awareness training	Pre-construction Construction	ECO dEO	Prior to the commencement of the	Environmental awareness training

		material which covers the dangers of open and/or unattended fire			environmental awareness training	material requirements checklist
- A staff attendance register of all staff to have received environmental awareness training must be available.	ECO / cEO / dEO	Filing system including all proof of training (i.e. attendance register)	During the construction phase	ECO dEO	Monthly	Completed and up to date filing system inclusive of all attendance registers
- Course material must be available and presented in appropriate languages that all staff can understand.	ECO / cEO / dEO	Develop environmental awareness training material in the required languages. Training material must be readily available to all staff	During the construction phase	ECO dEO	Monthly	Environmental awareness training material requirements checklist and the training register which must indicate the language of the training

5.2 Site Establishment development

Impact management outcome: Impacts on the environment are minimised during site establishment and the development footprint are kept to demarcated development area.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> - A method statement must be provided by the contractor prior to any onsite activity that includes the layout of the construction camp in the form of a plan showing the location of key infrastructure and services (where applicable), including but not limited to offices, overnight vehicle parking areas, stores, the workshop, stockpile and lay down areas, hazardous materials storage areas (including fuels), the batching plant (if one is located at the construction camp), designated access routes, equipment cleaning areas and the placement of staff accommodation, cooking and ablution facilities, waste and wastewater management; 	Contractor	Development of an appropriate method statement	Pre-construction	ECO dEO	Once, prior to construction	Availability of the method statement which complies with the minimum requirements listed
<ul style="list-style-type: none"> - Location of camps must be within approved area to ensure that the site does not impact on sensitive areas identified in the environmental assessment or site walk through; 	DPM	Place construction camps outside of sensitive areas identified in the Basic Assessment Report	Pre-construction Construction	ECO dEO	Once, prior to construction	Availability of a layout and sensitivity map indicating avoidance of sensitive areas
<ul style="list-style-type: none"> - Sites must be located where possible on previously disturbed areas; 	DPM	Place site outside of sensitive areas and within previously disturbed areas	Pre-construction	ECO dEO	Once, prior to construction	Availability of a layout and sensitivity map indicating

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		identified in the BA Report				avoidance of sensitive areas and placement within disturbed areas
– The camp must be fenced in accordance with Section 5.5: Fencing and gate installation ; and	DPM	Design and implementation of fencing as per the requirements of Section 5.5 of this EMPr	Pre-construction & Construction	ECO dEO	Once, prior to construction and once during the construction of the fencing	The camp is fenced in accordance with Section 5.5 of this EMPr
– The use of existing accommodation for contractor staff, where possible, is encouraged.	Not applicable – the development of new accommodation is not proposed. Employees will be accommodated in the nearby towns such as Richmond and Victoria West and transported to and from site daily.					

5.3 Access restricted areas

Impact management outcome: Access to restricted areas prevented.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Identification of access restricted areas is to be informed by the environmental assessment, site walk through and any additional areas identified during development;	dEO / cEO in consultation with the ECO	Spatially demarcate access restricted areas informed by the BA Report	Pre-construction	ECO	Once, prior to construction	Access restricted areas are identified and provided in a spatial format
– Erect, demarcate and maintain a temporary barrier with clear signage around the perimeter of any access restricted area, colour coding could be used if appropriate; and	dEO / cEO in consultation with the ECO	Erect appropriate temporary barriers around access restricted areas	At the commencement and for the duration of the construction phase	ECO	Monthly	Access restricted areas are closed-off through temporary barriers and barriers are maintained to a sufficient standard
– Unauthorised access and development related activity inside access restricted areas is prohibited.	Contractor / dEO / cEO	Erect appropriate temporary barriers around access restricted areas and provide clear signage of restricted status	During the construction phase	ECO	Monthly, and as and when required	Photographic evidence and notes of compliance that no unauthorised access or

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
						activities has taken place within the access restricted areas

5.4 Access roads

Impact management outcome: Minimise impact to the environment through the planned and restricted movement of vehicles on site.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– An access agreement must be formalised and signed by the DPM, Contractor and landowner before commencing with the activities;	DPM Contractor	Develop access agreements with the affected landowners. Ensure that agreements are approved and signed	Pre-construction	dEO ECO	Once, prior to construction	Availability of approved and signed negotiations
– All private roads used for access to the servitude must be maintained and upon completion of the works, be left in at least the original condition	Contractor	Undertake maintenance activities on private roads used for construction as	During the construction phase	cEO / ECO	Weekly	Photographic record of the pre-construction condition

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		degradation takes place				and degradation of roads, and records of the implementation and effectiveness of maintenance activities
– All contractors must be made aware of all these access routes.	dEO / cEO	Develop a map illustrating all access routes associated with the project and present and provide the map to all contractors	Pre-construction Construction	ECO	Once, prior to construction	Access routes map readily available
– Any access route deviation from that in the written agreement must be closed and re-vegetated immediately, at the contractor's expense;	Contractor	All access routes developed that are not in-line with the access route agreements must be closed and rehabilitated to the pre-disturbance state	Construction and Rehabilitation	cEO ECO	Bi-weekly (every two weeks)	Photographic record of the closure of access roads and re-vegetation
– Maximum use of both existing servitudes and existing roads must be made to minimize further disturbance through the development of new roads;	Contractor (and Eskom maintenance)	Existing access routes to be used must be specified	Construction and operation	cEO Operation and	Weekly	Implementation of the

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
	staff where relevant to operation)	and the development of new roads must be avoided as far as possible		maintenance team		approved layout
– In circumstances where private roads must be used, the condition of the said roads must be recorded in accordance with section 4.9: photographic record ; prior to use and the condition thereof agreed by the landowner, the DPM, and the contractor;	dEO / cEO	Record the conditions of private roads to be used (prior to use) as per the requirements of section 4.9 and agree on the required condition of the roads with the landowner, DPM and contractor	During the construction phase	ECO	Prior to the use of private roads	Photographic record and proof of the road conditions agreed upon with the relevant parties
– Access roads in flattish areas must follow fence lines and tree belts to avoid fragmentation of vegetated areas or croplands	DPM and Contractor	Design access roads to follow fence lines and avoid vegetated areas	Pre-construction	ECO	Once during the design and once prior to construction	Implementation of the approved layout
– Access roads must only be developed on pre-planned and approved roads.	Contractor	Construction of access roads only on pre-planned and approved access roads	During the construction phase	ECO once during the design dEO	Once during the design and weekly during the construction	Implementation of the approved layout

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
					n of access roads	

5.5 Fencing and Gate installation

Impact management outcome: Minimise impact to the environment and ensure safe and controlled access to the site through the erection of fencing and gates where required.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Use existing gates provided to gain access to all parts of the area authorised for development, where possible;	Contractor	Identify and inform all relevant staff of the existing gates to be used	Pre-construction & Construction	dEO	Monthly	Existing gates are utilised on a frequent basis and only limited new access gates are developed
– Existing and new gates to be recorded and documented in accordance with section 4.9: photographic record;	ECO	Existing and new gates will be recorded and documented as per the requirements of section 4.9	During the construction phase	ECO	Once, when the construction of all new gates have been completed	Photographic record of the existing and new gates as per the requirements of section 4.9

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All gates must be fitted with locks and be kept locked at all times during the development phase, unless otherwise agreed with the landowner;	Contractor	Ensure all relevant gates are fitted with locks and are always locked	Construction and Operation	ECO monthly, Operation and maintenance team and cEO	Bi-weekly (every second week)	All gates are locked and no complaints from landowners are received in this regard
– At points where the line crosses a fence in which there is no suitable gate within the extent of the line servitude, on the instruction of the DPM, a gate must be installed at the approval of the landowner;	dEO	Install new gates where required with the approval of the affected landowner	During the construction phase	ECO	Once, prior to construction and during the construction phase, as and when required	New gates are installed where required
– Care must be taken that the gates must be so erected that there is a gap of no more than 100 mm between the bottom of the gate and the ground;	Contractor	Install gates in a manner so that there is a gap of no more than 100mm between the bottom of the gate and the ground	During the construction phase	cEO	Once, during the erection of the gates during the construction phase	New gates installed as per the requirement
– Where gates are installed in jackal proof fencing, a suitable reinforced concrete sill must be provided beneath the gate;	Contractor	Implement a reinforced concrete sill beneath gates installed for jackal proofing	During the construction phase	cEO	Once, during the erection of the gates during the construction phase	New gates installed as per the requirement

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- Original tension must be maintained in the fence wires;	Contractor	Maintain original tension of fences through required activities	During the construction phase	ECO	Monthly	No tension reduction on fence wires
- All gates installed in electrified fencing must be re-electrified;	Contractor	Electrify gates installed in electrified fencing	During the construction phase	ECO	Once, during the erection of the gates during the construction phase	Gates installed in electrified fencing is electrified
- All demarcation fencing and barriers must be maintained in good working order for the duration of the development activities;	Contractor	Undertake maintenance activities on fences and barriers	During the construction phase	ECO	Monthly	Photographic record of maintained fences and barriers
- Fencing must be erected around the camp, batching plants, hazardous storage areas, and all designated access restricted areas, where applicable;	Contractor	Fence construction camps, batching plants, hazardous storage areas and access restricted areas. Avoid sensitive flora	During the construction phase	ECO	Once during the erection of fencing	Photographic record of fences erected
- Any temporary fencing to restrict the movement of livestock must only be erected with the permission of the land owner.	dEO/ cEO Contractor	Obtain written approval from the relevant landowner where temporary fencing is required to	During the construction phase	ECO	To be monitored as temporary fencing is required	Written approval to be provided by the dEO

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		restrict livestock movement				
– All fencing must be developed of high quality material bearing the SABS mark;	Contractor	Make use of high quality materials approved by SABS	During the construction phase	cEO	To be monitored as fencing is erected during the construction phase	Use of high quality materials for fencing approved by SABS
– The use of razor wire as fencing must be avoided;	Contractor	Razor wire must not be sourced or used for the erection of fencing	During the construction phase	ECO	To be monitored as fencing is erected during the construction phase	Fences erected do not make use of razor wire
– Fenced areas with gate access must remain locked after hours, during weekends and on holidays if staff is away from site. Site security will be required at all times;	DSS and Contractor	Ensure fenced areas are locked as required through the implementation of a formalised process. Appoint a security company	During the construction phase	cEO	Weekly and as and when required	Fences are locked and no complaints from landowners are received. A security company is appointed
– On completion of the development phase all temporary fences are to be removed;	Contractor	Removal of all temporary fences	At the end of the Construction Phase	ECO dEO	Once, following the completion	No temporary fences associated

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
					of the construction phase	with the project is present following the completion of the construction phase
<ul style="list-style-type: none"> - The contractor must ensure that all fence uprights are appropriately removed, ensuring that no uprights are cut at ground level but rather removed completely. 	Contractor	Appropriate removal of all fence uprights	At the end of the Construction Phase	ECO dEO	Once, following the completion of the construction phase	No fence uprights associated with the project is present following the completion of the construction phase

5.6 Water Supply Management

Impact management outcome: Undertake responsible water usage.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> - All abstraction points or bore holes must be registered with the DWS and suitable water meters installed to ensure that the abstracted volumes are measured on a daily basis; 	DPM and Contractor	Obtaining relevant registrations from DWS and installation of water meters	Pre-construction	cEO	To be monitored with the installation of water meters and daily during construction and operation	Use of high quality water meters
<ul style="list-style-type: none"> - The Contractor must ensure the following: <ul style="list-style-type: none"> a. The vehicle abstracting water from a river does not enter or cross it and does not operate from within the river; b. No damage occurs to the river bed or banks and that the abstraction of water does not entail stream diversion activities; and c. All reasonable measures to limit pollution or sedimentation of the downstream watercourse are implemented. 	Not applicable – No abstraction from a river is proposed.					

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> - Ensure water conservation is being practiced by: <ul style="list-style-type: none"> a. Minimising water use during cleaning of equipment; b. Undertaking regular audits of water systems; and c. Including a discussion on water usage and conservation during environmental awareness training. d. The use of grey water is encouraged. 	Contractor / dEO / cEO in consultation with the ECO	Implement the required water conservation measures throughout on-site construction processes	During the construction phase	ECO	Monthly, and as and when required	Successful implementation of water conservation

5.7 Storm and waste water management

Impact management outcome: Impacts to the environment caused by storm water and wastewater discharges during construction are avoided.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> - Runoff from the cement/ concrete batching areas must be strictly controlled, and contaminated water must be collected, stored and either treated or disposed of off-site, at a location approved by the project manager; 	Contractor	Implement measures for the control and management of runoff	During the construction phase	cEO	Weekly	No mismanagement of runoff or contaminated water due to the temporary concrete batching plant

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<p>– All spillage of oil onto concrete surfaces must be controlled by the use of an approved absorbent material and the used absorbent material disposed of at an appropriate waste disposal facility;</p>	Contractor and cEO	Obtain approved absorbent material and make use of licensed waste disposal facilities for disposal of oil	During the Construction Phase	ECO	Monthly	Availability of approved absorbent material at the construction site and proof of disposal of oil at licensed disposal facilities
<p>– Natural storm water runoff not contaminated during the development and clean water can be discharged directly to watercourses and water bodies, subject to the Project Manager's approval and support by the ECO;</p>	DPM in consultation with the ECO	Consultation between the DPM and the ECO to determine if water can be discharged directly into water bodies (where present). The necessary water quality testing must be undertaken prior to discharge	During the construction phase	ECO	As and when the need arises to discharge natural stormwater runoff and clean water	Proof of consultation between the DPM and ECO and the outcomes thereof to be provided. Proof of water quality testing and the results thereof.
<p>– Water that has been contaminated with suspended solids, such as soils and silt, may be released into watercourses or water bodies only once all suspended solids have been removed from the water by settling out these solids in settlement ponds. The release of settled water back into the environment must be subject to the Project Manager's approval and support by the ECO.</p>	DPM in consultation with the ECO	Consultation between the DPM and the ECO to determine if water can be released following settling.	During the construction phase	ECO	As and when the need arises to discharge settled water	Proof of consultation between the DPM and ECO and the outcomes

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
						thereof to be provided.

5.8 Solid and hazardous waste management

Impact management outcome: Wastes are appropriately stored, handled and safely disposed of at a recognised waste facility.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All measures regarding waste management must be undertaken using an integrated waste management approach;	Contractor	Develop and implement a waste management plan	During the construction phase	ECO	Monthly	Implementation of the waste management plan and proof of waste management through proof of responsible disposal
– Sufficient, covered waste collection bins (scavenger and weatherproof) must be provided;	Contractor	Provision of appropriate waste collection bins	During the construction phase	cEO	Weekly	Appropriate waste collection

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		strategically placed throughout the site				bins are available throughout the site
– A suitably positioned and clearly demarcated waste collection site must be identified and provided;	DPM and Contractor	Identify an appropriate location for the waste collection site which must be clearly demarcated through signage and temporary fencing	Design and Construction Phase	ECO	Once, prior to the commencement of construction	A waste collection site is appropriately placed and demarcated
– The waste collection site must be maintained in a clean and orderly manner;	Contractor	Regular collection of waste and maintenance of the area must be undertaken as per the waste requirements for the project during construction	During the Construction Phase	cEO	Weekly	The waste collection site is maintained and clean
– Waste must be segregated into separate bins and clearly marked for each waste type for recycling and safe disposal;	Contractor	Provide separate and marked bins for the different waste types associated with the construction phase	During the Construction Phase	cEO	Weekly	Separate waste bins are available on site and waste generated is separated

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
						into the relevant bins
– Staff must be trained in waste segregation;	cEO / dEO in consultation with the ECO	Include waste segregation as part of the environmental awareness training material.	Pre-construction Construction	ECO	Monthly, and as and when required	Environmental awareness training material requirements checklist
– Bins must be emptied regularly;	Contractor	Bins must be emptied before reaching total capacity and on a regular basis as required for the project	During the construction phase	ECO	Monthly	No mismanagement of bins.
– General waste produced onsite must be disposed of at registered waste disposal sites/ recycling company;	Contractor	Disposal of general waste at licensed waste disposal facilities must be undertaken as per the waste management plan	During the construction phase	ECO	Monthly	Disposal certificates of disposal at licensed facilities to be provided
– Hazardous waste must be disposed of at a registered waste disposal site;	Contractor	Disposal of hazardous waste at licensed waste disposal facilities must be undertaken as per the waste	During the construction phase	ECO	Monthly	Disposal certificates of disposal at licensed facilities to be provided

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		management plan				
– Certificates of safe disposal for general, hazardous and recycled waste must be maintained.	Contractor	Obtain certificates for safe disposal of waste	During the construction phase	ECO	Monthly	Disposal certificates of disposal at licensed facilities to be provided and filed as part of the filing system

5.9 Protection of watercourses and estuaries

Impact management outcome: Pollution and contamination of the watercourse environment and or estuary erosion are prevented.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All watercourses must be protected from direct or indirect spills of pollutants such as solid waste, sewage, cement, oils, fuels, chemicals, aggregate tailings, wash and contaminated water or organic material resulting from the Contractor's activities;	Contractor	Contractor to undertake activities which can cause spills of pollutants outside of watercourses	During the construction phase	cEO	Weekly	No incidents reported of spillage of pollutants into watercourses

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– In the event of a spill, prompt action must be taken to clear the polluted or affected areas;	Contractor and cEO	Develop a management plan or process for implementation should a spill take place	During the construction phase	cEO	Weekly	Feedback must be provided by the contractor in terms of how the spill was handled and photographic evidence of the feedback must be provided and kept on record
– Where possible, no development equipment must traverse any seasonal or permanent wetland	cEO and Contractor	Ensure layout has been informed by the environmental sensitivities as determined by the basic assessment and specialist studies	Construction Phase	ECO	Once off review that the layout used is the approved one	Confirm no development equipment traverses any seasonal or permanent wetland as per the authorised layout by reviewing the as-built designs (once-off

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance (confirmation)
– No return flow into the estuaries must be allowed and no disturbance of the Estuarine functional Zone should occur;	Not applicable – no estuaries are located within the study area.					
– Development of permanent watercourse or estuary crossing must only be undertaken where no alternative access to tower position is available;	cEO, Contractor	Ensure that permanent crossings (access roads) are provided for access to the substations if no alternative crossing is available.	During the construction phase	cEO	Weekly	Ensure that permanent crossings are developed if there is no alternative.
– There must not be any impact on the long term morphological dynamics of watercourses or estuaries;	DPM, cEO	Develop a management plan or process for implementation should a spill take place within a watercourse and ensure continuous monitoring	During the construction and operation phase	ECO, dEO	For all phases of the project life cycle (i.e. construction, operation, decommissioning)	No incidents reported of spillage of pollutants into watercourses
– Existing crossing points must be favored over the creation of new crossings (including temporary access)	DPM, cEO	Develop a management plan or process for implementation should a spill take place within a	During the pre-construction and construction phase	ECO, dEO	During the construction phase of the project.	Existing crossing points utilised as opposed to new ones created and

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		watercourse and ensure continuous monitoring				no incidents reported of spillage of pollutants into watercourses
<p>– When working in or near any watercourse or estuary, the following environmental controls and consideration must be taken:</p> <p>a) Water levels during the period of construction; No altering of the bed, banks, course or characteristics of a watercourse</p> <p>b) During the execution of the works, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented e.g. including ensuring that construction equipment is well maintained;</p> <p>c) Where earthwork is being undertaken in close proximity to any watercourse, slopes must be stabilised using suitable materials, i.e. sandbags or geotextile fabric, to prevent sand and rock from entering the channel; and</p> <p>d) Appropriate rehabilitation and re-vegetation measures for the watercourse banks must be implemented timeously. In this regard, the banks should be appropriately and incrementally stabilised as soon as development allows.</p>	Contractor	Activities undertaken near watercourses must be in-line with and consider the specified environmental controls	During the construction phase	ECO	Monthly, and as and when required	No degradation of the watercourses and no incidents of destruction reported

5.10 Vegetation clearing

Impact management outcome: Vegetation clearing is restricted to the authorised development footprint of the proposed infrastructure.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
General:						
– Indigenous vegetation which does not interfere with the development must be left undisturbed;	cEO and contractor	Demarcate areas of indigenous vegetation to be avoided before clearance is undertaken	Construction and operation (i.e. for maintenance purposes)	ECO monthly, Operation and maintenance team weekly	Weekly, and as and when required	No unnecessary clearance of indigenous vegetation is undertaken
– Protected or endangered species may occur on or near the development site. Special care should be taken not to damage such species;	Contractor	Demarcate areas containing protected or endangered species to be avoided by construction activities	During the Construction Phase	ECO monthly and Operation and maintenance team weekly	Weekly, and as and when required	No clearance of protected or endangered species other than those permitted to be removed
– Search, rescue and replanting of all protected and endangered species likely to be damaged during project development must be identified by the relevant specialist and completed prior to any development or clearing;	Relevant specialist in consultation with the Contractor	Develop and implement a Plant Search and Rescue Plan	Pre-construction & Construction	cEO	Weekly, and as and when required	Implementation of the Plant Search and Rescue Plan and photographic evidence and notes of the

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
						implementation of the plan
<ul style="list-style-type: none"> Permits for removal must be obtained from the relevant CA prior to the cutting or clearing of the affected species, and they must be filed; 	DPM	Undertake the permitting process in order to obtain the relevant permits for the removal of protected species. Permits must be kept on file	Pre-construction	ECO	Once, prior to the commencement of the construction phase and removal of the protected species	CA permits on file
<ul style="list-style-type: none"> The Environmental Audit Report must confirm that all identified species have been rescued and replanted and that the location of replanting is compliant with conditions of approvals; 	ECO	Ensure that the audit report indicates all species rescued and replanted and provides feedback in terms of compliance with the conditions of permits for replanting	During the Construction Phase and following the completion of the Construction Phase	ECO	Once off or as and when required	ECO confirmed rescued and replanted programme implemented correctly.
<ul style="list-style-type: none"> Trees felled due to construction must be documented and form part of the Environmental Audit Report; 	ECO	Ensure that the audit report documents the details of trees felled	During the Construction Phase and following the completion of the	ECO	Once, prior to the commencement of the construction phase	CA permits on file

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
			Construction Phase		and removal of the protected species	
– Rivers and watercourses must be kept clear of felled trees, vegetation cuttings and debris;	Contractor	Felled trees, vegetation cuttings and debris must be disposed of at a licensed waste disposal facility	During the Construction Phase	ECO	Monthly	No felled trees, vegetation cuttings and debris are dumped in inappropriate locations and disposal certificates are available as proof of responsible disposal
– Only a registered pest control operator may apply herbicides on a commercial basis and commercial application must be carried out under the supervision of a registered pest control operator, supervision of a registered pest control operator or is appropriately trained;	DPM and Contractor	A suitably qualified pest control operator must be appointed	Construction and Operation	ECO	As and when the use of herbicides is required	Only registered pest control operators must be appointed and proof of their registration must be provided

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- A daily register must be kept of all relevant details of herbicide usage;	DPM and Contractor	A suitably qualified pest control operator must be appointed	Construction and Operation	ECO	As and when the use of herbicides is required	Only registered pest control operators must be appointed and proof of their registration must be provided
- No herbicides must be used in estuaries	Not applicable - no estuaries are present within the study area					
- All protected species and sensitive vegetation not removed must be clearly marked and such areas fenced off in accordance to Section 5.3: Access restricted areas.	Contractor in consultation with the cEO	Spatially demarcate protected species and sensitive vegetation and implement appropriate fencing where required as per section 5.3	During the construction phase	ECO	Once, during the undertaking of the demarcation of the areas and the erection of the fencing	Demarcation and fencing is undertaken in-line with the requirements of section 5.3
- Alien invasive vegetation must be removed and disposed of at a licensed waste management facility.	Contractor	Undertake removal of alien invasive vegetation in accordance with the relevant	Construction and Operation	ECO Operation and maintenance team	Monthly, and as and when required	Proof must be provided that alien invasive vegetation has been cleared in

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		guideline and ensure the vegetation is disposed of at a licensed waste disposal facility				accordance to the relevant guideline and that the vegetation was disposed of at a licensed waste disposal facility

5.11 Protection of fauna

Impact management outcome: Disturbance to fauna is minimised.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– No interference with livestock must occur without the landowner's written consent and with the landowner or a person representing the landowner being present;	dEO / cEO Contractor	Develop a procedure for dealing with livestock within the affected properties	Pre-construction and during the construction phase	ECO	Once, prior to the commencement of construction and as and when	Written consent provided by the landowner and proof of representatio

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
					required during the construction phase	n of the landowner during interference
– The breeding sites of raptors and other wild birds species must be taken into consideration during the planning of the development programme;	dEO / cEO in consultation with the Contractor	Ensure that the planning and development programme considers breeding sites for wild bird species	Pre-construction & Construction	ECO	Once, prior to the commencement of construction and as and when required	The planning and development programme includes the consideration of breeding sites for wild bird species
– Breeding sites must be kept intact and disturbance to breeding birds must be avoided. Special care must be taken where nestlings or fledglings are present;	dEO / cEO in consultation with the Contractor	Avoid breeding sites and ensure that special care is taken in the presence of nestlings and fledglings	During the Construction Phase Operation Phase	ECO monthly, cEO and Operation and maintenance team weekly	Weekly, and as an when required during the construction . Monthly, and as and when required during operation	Photographic record of intact breeding sites
– Special recommendations of the avian specialist must be adhered to at all times to prevent unnecessary disturbance of birds;	dEO / cEO in consultation with the Contractor	All mitigation measures recommended by the avifauna specialist must be implemented	During the Construction Phase Operation Phase	ECO Operation and maintenance team	Monthly during construction and monthly during operation	Photographic record of compliance and successful implementation of the

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
						recommended measures
- No poaching must be tolerated under any circumstances. All animal dens in close proximity to the works areas must be marked as Access restricted areas;	dEO / cEO in consultation with the Contractor	All site staff must be informed of this requirement during the Environmental Awareness Training and the consequences of not adhering to the requirement. These areas must be demarcated as Access Restricted Areas	During the Construction Phase	ECO	Monthly, and as and when required	No instances of poaching is reported
- No deliberate or intentional killing of fauna is allowed;	dEO / cEO in consultation with the Contractor	All site staff must be informed of this requirement during the Environmental Awareness Training and the consequences of not adhering to the requirement. These areas must be demarcated as Access Restricted Areas	During the Construction Phase	ECO	Monthly, and as and when required	No instances of deliberate or intentional killing is reported

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> - In areas where snakes are abundant, snake deterrents to be deployed on the pylons to prevent snakes climbing up, being electrocuted and causing power outages; and 	dEO / cEO in consultation with the Contractor	Implement and maintain snake deterrents on pylons in areas where snakes are abundant	During the Construction Phase Operation Phase	ECO Operation and maintenance team	Once, during the construction of the pylons and as and when required. Monthly during operation	Photographic record of the implementation and maintenance of snake deterrents
<ul style="list-style-type: none"> - No Threatened or Protected species (ToPs) and/or protected fauna as listed according NEMBA (Act No. 10 of 2004) and relevant provincial ordinances may be removed and/or relocated without appropriate authorisations/permits. 	DPM in consultation with the dEO	Undertake a permitting process to obtain the required permits	Pre-construction	ECO	Once, prior to the commencement of construction and as and when required	Permits for removal and/relocation must be kept on file and be readily available

5.12 Protection of heritage resources

Impact management outcome: Impact to heritage resources is minimised.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Identify, demarcate and prevent impact to all known sensitive heritage features on site in accordance with the No-Go procedure in Section 5.3: Access restricted areas ;	DPM and a suitably qualified specialist dEO / cEO in consultation with the Contractor and ECO	Spatially identify and demarcate areas of heritage significance as per the Heritage Impact Assessment and the Heritage Walk-through Report and as per the requirements of section 5.3	Pre-construction	ECO	Once, prior to the commencement of construction	Proof of avoidance of sensitive heritage features through details of avoidance and photographic records
– Carry out general monitoring of excavations for potential fossils, artefacts and material of heritage importance;	dEO (in consultation with specialists if/as required).	Ensure construction staff are adequately informed (via environmental awareness training) to carry out monitoring of excavations for fossils, artefacts and important heritage material	During the Construction Phase	ECO	Monthly, or as required	Environmental awareness training includes measures relating to monitoring for chance finds

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> All work must cease immediately, if any human remains and/or other archaeological, palaeontological and historical material are uncovered. Such material, if exposed, must be reported to the nearest museum, archaeologist/ palaeontologist (or the South African Police Services), so that a systematic and professional investigation can be undertaken. Sufficient time must be allowed to remove/collect such material before development recommences. 	dEO / cEO in consultation with the Contractor and ECO	Develop and implement procedures for situations where human remains, archaeological, palaeontological or historical material are uncovered	During the Construction Phase	ECO	As and when required	Proof of work ceased and the required procedures followed in cases where material is discovered.

5.13 Safety of the public

Impact management outcome: All precautions are taken to minimise the risk of injury, harm or complaints.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> Identify fire hazards, demarcate and restrict public access to these areas as well as notify the local authority of any potential threats e.g. large brush stockpiles, fuels etc.; 	cEO in consultation with the Contractor	Develop an Emergency Preparedness, Response and Fire Management Plan specific to the project	Pre-construction Construction	cEO	Once, prior to the commencement of construction and weekly during the	Compliance with the Emergency Preparedness, Response and Fire Management Plan

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
					construction phase	
– All unattended open excavations must be adequately fenced or demarcated;	Contractor	Ensure that all excavations undertaken is fenced and demarcated within a reasonable timeframe and in instances where excavations will be open for long-periods of time	During the Construction Phase	cEO	Weekly	Excavations are fenced where required and photographic proof can be provided
– Adequate protective measures must be implemented to prevent unauthorised access to and climbing of partly constructed towers and protective scaffolding;	Contractor	All staff must be easily identifiable and the climbing of towers and scaffolding must only be undertaken by authorised personnel as managed by the Contractor	During the construction phase	ECO	Monthly, and as and when required	No incidents of unauthorised climbing is reported
– Ensure structures vulnerable to high winds are secured;	Contractor	Ensure that sufficient stabilisation measures are implemented to	During the construction phase	cEO	Weekly, and as and when required	No incidents of unstable structures due to high

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		secure structures vulnerable to high winds				winds is reported
– Maintain an incidents and complaints register in which all incidents or complaints involving the public are logged.	cEO	Compile and regularly update as incidents and complaints are submitted from the public and indicate the actions taken to resolve the complaint	During the construction phase	ECO	Monthly, and as and when required	The incidents and complaints register is complete and provides all the required details

5.14 Sanitation

Impact management outcome: Clean and well maintained toilet facilities are available to all staff in an effort to minimise the risk of disease and impact to the environment.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Mobile chemical toilets are installed onsite if no other ablution facilities are available;	Contractor	Mobile chemical toilets must be placed appropriately and in areas that avoid	During the Construction Phase	cEO	Weekly	Mobile toilets are installed and avoid environmental sensitivities

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		environmental sensitivities				
<ul style="list-style-type: none"> - The use of ablution facilities and or mobile toilets must be used at all times and no indiscriminate use of the veld for the purposes of ablutions must be permitted under any circumstances; 	Contractor in consultation with the cEO	All site staff must be informed of this requirement during the Environmental Awareness Training and the consequences of not adhering to the requirement.	Pe-construction & Construction	ECO	Monthly, and as and when required	No evidence of non-compliance identified
<ul style="list-style-type: none"> - Where mobile chemical toilets are required, the following must be ensured: <ul style="list-style-type: none"> a) Toilets are located no closer than 100 m to any watercourse or water body; b) Toilets are secured to the ground to prevent them from toppling due to wind or any other cause; c) No spillage occurs when the toilets are cleaned or emptied and the contents are managed in accordance with the EMPr; d) Toilets have an external closing mechanism and are closed and secured from the outside when not in use to prevent toilet paper from being blown out; e) Toilets are emptied before long weekends and workers holidays, and must be locked after working hours; f) Toilets are serviced regularly and the ECO must inspect toilets to ensure compliance to health standards; 	Contractor in consultation with the cEO	The installation of the toilets by the Contractor must be as per the listed requirements	During the Construction Phase	cEO	Weekly	No evidence of non-compliance identified

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- A copy of the waste disposal certificates must be maintained.	Contractor	Certificates obtained from the licensed waste disposal facility with the emptying of the toilets must be kept on file	During the Construction Phase	ECO	Monthly, and as and when required	Certificates for waste disposal from the licensed waste disposal facility available on site

5.15 Prevention of disease

Impact Management outcome: All necessary precautions linked to the spread of disease are taken.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- Undertake environmentally-friendly pest control in the camp area;	Contractor	Only environmentally-friendly pest control must be used, when required	During the Construction Phase	ECO	As and when pest control is required for the project	Contractor to provide proof of pest control used being environmentally-friendly
- Ensure that the workforce is sensitised to the effects of sexually transmitted diseases, especially HIV AIDS;	cEO / Contractor in	The effects of sexually transmitted	Pre-construction & Construction	ECO	Once, prior to the commence	Environmental awareness training

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
	consultation with the ECO	diseases and HIV/AIDS must be covered in the Environmental Awareness Training			ment of construction and monthly during construction	material requirements checklist
– The Contractor must ensure that information posters on AIDS are displayed in the Contractor Camp area;	Contractor	Develop and place information posters on HIV/AIDS	During the Construction Phase	cEO	Weekly	Photographic evidence of poster placement
– Information and education relating to sexually transmitted diseases to be made available to both construction workers and local community, where applicable;	cEO / Contractor in consultation with the ECO	Information and education of sexually transmitted diseases must be covered in the Environmental Awareness Training.	Pre-construction & Construction	ECO	Monthly	Environmental awareness training material requirements checklist
– Free condoms must be made available to all staff on site at central points;	Contractor	Placement of free condoms in mobile toilets and at the construction camps	During the Construction Phase	ECO	Monthly	Proof of placement of free condoms by the contractor to be provided
– Medical support must be made available;	dEO / cEO in consultation with the Contractor	Ensure that designated personnel with first aid training are	Construction and Operations	ECO	Monthly	Check the availability of first aid trained

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		available on site and that first aid kits to provide medical support is readily available				personnel and medical kits (including if these are complete in terms of supplies)
- Provide access to Voluntary HIV Testing and Counselling Services.	Contractor	Compile a HIV testing schedule and provide counselling services where required	During the Construction Phase	ECO	Quarterly, and as and when required	Voluntary testing schedules and proof of counselling (where undertaken)

5.16 Emergency procedures

Impact management outcome: Emergency procedures are in place to enable a rapid and effective response to all types of environmental emergencies.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Compile an Emergency Response Action Plan (ERAP) prior to the commencement of the proposed project;	Contractor	Develop an Emergency Preparedness, Response and Fire Management Plan specific to the project	Pre-construction	ECO	Once, prior to the commencement of construction	Emergency Preparedness, Response and Fire Management Plan compiled
– The Emergency Plan must deal with accidents, potential spillages and fires in line with relevant legislation;	Contractor	Develop an Emergency Preparedness, Response and Fire Management Plan specific to the project which covers accidents, potential spillages and fires	Pre-construction	ECO	Once, prior to the commencement of construction	Emergency Preparedness, Response and Fire Management Plan includes required specifications
– All staff must be made aware of emergency procedures as part of environmental awareness training;	CEO / dEO in consultation with the ECO	Develop environmental awareness training material which covers the relevant	Pre-construction	ECO	Prior to the commencement of the environmental	Environmental awareness training material requirements checklist

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		emergency procedures			awareness training	
– The relevant local authority must be made aware of a fire as soon as it starts;	Contractor in consultation with the ECO	Develop and include a procedure in the Emergency Preparedness, Response and Fire Management Plan for the event of a fire and the procedure to be followed for informing the local authority	Construction	ECO	As and when a fire occurs	The local authority was informed as per the relevant procedure set out in the Emergency Preparedness, Response and Fire Management Plan
– In the event of emergency necessary mitigation measures to contain the spill or leak must be implemented (see Hazardous Substances section 5.17).	Contractor	Implement the required mitigation measures in the event of a spill or leak as per the requirements of Section 5.17.	Construction and Operations	ECO	As and when a spill or leak occurs	The mitigation measures included under Section 5.17 have been adhered to

5.17 Hazardous substances

Impact management outcome: Safe storage, handling, use and disposal of hazardous substances.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- The use and storage of hazardous substances to be minimised and non-hazardous and non-toxic alternatives substituted where possible;	CEO in consultation with the Contractor	Develop a strategy of how hazardous substances can be and should be minimised	Pre-construction & Construction	ECO	Once, prior to the commencement of construction and monthly during the construction phase	Contractor to provide evidence of substances used for proof of compliance
- All hazardous substances must be stored in suitable containers as defined in the Method Statement;	Contractor	Develop a Method Statement for the storage of hazardous substances in suitable containers	Pre-construction & Construction	ECO	Once, prior to the commencement of construction and monthly during the construction phase	Photographic proof that hazardous substances are stored in suitable containers as per the requirements of the relevant Method Statements

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Containers must be clearly marked to indicate contents, quantities and safety requirements;	Contractor	Where hazardous waste is stored these must be clearly marked indicating the required details of the contents	During the Construction Phase	ECO	Monthly	Photographic proof that containers are marked as per the requirements
– All storage areas must be bunded. The bunded area must be of sufficient capacity to contain a spill / leak from the stored containers;	Contractor	Ensure that storage areas are sufficiently bunded which are of sufficient capacity to contain a spill / leak from the stored containers	During the Construction Phase	ECO	Monthly during the Construction Phase	Photographic proof that storage areas are bunded and proof that the bund areas are of sufficient capacity to contain a spill / leak from the stored containers
– Bunded areas to be suitably lined with a SABS approved liner;	Contractor	Ensure that bunded storage areas are suitably lined	During the Construction Phase	ECO	Once, during the Construction Phase	Photographic proof that bunded storage areas are suitably lined
– An Alphabetical Hazardous Chemical Substance (HCS) control sheet must be drawn up and kept up to date on a continuous basis;	cEO / Contractor	Compile and update an Alphabetical Hazardous Chemical	During the Construction Phase	ECO	Monthly, and as and when required	Complete and up to date control sheet provided by

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		Substance (HCS) control sheet specific to the project				the Contractor
– All hazardous chemicals that will be used on site must have Material Safety Data Sheets (MSDS);	cEO / Contractor	Keep a record of all hazardous chemicals and the respective MSDS	During the Construction Phase	ECO	Monthly, and as and when required	Record of hazardous chemicals and the respective MSDS
– All employees working with HCS must be trained in the safe use of the substance and according to the safety data sheet;	cEO / Contractor	Provide training for personnel working with HCS	Pre-construction	ECO	Once, prior to the commencement of construction and as and when required	Record of training provided to personnel working with HCS
– Employees handling hazardous substances / materials must be aware of the potential impacts and follow appropriate safety measures. Appropriate personal protective equipment must be made available;	cEO / Contractor	Develop environmental awareness training material which covers the relevant impacts and safety measures. Provide appropriate training and personal	Pre-construction & Construction	ECO	Prior to the commencement of the environmental awareness training and monthly during the construction phase for personal	Environmental awareness training material requirements checklist and all relevant personnel have undergone appropriate training and have access

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		protective equipment for the relevant personnel handling hazardous substances and materials			protective equipment	to personal protective equipment
– The Contractor must ensure that diesel and other liquid fuel, oil and hydraulic fluid is stored in appropriate storage tanks or in bowsers;	Contractor	Appropriate storage facilities must be constructed or obtained for the storing of diesel, other liquid fuel, oil and hydraulic fluid	During the Construction Phase	ECO	Monthly, and as and when required	Storage tanks for the project are appropriate and no incidents are reported in this regard
– The tanks/ bowsers must be situated on a smooth impermeable surface (concrete) with a permanent bund. The impermeable lining must extend to the crest of the bund and the volume inside the bund must be 130% of the total capacity of all the storage tanks/ bowsers (110% statutory requirement plus an allowance for rainfall);	Contractor	Appropriate storage facilities must be constructed or obtained for tanks as per the requirements listed	During the Construction Phase	ECO	Monthly, and as and when required	Storage areas for the tanks/ bowsers for the project are appropriate and no incidents are reported in this regard
– The floor of the bund must be sloped, draining to an oil separator;	Contractor	Appropriate storage facilities must be constructed as per	During the Construction Phase	ECO	Once, during construction	Bunded storage areas are constructed according to

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		the requirements listed				the requirements
– Provision must be made for refueling at the storage area by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained;	Contractor	Appropriately constructed refuelling facility must be developed as per the requirements. Drip trays must be provided for use	During the Construction Phase	ECO cEO	Monthly Weekly	Soils at the refuelling facility are protected as required and drip trays are provided and used
– All empty externally dirty drums must be stored on a drip tray or within a bunded area;	Contractor	Ensure that empty dirty drums are stored appropriately as per the requirements	During the Construction Phase	ECO cEO	Monthly Weekly	Drip trays or bunded areas are used for the storage of dirty drums
– No unauthorised access into the hazardous substances storage areas must be permitted;	Contractor	Ensure through the implementation of procedures that no unauthorised access is undertaken into the storage areas	During the Construction Phase	ECO	Monthly	Proof of the implementation of the relevant procedure must be provided by the contractor
– No smoking must be allowed within the vicinity of the hazardous storage areas;	Contractor	Inform all employees of the requirement and develop and place relevant	During the Construction Phase	ECO cEO	Monthly Weekly	Photographic record of the signage placed must be provided

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		signage in the relevant areas				
– Adequate fire-fighting equipment must be made available at all hazardous storage areas;	Contractor	Hazardous storage areas must be fitted with adequate fire-fighting equipment	During the Construction Phase	ECO	Monthly	Adequate fire-fighting equipment is available and has been serviced
– Where refueling away from the dedicated refueling station is required, a mobile refueling unit must be used. Appropriate ground protection such as drip trays must be used;	Contractor	Provide a mobile refuelling unit as well as suitable ground protection, where required	During the Construction Phase	ECO	Monthly, and as and when required	A mobile refuelling unit and suitable ground protection is available for use
– An appropriately sized spill kit kept onsite relevant to the scale of the activity/s involving the use of hazardous substance must be available at all times;	Contractor	Provide an appropriate spill kit for the project for the use of hazardous substances	During the Construction Phase	ECO	Monthly, and as and when required	Appropriate spill kits are available for use
– The responsible operator must have the required training to make use of the spill kit in emergency situations;	cEO and Contractor	Provide training on the use of spill kits to the relevant employees	Pre-construction	ECO	Once, prior to the commencement of construction	Proof of training to be provided by the contractor
– An appropriate number of spill kits must be available and must be located in all areas where activities are being undertaken;	cEO and Contractor	Provide an appropriate number of spill kits in relevant areas	During the Construction Phase	ECO	Monthly	Proof of appropriate number of spill kits in

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
						appropriate areas to be provided by the contractor
<p>– In the event of a spill, contaminated soil must be collected in containers and stored in a central location and disposed of according to the National Environmental Management: Waste Act 59 of 2008. Refer to Section 5.7 for procedures concerning storm and waste water management and 5.8 for solid and hazardous waste management.</p>	cEO and Contractor	Storage and disposal of contaminated soil must be in accordance with the National Environmental Management: Waste Act and sections 5.7 and 5.8 of this EMPr	During the Construction Phase	ECO	Monthly, and as and when required	<p>Proof of storage and disposal in terms of the National Environmental Management: Waste Act must be provided.</p> <p>Certificates of disposal at licensed waste disposal facilities must be provided</p>

5.18 Workshop, equipment maintenance and storage

Impact management outcome: Soil, surface water and groundwater contamination is minimised.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Where possible and practical all maintenance of vehicles and equipment must take place in the workshop area;	Contractor	Demarcate specific areas for the maintenance of vehicles and equipment	During the Construction Phase	ECO	Monthly	A dedicated area for the maintenance of vehicles and machinery is used.
– During servicing of vehicles or equipment, especially where emergency repairs are effected outside the workshop area, a suitable drip tray must be used to prevent spills onto the soil. The relevant local authority must be made aware of a fire as soon as it starts;	Contractor	Ensure that a drip tray is available for any emergency repairs required	During the Construction Phase	ECO	Monthly	Contractor to provide evidence of drip tray use for emergency repairs
– Leaking equipment must be repaired immediately or be removed from site to facilitate repair;	Contractor	Ensure that where leaking equipment is identified it is repaired immediately or removed from site for repairs	During the Construction Phase	ECO	Monthly	Contractor to provide details of equipment repaired or removed from site
– Workshop areas must be monitored for oil and fuel spills;	cEO	Undertake regular inspections of the workshop areas for oil and fuel spills	During the Construction Phase	ECO	Monthly	Register of inspection

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		and keep an updated register of inspection on site				
– Appropriately sized spill kit kept onsite relevant to the scale of the activity taking place must be available;	Contractor	Provide an appropriate spill kit for the project	During the Construction Phase	ECO	Monthly, and as and when required	Appropriate spill kits are available for use
– The workshop area must have a bunded concrete slab that is sloped to facilitate runoff into a collection sump or suitable oil / water separator where maintenance work on vehicles and equipment can be performed;	Contractor	Ensure that the workshop area is sufficiently bunded in accordance with the required specification	During the Construction Phase	ECO	Once, during the Construction Phase and as and when required	Workshop area is bunded in accordance with the required specification
– Water drainage from the workshop must be contained and managed in accordance Section 5.7: Storm and waste water management.	Contractor	Ensure that water drainage from workshop area is managed as per the requirements of section 5.7	During the Construction Phase	ECO	Monthly	Workshop drainage is managed in accordance with the requirements

5.19 Batching plants

Impact management outcome: Minimise spillages and contamination of soil, surface water and groundwater.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- Concrete mixing must be carried out on an impermeable surface;	Contractor	Provide impermeable surface for the mixing of concrete	During the Construction Phase	cEO	Weekly	No concrete mixing is undertaken on open ground
- Batching plants areas must be fitted with a containment facility for the collection of cement laden water.	Contractor	Implement measures for the control and management of cement laden water	During the construction phase	cEO	Weekly	No mismanagement of laden water due to the temporary concrete batching plant
- Dirty water from the batching plant must be contained to prevent soil and groundwater contamination	Contractor	Implement measures for the control and management of dirty water to prevent soil and groundwater contamination	During the construction phase	cEO	Weekly	No mismanagement of dirty water due to the temporary concrete batching plant and no/minimal soil and

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
						groundwater contamination
– Bagged cement must be stored in an appropriate facility and at least 10 m away from any water courses, gullies and drains;	Contractor	Demarcate and provide a storage area for bagged cement in-line with the listed requirements	During the Construction Phase	cEO	Weekly	Photographic proof of bagged cement stored within the demarcated area
– A washout facility must be provided for washing of concrete associated equipment. Water used for washing must be restricted;	Contractor	Provide a washout facility for the washing of associated equipment. Enforce limitations on water use for washing of equipment	During the Construction Phase	cEO	Weekly	No cement laden water is released into the environment. Only minimal water is used for washing
– Hardened concrete from the washout facility or concrete mixer can either be reused or disposed of at an appropriate licensed disposal facility;	Contractor	Make use of hardened concrete where possible or dispose of concrete in a suitable manner	During the Construction Phase	ECO	Monthly	Certificates of disposal of concrete at licensed waste disposal facility
– Empty cement bags must be secured with adequate binding material if these will be temporarily stored on site;	Contractor	Bind empty cement bags and temporarily store it	During the Construction Phase	ECO	Monthly	Proof of binding of empty cement bags

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		in an appropriate area on site				and storage in an appropriate area on site to be provided by the Contractor
– Sand and aggregates containing cement must be kept damp to prevent the generation of dust (Refer to Section 5.20: Dust emissions)	Contractor	Ensure that sand and aggregates are kept damp or otherwise protected from dust generation	During the Construction Phase	ECO	Monthly	Proof of damping (or alternative dust suppression) of sand and aggregates must be provided by the Contractor
– Any excess sand, stone and cement must be removed or reused from site on completion of construction period and disposed at a registered disposal facility;	Contractor	Ensure that all excess sand, stone and cement is removed or reused	At the completion of the Construction Phase	ECO	Once, with the completion of construction	Certificates for the disposal of sand, stone and cement at licensed waste disposal facilities or proof of reuse must be provided

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Temporary fencing must be erected around batching plants in accordance with Section 5.5: Fencing and gate installation.	Contractor	Erect Temporary fencing	During the construction phase	cEO	Weekly	Temporary fencing around batching plants

5.20 Dust emissions

Impact management outcome: Dust prevention measures are applied to minimise the generation of dust.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Take all reasonable measures to minimise the generation of dust as a result of project development activities to the satisfaction of the ECO;	Contractor	Apply appropriate dust suppressant	During the Construction Phase	cEO	Weekly	Contractor to provide proof of use of appropriate dust suppressants
– Removal of vegetation must be avoided until such time as soil stripping is required and similarly exposed surfaces must be re-vegetated or stabilised as soon as is practically possible;	Contractor	Proper planning for vegetation removal must be undertaken as well as for the associated rehabilitation	During the Construction Phase and Rehabilitation	cEO	Weekly	Plan for implementation must be provided by the Contractor

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Excavation, handling and transport of erodible materials must be avoided under high wind conditions or when a visible dust plume is present;	Contractor	Ensure that specific limitations are placed on the transport and handling of erodible materials during high wind conditions or when a visible dust plume is present	During the Construction Phase	cEO	Bi-weekly (every second week)	No complaints submitted in this regard
– During high wind conditions, the ECO must evaluate the situation and make recommendations as to whether dust-damping measures are adequate, or whether working will cease altogether until the wind speed drops to an acceptable level;	ECO	ECO to provide adequate recommendations	During the Construction Phase	Not Applicable		
– Where possible, soil stockpiles must be located in sheltered areas where they are not exposed to the erosive effects of the wind;	Contractor	Place soil stockpiles in areas less affected by wind	During the Construction Phase	cEO and ECO	Bi-weekly (every second week) Monthly	Soil stockpiles are not exposed to wind and have not been eroded
– Where erosion of stockpiles becomes a problem, erosion control measures must be implemented at the discretion of the ECO;	Contractor in consultation with the ECO	Contractor to implement erosion control measures as recommended and agreed with the ECO	During the Construction Phase	cEO	Weekly, until erosion is no longer a problem	Recommendations made by the ECO have been implemented by the Contractor

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- Vehicle speeds must not exceed 40 km/h along dust roads or 20 km/h when traversing unconsolidated and non-vegetated areas;	cEO / dEO / contractor	Inform all drivers of speed limits and place appropriate signage along the relevant roads	During the Construction Phase Operation Phase	ECO Operation and Maintenance team	Monthly	No complaints from community members are submitted
- Straw stabilisation must be applied at a rate of one bale/10 m ² and harrowed into the top 100 mm of top material, for all completed earthworks;	Contractor	Ensure that straw stabilisation is undertaken as per the listed requirements	During the Construction Phase	ECO	Monthly	Photographic record of all straw stabilisation undertaken
- For significant areas of excavation or exposed ground, dust suppression measures must be used to minimise the spread of dust.	Contractor	Appropriate dust suppressant measures are implemented	During the Construction Phase	cEO	Weekly	Photographic record of measures being implemented and the results thereof

5.21 Blasting

Impact management outcome: Impact to the environment is minimised through a safe blasting practice.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- Any blasting activity must be conducted by a suitably licensed blasting contractor; and	Not Applicable – no blasting proposed.					
- Notification of surrounding landowners, emergency services site personnel of blasting activity 24 hours prior to such activity taking place on Site.	Not Applicable – no blasting proposed.					

5.22 Noise

Impact Management outcome: Prevent unnecessary noise to the environment by ensuring that noise from development activity is mitigated.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- The Contractor must keep noise level within acceptable limits, Restrict the use of sound amplification equipment for communication and emergency only;	Contractor	Ensure that noise limits do not exceed acceptable limits and avoid the use of amplification communication	During the Construction Phase	ECO	Monthly, and as and when required	No complaints registered in this regard. No amplification equipment is used.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All vehicles and machinery must be fitted with appropriate silencing technology and must be properly maintained;	Contractor	Provide and implement silencing technology	During the Construction Phase	ECO	Monthly, and as and when required	No complaints registered in this regard. Silencing technology is utilised.
– Any complaints received by the Contractor regarding noise must be recorded and communicated. Where possible or applicable, provide transport to and from the site on a daily basis for construction workers;	cEO	Update complaints register. Provide daily transport to and from site for employees	During the Construction Phase	ECO	Monthly, and as and when required	Complaints register provided by the cEO and proof of transportation services provided
– Develop a Code of Conduct for the construction phase in terms of behaviour of construction staff. Operating hours as determined by the environmental authorisation are adhered to during the development phase. Where not defined, it must be ensured that development activities must still meet the impact management outcome related to noise management.	cEO and Contractor in consultation with the ECO	Compile a Code of Conduct for staff. Appropriate operating hours must be identified for the project.	Pre-construction and Construction	ECO	Once, prior to the commencement of construction	No complaints registered in this regard.

5.23 Fire prevention

Impact management outcome: Prevention of uncontrollable fires.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Designate smoking areas where the fire hazard could be regarded as insignificant;	cEO / Contractor	Identify and demarcate through signage designated smoking areas	Pre-construction & Construction	ECO	Monthly	Photographic record of designated smoking area
– Firefighting equipment must be available on all vehicles located on site;	cEO / dEO in consultation with the Contractor	Provide all vehicles with firefighting equipment	Construction	ECO	Monthly	All vehicles are fitted with firefighting equipment and the details thereof are provided by the cEO
– The local Fire Protection Agency (FPA) must be informed of construction activities;	cEO in consultation with the ECO	Undertake formal consultation to inform the local FPA of the associated construction activities	Pre-construction	ECO	Once, during the commencement of the Construction Phase	Proof of consultation with the FPA
– Contact numbers for the FPA and emergency services must be communicated in environmental awareness training and displayed at a central location on site;	dEO / cEO / Contractor in	Develop environmental awareness training	Pre-construction & Construction	ECO	Prior to the commencement of the	Environmental awareness training

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
	consultation with the ECO	material which covers the contact numbers for the FPA and emergency services. Place the contact numbers for the FPA and emergency services at a visible and central location			environmental awareness training and once during the construction phase	material requirements checklist and photographic record of contact numbers on display
- Two way swop of contact details between ECO and FPA.	ECO	Consultation between the ECO and FPA in order to exchange contact details	Pre-construction	Not Applicable		

5.24 Stockpiling and stockpile areas

Impact management outcome: Reduce erosion and sedimentation as a result of stockpiling.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- All material that is excavated during the project development phase (either during piling (if required) or earthworks) must be stored appropriately on site in order to minimise impacts to watercourses, watercourses and water bodies;	Contractor	Identify and demarcate an appropriate location for the storage of excavated materials	Pre-construction & Construction	ECO	Monthly	Excavated material is not stored within sensitive environmental areas
- All stockpiled material must be maintained and kept clear of weeds and alien vegetation growth by undertaking regular weeding and control methods;	Contractor	Implement appropriate and sufficient maintenance on stockpiled material regularly	During the Construction Phase	cEO ECO	Bi-weekly (every second month) Monthly	Stockpiled material is maintained sufficiently and is clear of weeds and alien vegetation
- Topsoil stockpiles must not exceed 2 m in height;	Contractor	Enforce limitations for the height of topsoil stockpiles	During the Construction Phase	cEO ECO	Bi-weekly (every second month) Monthly	Topsoil stockpiles do not exceed 2m in height
- During periods of strong winds and heavy rain, the stockpiles must be covered with appropriate material (e.g. cloth, tarpaulin etc.);	Contractor	Appropriate material must be provided in order to cover stockpiles when required	During the Construction Phase	ECO	Monthly	Contractor to provide proof of availability of appropriate material to cover stockpiles when required

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Where possible, sandbags (or similar) must be placed at the bases of the stockpiled material in order to prevent erosion of the material.	Contractor	Sandbags must be provided in order to prevent erosion of stockpiled materials	During the Construction Phase	ECO	Monthly	Contractor to provide proof of availability of sandbags to prevent erosion of stockpiled materials

5.25 Civil works

Impact management outcome: Impact to the environment minimised during civil works to create the substation terrace.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Where terracing is required, topsoil must be collected and retained for the purpose of re-use later to rehabilitate disturbed areas not covered by yard stone;	Contractor	Collection and safe storage of topsoil for later use in rehabilitation phase	During the Construction Phase	ECO	Monthly	Visual inspection of topsoil stockpiles for later use
– Areas to be rehabilitated include terrace embankments and areas outside the high voltage yards;	Contractor	Regard areas that do not house infrastructure as requiring rehabilitation and apply	During the Construction Phase, where the area is no longer going to be utilised	ECO	Monthly	Visual inspection of rehabilitation implementation to ensure these areas

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		rehabilitation measures to these regions				are being rehabilitated
– Where required, all sloped areas must be stabilised to ensure proper rehabilitation is effected and erosion is controlled;	Contractor	If required stabilise soil using recognised methods to ensure proper rehabilitation and erosion control	Duration of the construction phase	ECO	Monthly	Visual inspection of stabilised soil regions and descriptions of staff of stabilisation method used
– These areas can be stabilised using design structures or vegetation as specified in the design to prevent erosion of embankments. The contract design specifications must be adhered to and implemented strictly;	Contractor	If required stabilise soil using recognised methods to ensure proper rehabilitation and erosion control	Duration of the construction phase	ECO	Monthly	Visual inspection of stabilised soil regions and descriptions of staff of stabilisation method used
– Rehabilitation of the disturbed areas must be managed in accordance with Section 5.35: Landscaping and rehabilitation ;	Contractor	Review and ensure that all rehabilitation measures are implemented in accordance with the requirements of Section 5.35	Duration of the construction phase	ECO	Monthly	Visual inspection of rehabilitation conducted and the degree of conformance with the requirements set out in Section 35.5 of this report

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- All excess spoil generated during terracing activities must be disposed of in an appropriate manner and at a recognised landfill site; and	Contractor	Dispose of all excess spoil using appropriate means and at recognised landfill sites. Keep written registers of the disposal conducted	Duration of the construction phase	ECO	Monthly	Evidence of disposal slips as applicable kept in the site environmental file
- Spoil can however be used for landscaping purposes and must be covered with a layer of 150 mm topsoil for rehabilitation purposes.	Contractor	Where spoil is utilised for landscaping purposes implement a 150mm topsoil layer on top following shaping and compaction to promote rehabilitation	Duration of the construction phase	ECO	Monthly	Spoil material used in landscaping is suitably covered with a later of topsoil at least 150mm deep

5.26 Excavation of foundation, cable trenching and drainage systems

Impact management outcome: No environmental degradation occurs as a result of excavation of foundation, cable trenching and drainage systems.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- All excess spoil generated during foundation excavation must be disposed of in an appropriate manner and at a licensed landfill site, if not used for backfilling purposes;	Contractor	Use a licensed waste disposal facility for the disposal of excess spoil	During the Construction Phase	ECO	Monthly	Certificates obtained for the disposal of excess spoil at a licensed waste disposal facility
- Spoil can however be used for landscaping purposes and must be covered with a layer of 150 mm topsoil for rehabilitation purposes;	Contractor	Spoil used for landscaping must be applied as per the listed requirements	Construction and Rehabilitation	ECO	Monthly	Photographic record of spoil used for landscaping purposes as well as feedback from the contractor
- Management of equipment for excavation purposes must be undertaken in accordance with Section 5.18: Workshop, equipment maintenance and storage ; and	Contractor	Undertake the management of equipment for excavation as per the requirements of section 5.18	During the Construction Phase	ECO	Monthly	Management of equipment is undertaken in line with the requirements of section 5.18
- Hazardous substances spills from equipment must be managed in accordance with Section 5.17: Hazardous substances .	Contractor	Undertake the management of hazardous substances spills from equipment as	During the Construction Phase	ECO	Monthly	Management of hazardous substances spills from

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		per the requirements of section 5.17				equipment is undertaken in line with the requirements of section 5.17

5.27 Installation of foundations, cable trenching and drainage systems

Impact management outcome: No environmental degradation occurs during the installation of foundation, cable trenching and drainage system.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Batching of cement to be undertaken in accordance with Section 5.19: Batching plants ; and	Contractor	Ensure correct batching of cement	During the construction phase	cEO	Weekly	Measures in place to ensure the batching of cement is done in accordance with Section 5.19: Batching plants

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Residual solid waste must be disposed of in accordance with Section 5.8: Solid waste and hazardous management.	Contractor	Undertake the disposal of residual solid waste as per the requirements of section 5.8	During the Construction Phase	ECO	Monthly	The disposal of residual solid waste is undertaken in line with section 5.8.

5.28 Installation of equipment (circuit breakers, current Transformers, Isolators, Insulators, surge arresters, voltage transformers, earth switches)

Impact management outcome: No environmental degradation occurs as a result of installation of equipment.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Management of dust must be conducted in accordance with Section 5. 20: Dust emissions;	Contractor	Review and implement dust management actions in accordance with the requirement of Section 5.20 of this report	During the Construction Phase	ECO	Monthly	Dust management actions observed to be in accordance with the requirement of Section 5.20 of this report

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Management of equipment used for installation must be conducted in accordance with Section 5.18: Workshop, equipment maintenance and storage;	Contractor	Review and implement equipment management actions in accordance with the requirement of Section 5.18 of this report	During the Construction Phase	ECO	Monthly	Equipment management actions observed to be in accordance with the requirement of Section 18 of this report
– Management hazardous substances and any associated spills must be conducted in accordance with Section 5.17: Hazardous substances; and	Contractor	Review and implement hazardous substances and any associated spills in accordance with the requirement of Section 5.17 of this report	During the Construction Phase	ECO	Monthly	Hazardous substances and any associated spills management actions observed to be in accordance with the requirement of Section 5.17 of this report
– Residual solid waste must be recycled or disposed of in accordance with Section 5.8: Solid waste and hazardous management.	Contractor	Review and dispose/recycle residual solid waste in accordance with	During the Construction Phase	ECO	Monthly	Dispose/recycle residual solid waste observed to be in

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		the requirement of Section 5.8 of this report				accordance with the requirement of Section 5.8 of this report

5.29 Steelwork Assembly and Erection

Impact management outcome: No environmental degradation occurs as a result of steelwork assembly and erection.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- During assembly, care must be taken to ensure that no wasted/unused materials are left on site e.g. bolts and nuts	Contractor	Conduct an inspection of the site once assembly is complete to remove all stray bolts or unused materials that may be left on site	Duration of the construction phase	ECO	Monthly	Evidence of leftover waste/unused materials on site following closure of assembly
- Emergency repairs due to breakages of equipment must be managed in accordance with Section 5.18: Workshop, equipment maintenance and storage and Section 5.16: Emergency procedures.	Contractor	Review and conduct all emergency repairs in accordance with	Duration of the construction phase	ECO	Monthly	Evidence of emergency repairs carried out

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		Sections 5.18 and 5.16 of this report				having been conducted in accordance with Sections 5.18 and 5.16 of this report

5.30 Cabling and Stringing

Impact management outcome: No environmental degradation occurs as a result of stringing.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Residual solid waste (off cuts etc.) shall be recycled or disposed of in accordance with Section 6.8: Solid waste and hazardous Management;	Contractor	Undertake recycling or disposal of solid waste as per the requirements of section 6.8	During the Construction Phase	ECO	Monthly	Undertake recycling or disposal of solid waste as per the requirements of section 6.8
– Management of equipment used for installation shall be conducted in accordance with Section 5.18: Workshop, equipment maintenance and storage;	Contractor	Undertake the management of equipment as per the requirements of section 5.18	During the Construction Phase	ECO	Monthly	Management of equipment is undertaken in line with the requirements

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
						of section 5.18
– Management hazardous substances and any associated spills shall be conducted in accordance with Section 5.17: Hazardous substances.	Contractor	Undertake the management of hazardous substances as per the requirements of section 5.17	During the Construction Phase	ECO	Monthly	Management of hazardous substances is undertaken in line with the requirements of section 5.17

5.31 Testing and Commissioning (all equipment testing, earthing system, system integration)

Impact management outcome: No environmental degradation occurs as a result of Testing and Commissioning.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Residual solid waste must be recycled or disposed of in accordance with Section 5.8: Solid waste and hazardous management.	Contractor	Undertake recycling or disposal of solid waste as per the requirements of section 5.8	During the Construction Phase	ECO	Monthly	Undertake recycling or disposal of solid waste as per the requirements of section 5.8

5.32 Socio-economic

Impact management outcome: enhanced socio-economic development.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- Develop and implement communication strategies to facilitate public participation;	dEO / cEO	Identify and implement appropriate strategies for communication with the communities through consideration of the community needs	Pre-construction & Construction	ECO	Once, prior to the commencement of construction and monthly during the construction	Communication is undertaken as per the identified strategies and no complaints are submitted regarding communication
- Develop and implement a collaborative and constructive approach to conflict resolution as part of the external stakeholder engagement process;	Contractor	Development and implement a Grievance Mechanism which considers the community needs and provides procedures for conflict resolution	Pre-construction & Construction	ECO	Once, prior to the commencement of construction and monthly during the construction phase	Conflict resolution is undertaken in line with the requirements of the Grievance Mechanism. No complaints on conflict resolution is submitted by

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
						the community
– Sustain continuous communication and liaison with neighboring owners and residents	Contractor	Development and implementation and Grievance Mechanism provides procedures for communication / liaison with neighbouring landowners and residents	Pre-construction & Construction	ECO	Once, prior to the commencement of construction and monthly during the construction phase	Communication / liaison with neighbouring landowners and residents are undertaken in line with the requirements of the Grievance Mechanism. No complaints on communication with neighbouring landowners and residents are submitted
– Create work and training opportunities for local stakeholders; and	Contractor	Develop and implement a “locals first” policy for the provision of employment opportunities	Pre-construction & Construction	ECO	Once, prior to the commencement of construction and	The “locals first” policy is considered in terms of the employment

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
					monthly during the construction phase	and training opportunities
– Where feasible, no workers, with the exception of security personnel, must be permitted to stay over-night on the site. This would reduce the risk to local farmers.	Not applicable –no on-site housing is envisaged with daily commute to and from site expected of construction staff.					

5.33 Temporary closure of site

Impact management outcome: Minimise the risk of environmental impact during periods of site closure greater than five days.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Bunds must be emptied (where applicable) and need to be undertaken in accordance with the impact management actions included in sections 5.17: Hazardous substances and 5.18: Workshop, equipment maintenance and storage ;	Contractor	Regular emptying of the bunds must be undertaken. This must be undertaken as per the requirements listed in sections 5.17 and 5.18	During the Construction Phase	ECO	Prior to site closure for more than 05 days	Bunds are emptied as per the requirements listed under sections 5.17 and 5.18
– Hazardous storage areas must be well ventilated;	Contractor	Install appropriate ventilation in all hazardous storage areas	During the construction phase	ECO	Prior to site closure for more than 05 days	Effective ventilation is installed in

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
						hazardous storage areas
– Fire extinguishers must be serviced and accessible. Service records to be filed and audited at last service;	Contractor / cEO	Ensure fire extinguishers are serviced, as required and are easily accessible with appropriate signage indicating location. Ensure service records and kept up to date and filed	During the Construction Phase	ECO	Prior to site closure for more than 05 days	Signage placed indicating location of fire extinguishers and service records
– Emergency and contact details displayed must be displayed;	Contractor / cEO	Place emergency and contact details which are readily available and easily accessible	During the Construction Phase	ECO	Prior to site closure for more than 05 days	Photographic proof of contact details on display
– Security personnel must be briefed and have the facilities to contact or be contacted by relevant management and emergency personnel;	Contractor in consultation with the ECO	Hold a workshop with all security personnel to provide a brief of the project and security requirements. Provide facilities in order to contact management and emergency personnel	Pre-construction & construction	ECO	Prior to site closure for more than 05 days	Proof of the workshop held must be kept on file by the contractor.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Night hazards such as reflectors, lighting, traffic signage etc. must have been checked;	Contractor	Regular checks of night hazards must be undertaken	During the Construction Phase	ECO	Prior to site closure for more than 05 days	Proof of checks of night hazards must be provided by the contractor
– Fire hazards identified and the local authority must have been notified of any potential threats e.g. large brush stockpiles, fuels etc.;	cEO / Contractor in consultation with the ECO	Identify any potential fire hazards and notify the relevant local authority	During the Construction Phase	ECO	Prior to site closure for more than 05 days	Proof of notification of the fire hazards to the local authority must be provided by the Contractor
– Structures vulnerable to high winds must be secured;	Contractor	Ensure structures vulnerable to wind are secure prior to site closure	During the Construction Phase	ECO	Prior to site closure for more than 05 days	Structures vulnerable to wind are secured prior to site closure
– Wind and dust mitigation must be implemented;	Contractor	Implement wind and dust mitigation prior to site closure	During the Construction Phase	ECO	Prior to site closure for more than 05 days	Wind and dust mitigation is implemented prior to site closure
– Cement and materials stores must have been secured;	Contractor	Ensure cement and material stores	During the Construction Phase	ECO	Prior to site closure for	Cement and material stores are

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		are secured prior to site closure			more than 05 days	secured prior to site closure
- Toilets must have been emptied and secured;	Contractor	Ensure toilets are emptied and secured prior to site closure	During the Construction Phase	ECO	Prior to site closure for more than 05 days	Toilets are emptied and secured prior to site closure
- Refuse bins must have been emptied and secured;	Contractor	Ensure refuse bins are emptied and secured prior to site closure	During the Construction Phase	ECO	Prior to site closure for more than 05 days	Refuse bins are emptied and secured prior to site closure
- Drip trays must have been emptied and secured.	Contractor	Ensure drip trays are emptied and secured prior to site closure	During the Construction Phase	ECO	Prior to site closure for more than 05 days	Drip trays are emptied and secured prior to site closure

5.34 Dismantling of old equipment

Impact management outcome: Impact to the environment to be minimised during the dismantling, storage and disposal of old equipment commissioning.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- All old equipment removed during the project must be stored in such a way as to prevent pollution of the environment	Contractor	Ensure old equipment is secured and	During the Construction Phase	ECO	Monthly	Drip trays are emptied and

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		where required, stored in contained areas where no spillage or pollution may result				secured prior to site closure
– Oil containing equipment must be stored to prevent leaking or be stored on drip trays;	Contractor	Ensure old equipment is secured and where required, stored in contained areas where no spillage or pollution may result	During the Construction Phase	ECO	Monthly	Drip trays are emptied and secured prior to site closure
– All scrap steel must be stacked neatly and any disused and broken insulators must be stored in containers;	Contractor	Store defunct insulators in containers and scrap steel in one single place, neatly secured	During the Construction Phase	ECO	Monthly	Where needed, insulators observed to be stored in containers and scrap stored neatly as determined by the ECO
– Once material has been scrapped and the contract has been placed for removal, the disposal Contractor must ensure that any equipment containing pollution causing substances is dismantled and transported in such a way as to prevent spillage and pollution of the environment;	Contractor , cEO	Ensure dismantling and packaging of scrapped material is transported in such a way as to	During the Construction Phase	ECO	Monthly	Where needed, insulators observed to be stored in

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		prevent spillage and pollution of the environment;				containers and scrap stored neatly as determined by the ECO
- The Contractor must also be equipped to contain and clean up any pollution causing spills; and	cEO and Contractor	Provide training on the use of spill kits to the relevant employees	During the Construction Phase	ECO	Monthly	Proof of training to be provided by the contractor
- Disposal of unusable material must be at a licensed waste disposal site.	cEO and Contractor	Ensure a registered waste disposal site is utilised and keep disposal slips and record in the site environmental file	During the Construction Phase	ECO	Monthly	Visual inspection of disposal record documentation and registration of the waste disposal site utilised.

5.35 Landscaping and rehabilitation

Impact management outcome: Areas disturbed during the development phase are returned to a state that approximates the original condition.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All areas disturbed by construction activities must be subject to landscaping and rehabilitation; All spoil and waste must be disposed of to a registered waste site;	Contractor	Develop and implement a rehabilitation plan for the rehabilitation of all disturbed areas. Dispose of all spoil and waste at a licensed waste disposal facility	Pre-construction & Rehabilitation	cEO	Weekly	Rehabilitation of the disturbed areas is undertaken as per the rehabilitation plan. All certificates of waste disposal at licensed facilities are available.
– All slopes must be assessed for contouring, and to contour only when the need is identified in accordance with the Conservation of Agricultural Resources Act, No 43 of 1983	Contractor in consultation with the ECO	Assess all slopes and determine whether contouring is required	Rehabilitation	cEO	Weekly	All slopes are assessed and contoured as required
– All slopes must be assessed for terracing, and to terrace only when the need is identified in accordance with the Conservation of Agricultural Resources Act, No 43 of 1983;	Contractor in consultation with the ECO	Assess all slopes and determine whether terracing is required	Rehabilitation	cEO	Weekly	All slopes are assessed and terraced as required
– Berms that have been created must have a slope of 1:4 and be replanted with indigenous species and grasses that approximates the original condition;	Contractor	Ensure all berms have a slope of 1:4 and is replanted with indigenous species and grasses	Rehabilitation	cEO	Weekly	All berms have a slope of 1:4 and is replanted with indigenous species and grasses

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Where new access roads have crossed cultivated farmlands, that lands must be rehabilitated by ripping which must be agreed to by the holder of the EA and the landowners;	Not applicable					
– Rehabilitation of access roads outside of farmland;	Not applicable					
– Indigenous species must be used for with species and/grasses to where it compliments or approximates the original condition;	Contractor	Make use of indigenous species for rehabilitation	Rehabilitation	cEO	Weekly	Indigenous species are used for rehabilitation
– Stockpiled topsoil must be used for rehabilitation (refer to Section 5.24: Stockpiling and stockpiled areas);	Contractor	Ensure stockpiled topsoil is used as per the requirements listed under section 5.24	Rehabilitation	cEO	Weekly	Stockpiled topsoil is used as per the requirements listed under section 5.24
– Stockpiled topsoil must be evenly spread so as to facilitate seeding and minimise loss of soil due to erosion;	Contractor	Ensure that topsoil is spread evenly	Rehabilitation	cEO	Weekly	Topsoil is spread evenly
– Before placing topsoil, all visible weeds from the placement area and from the topsoil must be removed;	Contractor	Remove all visible weeds from placement area and topsoil before spreading the topsoil	Rehabilitation	cEO	Weekly	No weeds are visible in the placement area or the topsoil
– Subsoil must be ripped before topsoil is placed;	Contractor	Undertake the ripping of subsoil prior to the spreading of topsoil	Rehabilitation	cEO	Weekly	Subsoil is ripped before topsoil is placed

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– The rehabilitation must be timed so that rehabilitation can take place at the optimal time for vegetation establishment;	Contractor	Plan the timeframe for rehabilitation in order to undertake vegetation planting during the optimal time for vegetation establishment	Rehabilitation	ECO	At the start of rehabilitation to confirm correct timeframe	Rehabilitation is undertaken during the optimal time
– Where impacted through construction related activity, all sloped areas must be stabilised to ensure proper rehabilitation is effected and erosion is controlled;	Contractor	All disturbed slope areas must be stabilised	Rehabilitation	cEO	Weekly	Disturbed slopes are stabilised sufficiently
– Sloped areas stabilised using design structures or vegetation as specified in the design to prevent erosion of embankments. The contract design specifications must be adhered to and implemented strictly;	Contractor	Stabilise slopes as per the design specifications	Pre-construction & Rehabilitation	cEO	Weekly	Slopes are stabilised as per the design specifications
– Spoil can be used for backfilling or landscaping as long as it is covered by a minimum of 150 mm of topsoil.	Contractor	Spoil used for landscaping must be applied as per the listed requirements	Rehabilitation	cEO	Weekly	Photographic record of spoil used for landscaping purposes as well as feedback from the contractor
– Where required, re-vegetation including hydro-seeding can be enhanced using a vegetation seed mixture as described below. A mixture of seed can be used provided the mixture is carefully selected to ensure the following:	Contractor in consultation with a suitably	Make use of a suitable vegetation seed mixture should	Rehabilitation	ECO	As and when required	Use of a suitable vegetation seed mixture if required

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
a) Annual and perennial plants are chosen; b) Pioneer species are included; c) Species chosen must be indigenous to the area with the seeds used coming from the area; d) Root systems must have a binding effect on the soil; e) The final product must not cause an ecological imbalance in the area	qualified specialist	enhancement be required				

6 ACCESS TO THE GENERIC EMPr

Once completed and signed, to allow the public access to the generic EMPr, the holder of the EA must make the EMPr available to the public in accordance with the requirements of Regulation 26(h) of the EIA Regulations.

PART B: SECTION 2

7 SITE SPECIFIC INFORMATION AND DECLARATION

7.1 Sub-section 1: contact details and description of the project

7.1.1 Details of the applicant:

Applicant Name	Great Karoo Renewable Energy (Pty) Ltd
Contact Person	Romaya Dorasamy & Tobias Hobbach
Physical Address	53 Carlisle Street, Paarden Eiland, Cape Town, 7405
Postal Address	53 Carlisle Street, Paarden Eiland, Cape Town, 7405
Telephone	N/A
Fax	N/A
Cell	N/A
Email Address	tobias@greatkaroo.energy romaya@greatkarro.energy

7.1.2 Details and expertise of the EAP:

EAP Name	Jo-Anne Thomas
EAP Qualifications	M.Sc. (Botany)
Professional Affiliation/Registration	South African Council for Scientific Natural Professions (SACNASP): Certified Natural Scientist – Pr.Sci.Nat. (Membership No.: 117178)
Physical Address	South African Council for Natural Scientific Professions (SACNASP) – registration number: registration number 400024/00 Environmental Assessment Practitioners Association of South Africa (EAPASA) – registration number: 2019/726
Telephone	011 656 3237
Fax	086 684 0547
Cell	082 775 5628
Email Address	joanne@savannahsa.com

7.1.3 Project name: Great Karoo Electrical Grid Infrastructure, Northern Cape and Western Cape Provinces

7.1.4 Description of the project:

Great Karoo Renewable Energy (Pty) Ltd is proposing the development of a 132kV central collector substation and a 132kV double circuit power line on a site located approximately 35km south-west of Richmond and 80km south-east of Victoria West, within the Ubuntu Local

Municipality of the Pixley Ka Seme District Municipality in the Northern Cape Province. A portion (approximately 2km) of the grid corridor falls within the Beaufort West Local Municipality of the Central Karoo District in the Western Cape Province. One grid corridor has been considered for the assessment and placement of the 132kV double circuit power line. The entire extent of the site falls within the Central Corridor of the Strategic Transmission Corridors¹. The grid connection infrastructure is known as the Great Karoo Electrical Grid Infrastructure (EGI).

The development of the 132kV central collector substation and 132kV power line is required to enable the connection for the Great Karoo Cluster of Renewable Energy Facilities, which comprises three (3) 100MW Solar Photovoltaic (PV) Energy Facilities, and two (2) 140MW Wind Farms, to the national grid for the evacuation of the generated electricity. The connection point into the national grid will be the existing Eskom Gamma Substation.

The projects which the proposed grid connection infrastructure will facilitate connection for are:

- » Angora Wind Farm
- » Merino Wind Farm
- » Nku Solar PV Energy Facility
- » Moriri Solar PV Energy Facility
- » Kwana Solar PV Energy Facility

The above-mentioned renewable energy facilities are proposed in response to identified objectives of the national and provincial government, and local and district municipalities to develop renewable energy facilities for power generation purposes.

It is the developer's intention to either bid the projects under the Department of Mineral Resources and Energy's (DMRE's) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme, with the aim of evacuating the generated power into the national grid or supply the electricity to private off-takers nationally. The generated electricity will be evacuated through use of the 132kV central collector substation and 132kV double circuit power line and the national electricity grid. The development of the Great Karoo EGI will indirectly aid in the diversification and stabilisation of the country's electricity supply, in line with the objectives of the Integrated Resource Plan (IRP). As the project has the potential to impact on the environment, an Environmental Authorisation (EA) is required from the National Department of Forestry, Fisheries, and the Environment (DFFE) subject to the completion of a BA process, as prescribed in Regulations 19 and 20 of the 2014 Environmental Impact Assessment (EIA) Regulations (GNR 326), as amended.

Infrastructure associated with the Great Karoo EGI includes:

- » A 132kV collector substation with a development footprint of 19.95ha.
- » A double circuit 132kV distribution line to connect the central collector 132kV substation to the existing Eskom Gamma Substation will be constructed.

¹ The Strategic Transmission Corridors are identified by the Department of Environment, Forestry and Fisheries (DEFF) as geographical areas of strategic importance for the development of the supporting large scale electricity transmission and distribution infrastructure in terms of Strategic Integrated Project 10: Electricity Transmission and distribution. This is as per GNR113 of February 2018.

- » Temporary and permanent laydown areas.
- » Associated equipment, infrastructure and buildings.
- » A 4 -6 m wide road along the length of the power line corridor to allow for large crane movement and for maintenance purposes.

A summary of the details and dimensions of the proposed EGI is provided in **Table 1**.

Table 1: Details and dimensions of the planned infrastructure associated with the Great Karoo EGI

Infrastructure	Footprint and dimensions																																
Development footprint (permanent infrastructure area)	19.95ha																																
Capacity of the central collector substation	580MVA at 132kV																																
Corridor width (for assessment purposes)	One grid connection corridor has been identified for the assessment and placement of the grid connection infrastructure. The grid connection corridor is up to 1km wide and 37.5km long to allow for avoidance of environmental sensitivities, and suitable placement of the 132kV overhead power line within the corridor. Therefore, the entire corridor is being proposed for the development provided the infrastructure remains within the assessed corridor and environmental sensitivities are avoided.																																
Capacity and circuit of the power line	580MVA at 132kV (double circuit)																																
Power line servitude width	Up to 40m																																
Length of the grid connection corridor	Collector Sub – Gamma ~ 37.5km																																
Height of the power line towers (pylons)	Up to 41m																																
Access road	During construction, a permanent access road along the length of the power line corridor between 4 - 6m wide will be established to allow for large crane movement. This track will then be utilised for maintenance during operation.																																
A description and coordinates of the corridor in which the proposed activity or activities is to be undertaken	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3" style="background-color: #a0c0ff;">Central Collector Substation</th> </tr> <tr> <th rowspan="8" style="background-color: #e0e0e0; vertical-align: middle;">Great Karoo EGI</th> <th style="background-color: #e0e0e0;">Lat</th> <th style="background-color: #e0e0e0;">Long</th> </tr> <tr> <th colspan="2" style="background-color: #e0e0e0;">Centre Coordinates</th> </tr> <tr> <td style="text-align: center;">31°28'21.93"S</td> <td style="text-align: center;">23°38'2.75"E</td> </tr> <tr> <th colspan="2" style="background-color: #e0e0e0;">Corner Coordinates</th> </tr> <tr> <td style="text-align: center;">31°28'13.91"S</td> <td style="text-align: center;">23°37'53.22"E</td> </tr> <tr> <td style="text-align: center;">31°28'11.83"S</td> <td style="text-align: center;">23°38'20.01"E</td> </tr> <tr> <td style="text-align: center;">31°28'28.91"S</td> <td style="text-align: center;">23°38'21.02"E</td> </tr> <tr> <td style="text-align: center;">31°28'33.05"S</td> <td style="text-align: center;">23°37'33.58"E</td> </tr> </thead> <tbody> <tr> <th colspan="3" style="background-color: #a0c0ff;">Grid Corridor</th> </tr> <tr> <th style="background-color: #e0e0e0;">Point</th> <th colspan="2" style="background-color: #e0e0e0;">Latitude</th> </tr> <tr> <td style="text-align: center;">Start Point</td> <td colspan="2" style="text-align: center;">31°27'54.54"S</td> </tr> <tr> <td style="text-align: center;">Middle Point</td> <td colspan="2" style="text-align: center;">31°34'0.85"S</td> </tr> </tbody> </table>	Central Collector Substation			Great Karoo EGI	Lat	Long	Centre Coordinates		31°28'21.93"S	23°38'2.75"E	Corner Coordinates		31°28'13.91"S	23°37'53.22"E	31°28'11.83"S	23°38'20.01"E	31°28'28.91"S	23°38'21.02"E	31°28'33.05"S	23°37'33.58"E	Grid Corridor			Point	Latitude		Start Point	31°27'54.54"S		Middle Point	31°34'0.85"S	
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Grid Corridor																																	
Point	Latitude																																
Start Point	31°27'54.54"S																																
Middle Point	31°34'0.85"S																																
Substation coordinates (approximate centre point and corner points)																																	

Infrastructure	Footprint and dimensions		
	End Point	31°42'0.68"S	23°24'5.71"E

7.2 Sub-section 2: Development footprint site map

This sub-section must include a map of the site sensitivity overlaid with the preliminary infrastructure layout. The sensitivity map must be prepared from the national web based environmental screening tool, when available for compulsory use at: <https://screening.environment.gov.za/screeningtool>. The sensitivity map shall identify the nature of each sensitive feature e.g., threatened plant species, archaeological site, etc. Sensitivity maps shall identify features both within the planned working area and any known sensitive features within 50 m from the development footprint.

The national web-based environmental screening tool was utilised for this project and the Merino Wind Farm sensitivity maps can be seen in Figures 2 to 10. The site-specific environmental sensitivity map included in the EIA Report is included as Figure 1.

Site sensitivity

A combined sensitivity map for the grid connection corridor is provided below. This has been compiled based on the specialist sensitivities determined from their respective studies, and therefore aims to represent the entirety of the site and the combined sensitivities. The following environmental sensitivities were noted on site (refer to **Figure 1**):

- » **Terrestrial Ecology:** Sensitivities that occur within the grid connection corridor include:
 - * Drainage lines/CBA1 (high – very high sensitivity)
 - * Mountain slopes (medium – high sensitivity)
 - * □ Karroid plains (medium sensitivity)
 - * Infrastructure (roads) (low sensitivity)
- » **Aquatic Ecology:** The drainage lines and rivers that traverse the grid connection corridor are considered to be of high sensitivity and a 15m no-go buffer has been recommended around these features.
- » **Avifauna:** At a site-specific level, environmentally sensitive features present within the proposed study area include the existing eagle nests, in addition to permanent and ephemeral waterbodies. These areas are classified as areas of HIGH sensitivity. Construction in the areas containing eagle nests will need to be carefully managed to ensure minimal disturbance to the breeding birds and/or their progeny. The construction of the proposed power line across or within close proximity to the waterbodies will necessitate the marking of the power line with bird flight diverters to mitigate the collision impact. The remainder of the study area is considered to be of MEDIUM sensitivity, given its propensity to support Ludwig's Bustard.
- » **Heritage:** A total of thirty (30) archaeological heritage resources and six (6) palaeontological heritage resources were identified during the survey of the grid connection corridor and substation footprint. None of the identified heritage resources are regarded to be conservation worthy or of significance and as such, no buffers have been recommended around these sites.

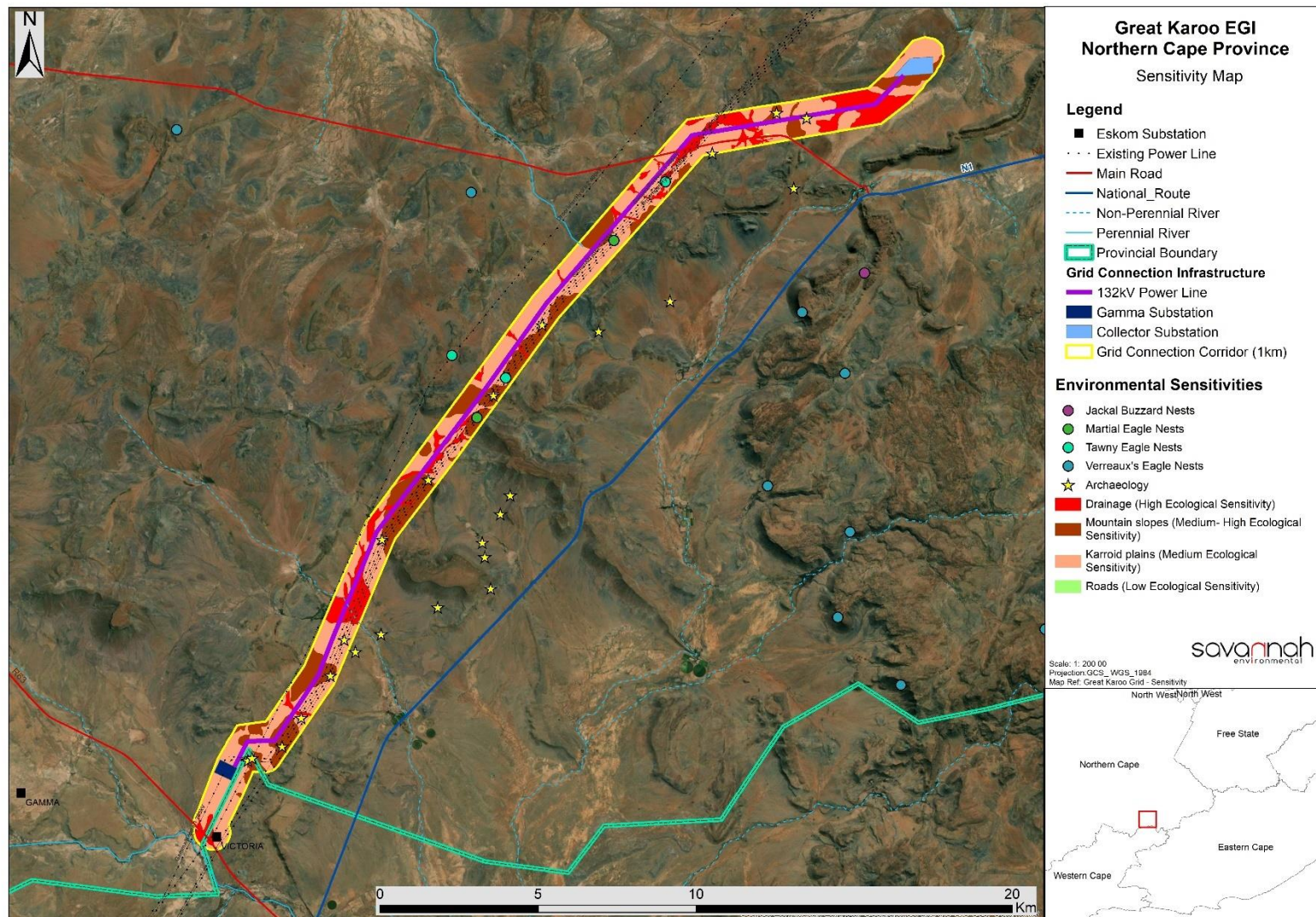


Figure 1: Environmental sensitivity map showing the grid connection corridor and collector substation location

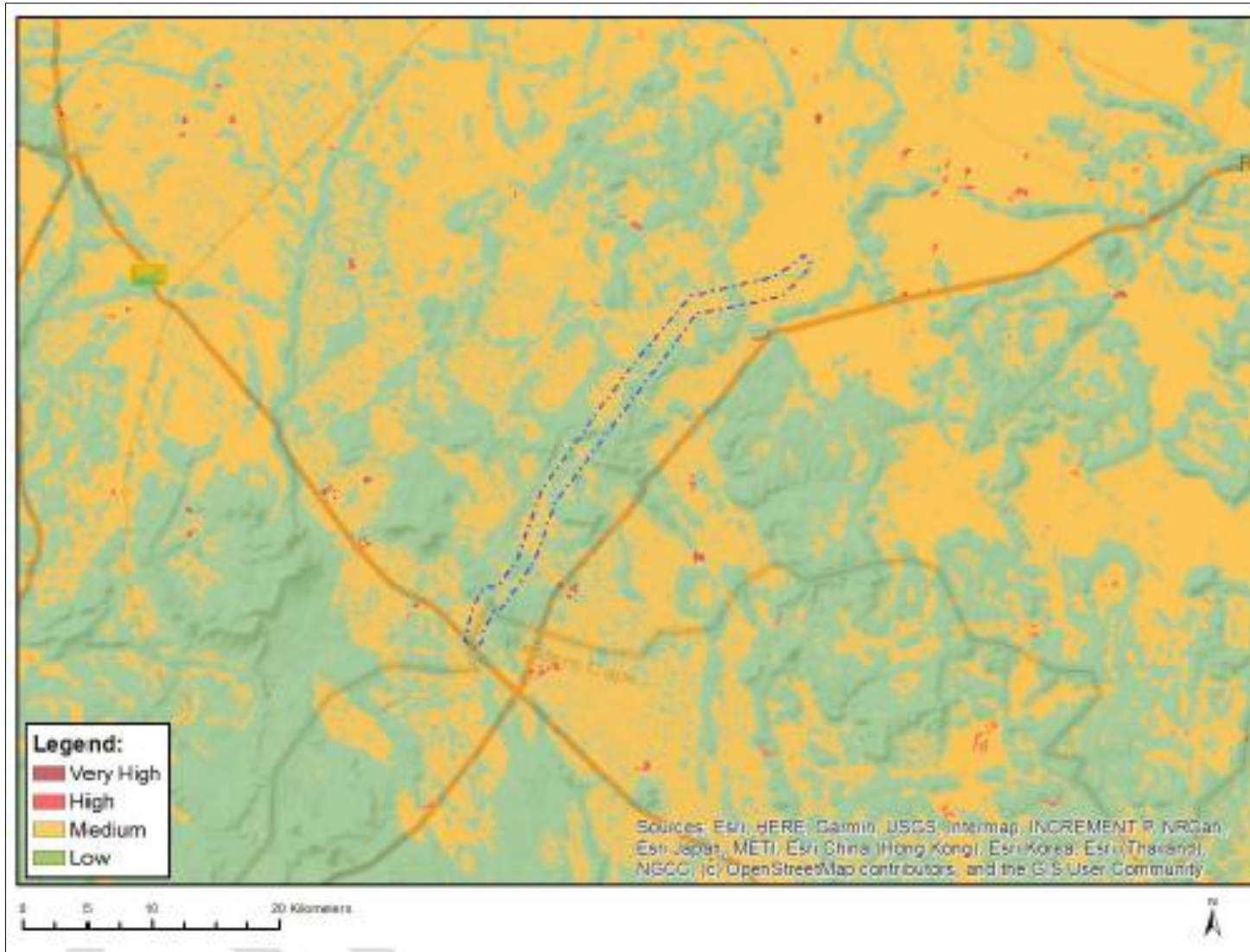


Figure 2: Map of relative agriculture theme sensitivity

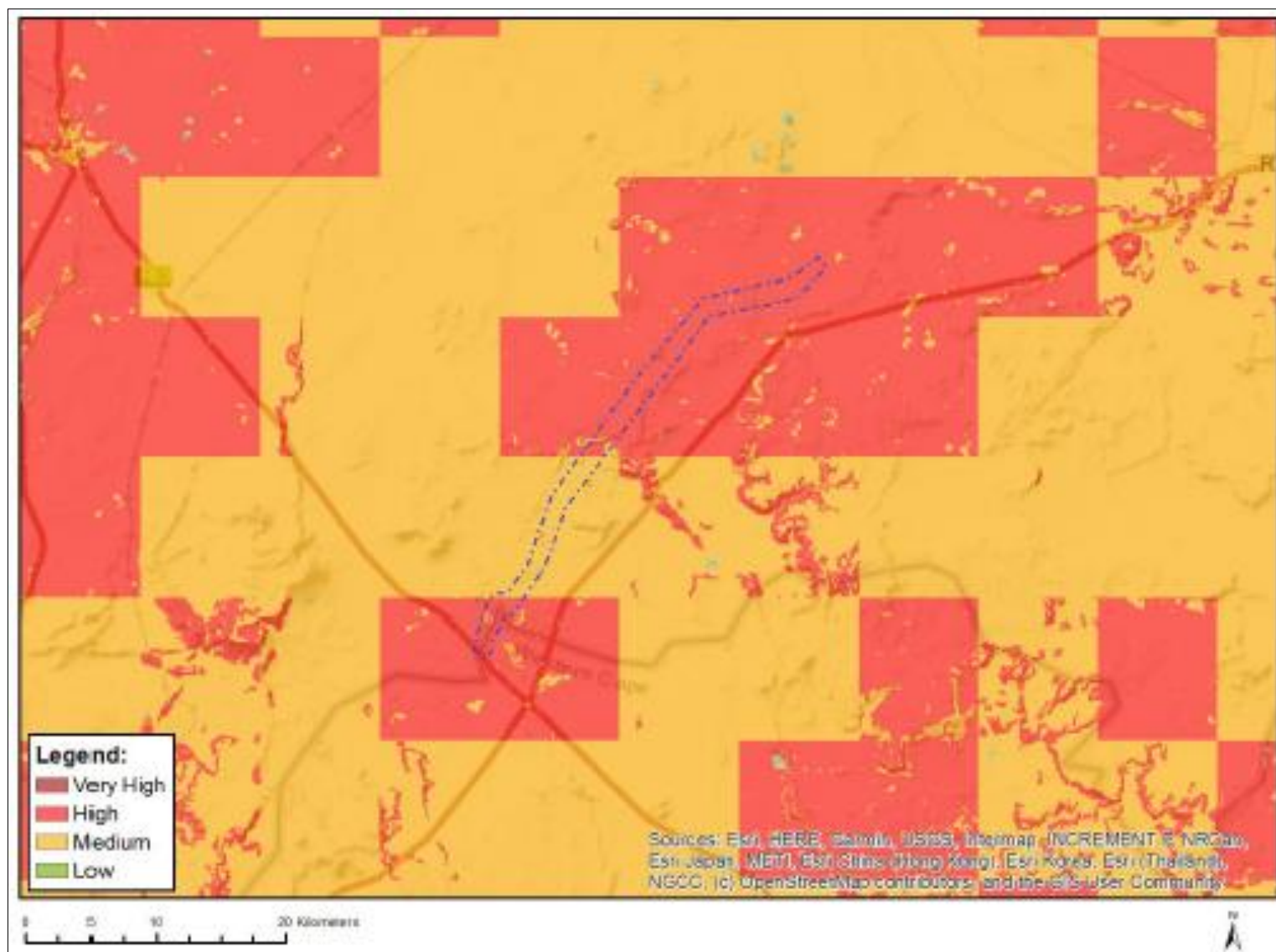


Figure 3: Map of relative animal species theme sensitivity

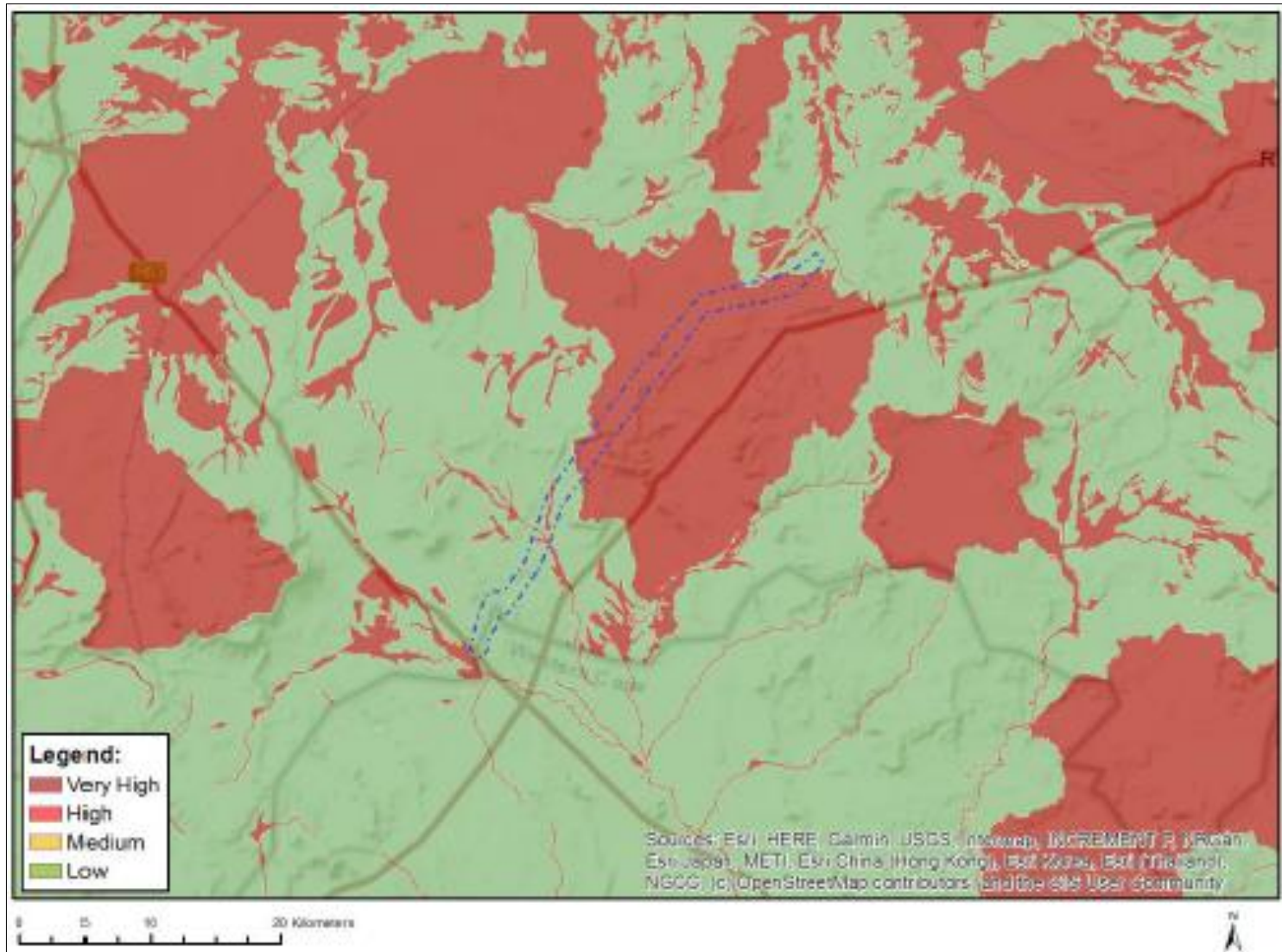


Figure 4: Map of relative aquatic biodiversity theme sensitivity

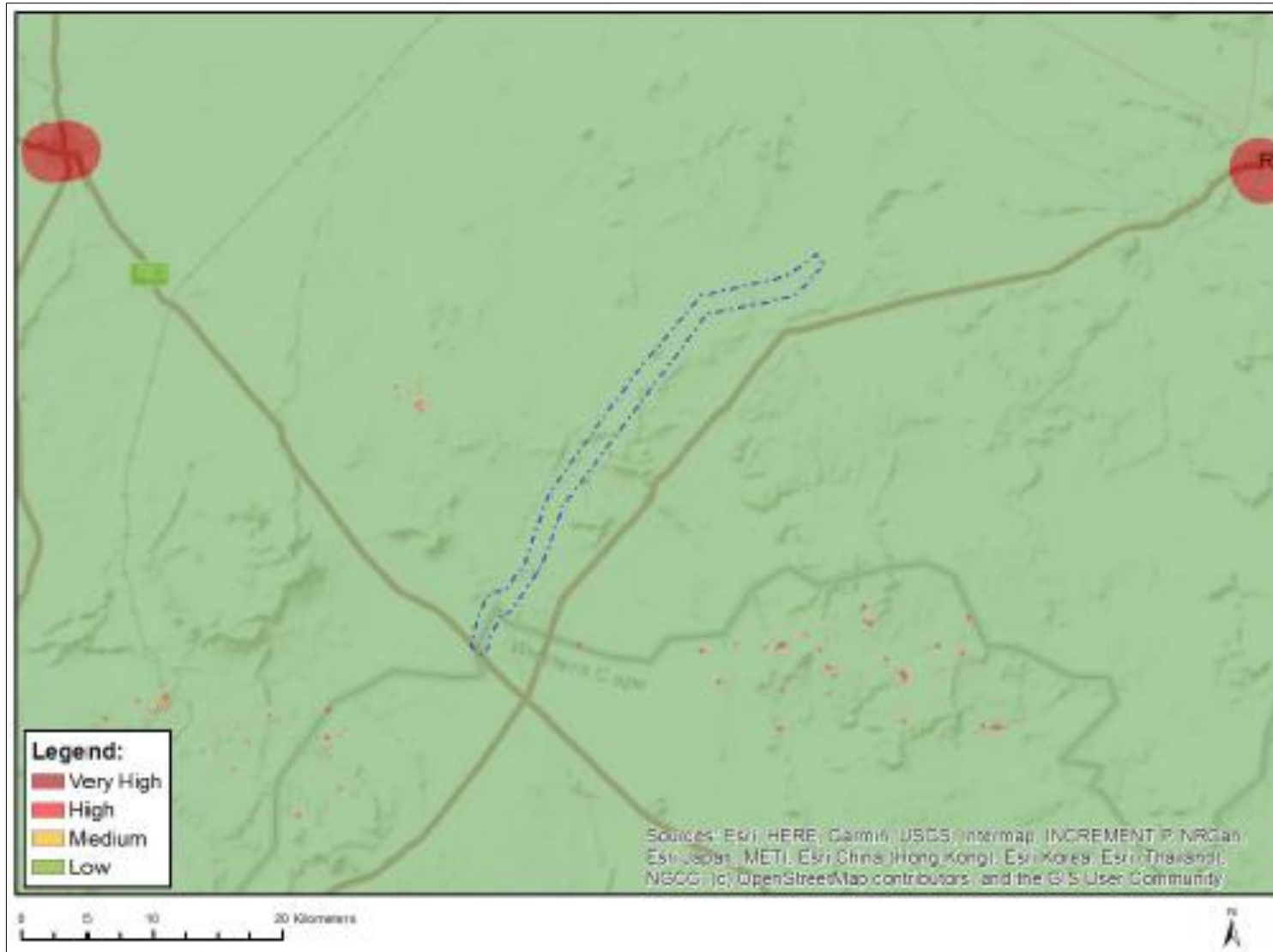


Figure 5: Map of relative archaeological and cultural heritage theme sensitivity

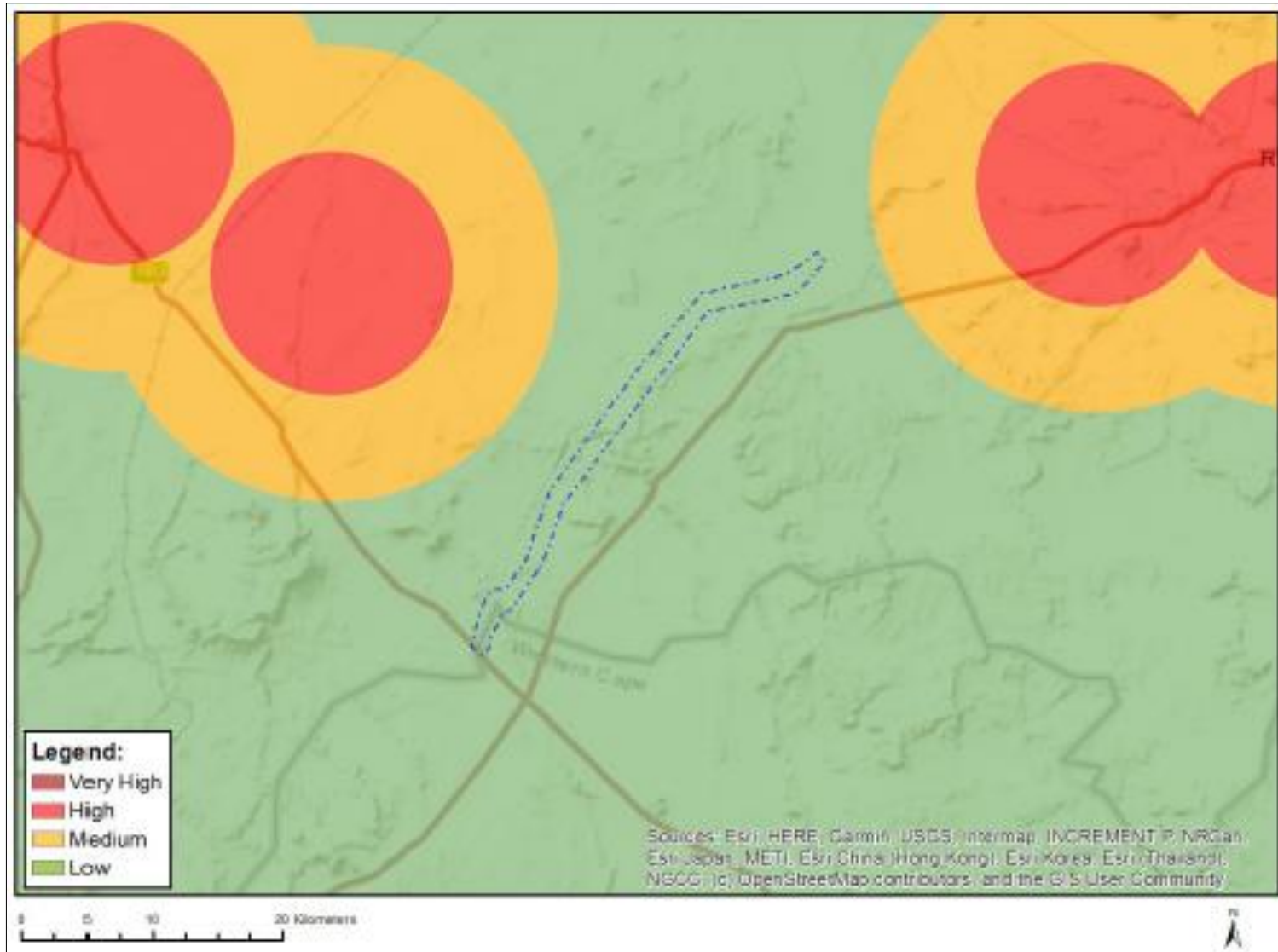


Figure 6: Map of relative civil aviation theme sensitivity

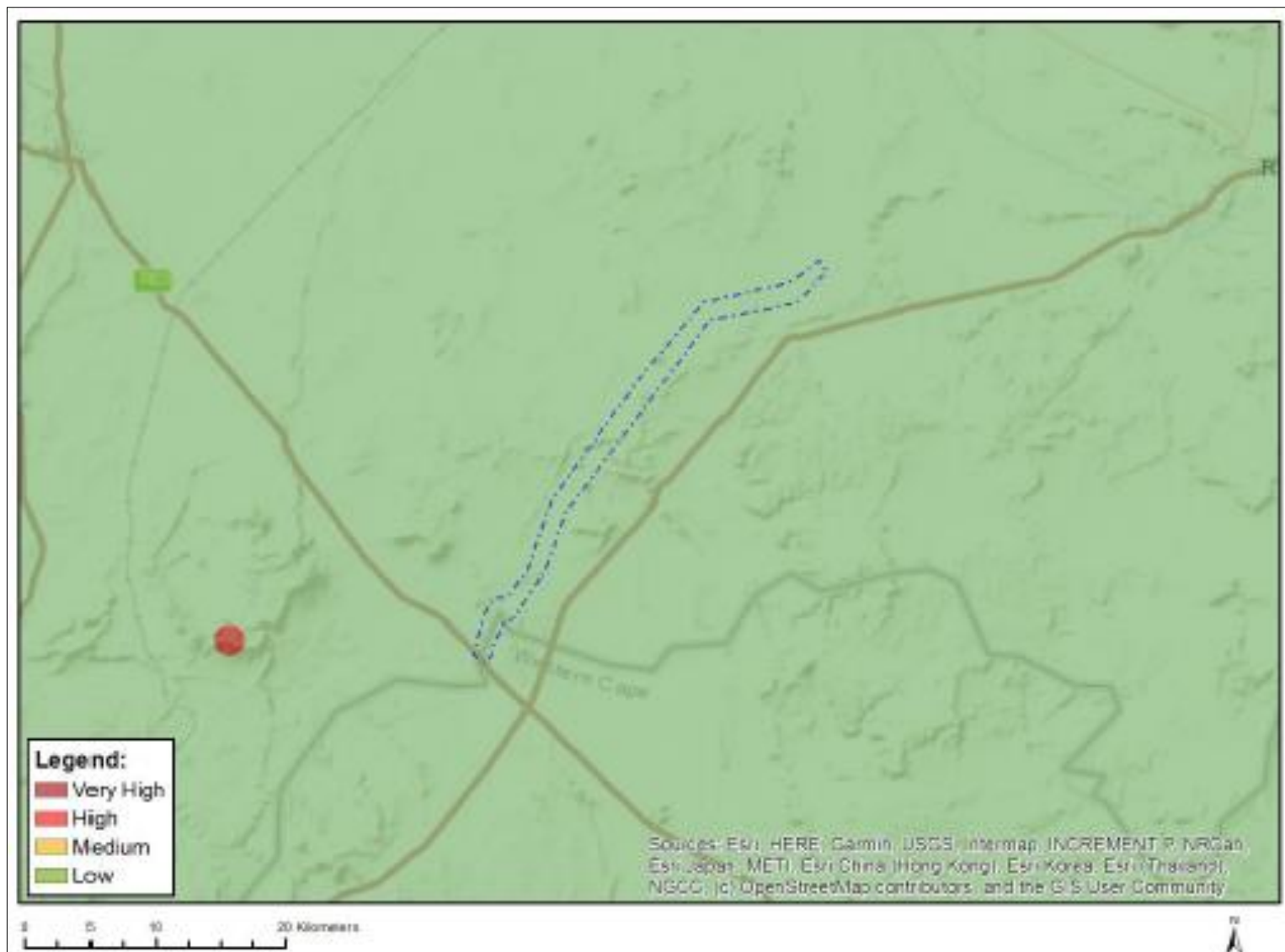


Figure 7: Map of relative defence theme sensitivity

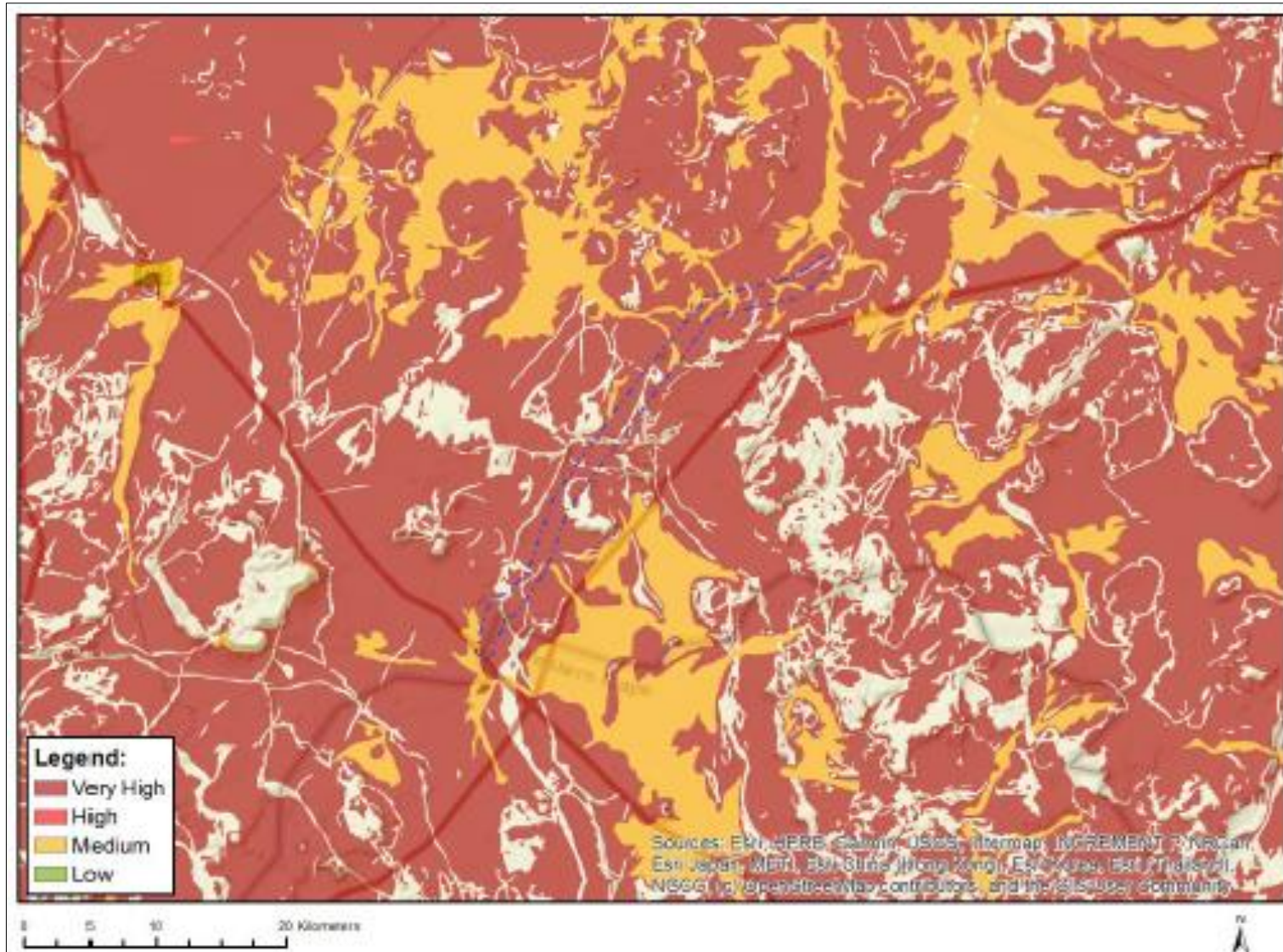


Figure 8: Map of relative palaeontological theme sensitivity

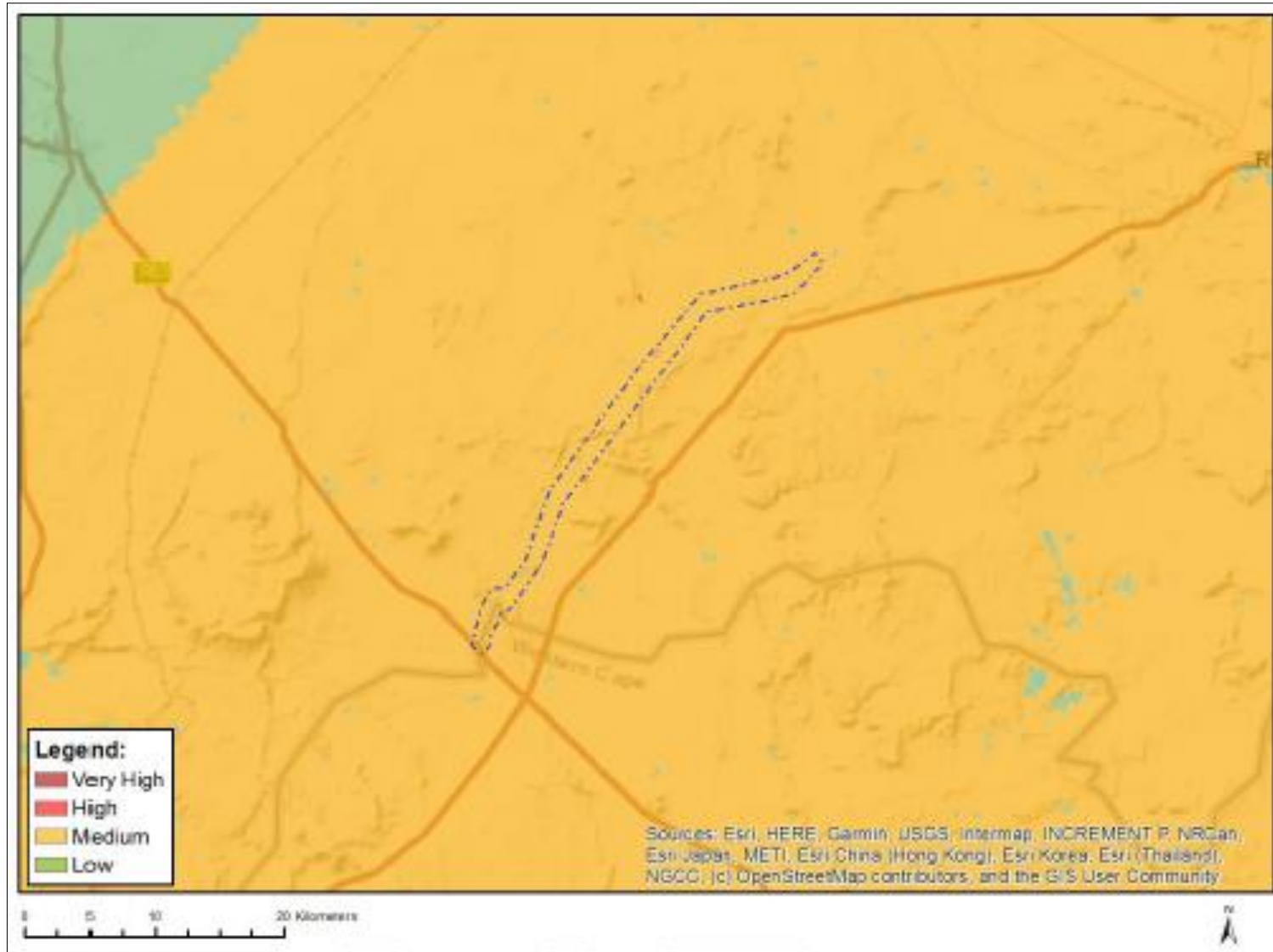


Figure 9: Map of relative plant species theme sensitivity



Figure 10: Map of relative terrestrial biodiversity theme

7.3 Sub-section 3: Declaration

The proponent/applicant or holder of the EA affirms that he/she will abide and comply with the prescribed impact management outcomes and impact management actions as stipulated in part B: section 1 of the generic EMPr and have the understanding that the impact management outcomes and impact management actions are legally binding. The proponent/applicant or holder of the EA affirms that he/she will provide written notice to the CA 14 day prior to the date on which the activity will commence or commencement of construction to facilitate compliance inspections.

Signature Proponent/applicant/ holder of EA

Date:

This declaration will be signed by the proponent/applicant/holder of the EA once the contractor is appointed and has provided inputs to this Generic EMPr as per the requirements of this template.

The contractor would be required to develop the following site-specific plans in accordance with the specialist recommendation contained in Section C of this EMPr:

- » **Alien Invasive Plant Management Plan**
- » **Plant Rescue Plan**
- » **Storm Water Management Plan**
- » **Rehabilitation Plan**

7.4 Sub-section 4: amendments to site specific information (Part B; section 2)

Should the EA be transferred to a new holder, Part B: Section 2 must be completed by the new holder and submitted with the application for an amendment of the EA in terms of Regulations 29 or 31 of the EIA Regulations, whichever applies. The information submitted for an amendment to an environmental authorisation will be considered to be incomplete should a signed copy of Part B: Section 2 not be submitted. Once approved, Part B: Section 2 forms part of the EMPr for the development and the EMPr becomes legally binding to the new EA holder.

PART C

8 SITE SPECIFIC ENVIRONMENTAL ATTRIBUTES

If any specific environmental sensitivities/attributes are present on the site which require more specific impact management outcomes and actions, not included in the pre-approved generic EMPr template, to manage impacts, those impact management outcomes and impact management actions must be included in this section. These specific management controls must be referenced spatially, and must include impact management outcomes and impact management actions. The management controls including impact management outcomes and impact management actions must be presented in the format of the pre-approved generic EMPr template. This applies only to additional impact management outcomes and impact management actions that are necessary.

If Part C is applicable to the development as authorised in the EA, it is required to be submitted to the CA together with the BAR or EIAR, for consideration of, and decision on, the application for EA. The information in this section must be prepared by an EAP and the name and expertise of the EAP, including the curriculum vitae are to be included. Once approved, Part C forms part of the EMPr for the site and is legally binding.

This section will **not be required** should the site contain no specific environmental sensitivities or attributes.

CONSTRUCTION AND DECOMMISSIONING OUTCOMES AND ACTIONS

7.1 Ecology (Fauna and Flora)

Impact management outcome: Direct loss and/or fragmentation of indigenous natural vegetation is minimised

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Timeframe	Evidence of compliance
– Restrict impact to development footprint only and limit disturbance creeping into surrounding areas.	Contractor	Place a barricade around the development footprint to indicate that no disturbance is allowed beyond that point	During the construction phase	ECO	Monthly	No evidence of disturbance beyond the development footprint
– As far as possible, locate infrastructure within areas that have been previously disturbed or in areas with lower sensitivity scores. Avoid sensitive features and habitats when locating infrastructure.	Design Engineer and Contractor	Develop a layout that avoids areas of high sensitivity Provide layout to the contractor and demarcate areas of high sensitivity	Prior to construction and during the construction phase	ECO	Monthly	Infrastructure avoids areas of high sensitivity
– Compile a Rehabilitation Plan.	Contractor, cEO	Make contractor aware of the requirement for a rehabilitation plan for the site	During the construction phase	ECO	Monthly	Rehabilitation Plan available on request

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Timeframe	Evidence of compliance
– Compile an Alien Plant Management Plan, including monitoring, to ensure minimal impacts on surrounding areas.	Contractor, CEO	Make contractor aware of the requirement for an alien plant management plan for the site	During the construction phase	ECO	Monthly	Alien Plant Management Plan available on request
– Where possible, access roads should be located along existing farm and district roads.	Design Engineer and Contractor	Develop a layout with access roads that are in alignment with existing farm and district roads and provide layout to the contractor	Prior to construction and during the construction phase	ECO	Monthly	Access roads are established along existing farm and district roads.
– Footprints of infrastructure, laydown areas, construction sites, roads and substation sites should be clearly demarcated.	Contractor	Make contractor aware of the requirement to demarcate the infrastructure footprint	During the construction phase	ECO	Monthly	Barricade evident around infrastructure footprints
– No additional clearing of vegetation should take place without a proper assessment of the environmental impacts and authorization from relevant authorities, unless for maintenance purposes, in which case all reasonable steps should be taken to limit damage to natural areas	Contractor	Place a barricade around the development footprint to indicate that no disturbance is allowed beyond that point	During the construction phase	ECO	Monthly	No vegetation clearing observed beyond the barricaded development footprint
– Limit clearing of natural habitat designated as sensitive, especially rocky outcrops, cliffs and riparian habitats, where possible.	Contractor, CEO	Install signage at locations of sensitive features that states that no	During the construction phase	ECO	Monthly	No clearing of natural habitat designated as

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Timeframe	Evidence of compliance
		disturbance is allowed				sensitive is observed on site
– No driving of vehicles off-road outside of construction areas. Personnel and vehicles should be restricted to access / internal roads and no off-road driving should occur.	Contractor	Install signage stating that no driving of vehicle off-road outside of construction areas is permitted and also include this in toolbox talks and induction training material	Duration of construction phase	ECO	Monthly	No evidence of vehicles driving in the veld outside the demarcated roads
– Access to sensitive areas should be limited during construction.	cEO and Contractor	Include topic the avoidance of sensitive features in toolbox talks	Duration of construction phase	ECO	Monthly	Avoidance of sensitive areas included in toolbox talks

Impact management outcome: Impact on the integrity of Critical Biodiversity Areas is avoided

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Timeframe	Evidence of compliance
– Locate linear infrastructure outside boundaries of CBA1 areas, except where these are located entirely within existing disturbance and/or transformation.	Design Engineer, Contractor	Design facility layout such that it avoids CBA1 areas Include topic of the avoidance of CBA1 areas by in linear infrastructure in toolbox talks	Prior to construction and during the construction phase	ECO	Monthly	Linear infrastructure avoids CBA1 areas
– Place tower structures as far as possible away from the point of origin of the drainage line that constitutes the core of the CBA1 area (this point is approximately at 31o31'36.1"S, 23o31'28"E). » Use the existing service roads under the existing power line to access towers at this particular location.	Design Engineer; Contractor	Ensure that tower structures are placed away from the point of origin of the drainage line in the layout and provide layout and coordinates of this point to the contractor	Prior to construction and during the construction phase	ECO	Monthly	No tower structures are located near the point of origin of the drainage line

Impact management outcome: Loss of individual species of conservation concern due to clearing is minimised

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Timeframe	Evidence of compliance
– A detailed pre-construction walk-through survey will be required during a favourable season to locate any individuals of protected plants, as well as for any populations of threatened plant species. This survey must cover the footprint of all approved infrastructure, including internal service roads and footprints of tower structures (final infrastructure layout). The best season is early to late Summer, but dependent on recent rainfall and vegetation growth.	Developer, Specialist	Appoint specialist prior to construction to undertake a detailed walk-through survey of the footprint areas	Prior to construction	ECO	Once at the commencement of construction	Walk-through report produced and kept on file during construction
– Where significant populations of SCC are found, shift infrastructure to avoid direct impacts.	Design Engineer	Use the results of the detailed walk-through survey to design the facility layout and ensure that the layout avoids areas of significant populations of species of conservation concern	Prior to construction	ECO	Monthly	No infrastructure established in areas where significant populations of species of conservation concern are found
– Compile a Plant Rescue Plan to be approved by the appropriate authorities.	Specialist, Developer	Appoint specialist to compile a detailed plant rescue plan	Prior to construction	ECO	Monthly	Plan rescue plan available on request
– Obtain the necessary permits for specimens or protected plant species that will be lost due to construction of the project.	Specialist; Developer	Undertake the permitting process in order to obtain the relevant permits for the removal of	Prior to construction	ECO	Monthly	Necessary permits are available on file at the site

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Timeframe	Evidence of compliance
		protected species. Permits must be kept on file				
– For any plants that are transplanted, annual monitoring should take place to assess survival. This should be undertaken for a period of three years after translocation and be undertaken by a qualified botanist. The monitoring programme must be designed prior to translocation of plants and should include control sites (areas not disturbed by the project) to evaluate mortality relative to wild populations.	cEO, Contractor	Prepare plan for the monitoring of transplanted plants	Prior to construction	ECO	As and when required	Plan for the monitoring of transplanted plants available upon request and results of monitoring are available on site
– No collecting or poaching of any plant species must be permitted on site. Report any illegal collection to conservation authorities.	cEO, Contractor	Requirement for induction of all staff prior to entry, in particular about the collection of plant species	During the construction phase	ECO	Monthly	No evidence of collection of plant species, and induction roster of all staff completed, maintained and available on site
– Loss of protected species of conservation concern must be report to the conservation authorities.	cEO, Contractor	Include this condition within the contractor's pack and within the site induction material	During the construction phase	ECO	Monthly	Condition include in the site induction material and contractor's pack
– Personnel must be educated about protection status of species, including distinguishing features, to be able to identify protected species.	cEO	Develop environmental awareness training material which covers the	During the construction phase	ECO	M Prior to the commencement of the environmental	Protection status of species, including distinguishing features

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Timeframe	Evidence of compliance
		protection status of species, including distinguishing features			awareness training	included in induction material
– Implement strict access control for the site.	DSS, dEO	Demarcate the project site and place a security guard and register at the main gate	Duration of the project	ECO	Monthly	Security guard placed on site and no reports of unauthorised entry
– The location of all transplanted rescued plants must be recorded, along with the identity of the plant.	Contractor, cEO	Ensure that the locations of transplanted rescued plants are recorded along with the identify of the plant and kept on file	During the construction phase	ECO	Monthly	Record of transplanted rescued plants available on site (includes location and identify of plants)

Impact management outcome: Establishment and spread of declared weeds and alien invader plants is minimised

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Timeframe	Evidence of compliance
– Undertake regular monitoring to detect alien invasions early so that they can be controlled.	Contractor, cEO	Prepare alien management plan for implementation for the duration of the construction phase	During the construction phase	ECO	Monthly	Alien Plant Management Plan available on request

Impact management outcome: Runoff and erosion are reduced

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Timeframe	Evidence of compliance
– Compile and implement a stormwater management plan.	Contractor, cEO	Make contractor aware of the requirement for a stormwater management plan for the site	During the construction phase	ECO	Monthly	Alien Plant Management Plan available on request
– Speed limits should be set for all roads on site, as well as access roads to the site. These limits should not exceed 40 km/h, but may be set lower, depending on local circumstances. Strict enforcement of speed limits should occur – install speed control measures, such as speed humps, if necessary.	Contractor, cEO	Install speed signature throughout site, include speed limit into induction and ensure all staff entering site is aware of the requirement to	During the construction phase	ECO	Monthly	Minimal instances of speeding as observed on site during audits and as evidenced in the written log of warnings and

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Timeframe	Evidence of compliance
		implement speed limits. Institute verbal and written warnings for violations and appropriate fines for repeat contraventions. Written log of fines and warning issued kept on site				fines issued for contraventions
– Maintain adequate buffer zones around hydrological features so that these do not become degraded from runoff and erosion	Design Engineer and Contractor	Ensure layout has been informed by the environmental sensitivities as determined by the environmental impact assessment and specialist studies	Prior to construction and during construction	ECO	Once off review that the layout used is the approved one, and monthly thereafter	Hydrological features clearly demarcated No evidence of construction activities taking place within the 'no-go' areas during audit

Impact management outcome: Minimal to no impacts to fauna species

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Timeframe	Evidence of compliance
– Pre-construction walk-through, undertaken in the correct season, in front of construction must be undertaken to move any individual animals, such as tortoises, prior to construction.	Developer, Specialist	Appoint specialist prior to construction to undertake a detailed walk-through survey of the footprint areas	Prior to construction	ECO	Once at the commencement of construction	Walk-through report produced and kept on file during construction
– No dogs or other pets should be allowed on site, except those confined to landowners' dwellings.	Contractor, cEO	Include topic on 'no dogs allowed on site' in toolbox talks	Duration of construction phase	ECO	Monthly	Topic on 'no dogs allowed on site' included in toolbox talks
– Personnel on site should undergo environmental induction training, including the need to abide by speed limits, the increased risk of collisions with wild animals on roads in rural areas.	cEO, Contractor	Include topic on speed limits and collision with wild animals in induction material	During the construction phase	ECO	Monthly	Topic on speed limits and collision with wild animals included in induction material
– Proper waste management must be implemented, ensuring no toxic or dangerous substances are accessible to wildlife. This should also apply to stockpiles of new and used materials to ensure that they do not become a hazard.	Contractor	Compile a waste management plan for implementation during the construction phase	During the construction phase	ECO	Monthly	Waste management plan available on site and waste is being managed in accordance with the plan

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Timeframe	Evidence of compliance
– No collecting, hunting or poaching of any animal species should take place. Report any mortality of protected species to conservation authorities.	cEO	Requirement for induction of all staff prior to entry, in particular about the collection, hunting or harvesting of and animals	Duration of the project	ECO	Monthly	No evidence of fauna mortality, and induction roster of all staff completed, maintained and available on site
– Appropriate lighting should be installed to minimize impacts on nocturnal animals, as per visual specialist assessment.	Developer, Contractor	Include lighting specifications in the contractor's pack	Prior to construction and during construction	ECO	Monthly	Lighting specifications include in contractor's pack Appropriate lighting utilised on site
– Construction activities should not be undertaken at night.	Developer, Contractor	Include working hours in contractor's pack	Prior to construction and during construction	ECO	Monthly	No evidence of construction activities being undertaken at night

7.2 Aquatic Ecology

Impact management outcome: Watercourse disturbance/loss is reduced

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Avoid direct impacts to water resources and their associated 15m buffer width.	cEO, Contractor	Demarcate the delineated water resources	Duration of the construction phase	ECO	Monthly	Delineated water resources are appropriately demarcated and no direct impact to these resources and the associated buffer is observed
– Clearly demarcate the construction footprint and restrict all construction activities to within the proposed infrastructure area. Minimize the disturbance footprint and unnecessary clearing of vegetation outside of the construction footprint.	Contractor	Demarcate the construction footprint	During the construction phase	ECO	Weekly and as and when required	No construction activities are taking place outside the proposed infrastructure area
– When clearing vegetation, allow for some vegetation cover as opposed to bare areas.	Contractor	Compile method statement for the clearing of vegetation	During the construction phase	ECO	Monthly	Method statement for the clearing of vegetation available on site
– Use the shapefiles to signpost the edge of the watercourses closest to site. Place the sign 15 m from the edge (stating this is the buffer zone). Label these areas as environmentally sensitive areas, keep out	Design Engineer, Contractor	Layout design should consider the watercourses identified as part of the BA process	Prior to and during the construction phase	ECO	Monthly	Layout avoids water courses and their buffers, and delineated water resources are

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		and the delineated water courses and their buffers should be demarcated				appropriately demarcated
– All activities (including driving) must adhere to the respective buffer areas.	Contractor	Toolbox talks should include topic on the avoidance of water courses and their buffer areas	During the construction phase	ECO	Monthly	Toolbox talks include topic on the avoidance of water resources and their buffer areas
– All alien vegetation within the site should be managed in terms of the Regulation GNR.1048 of 25 May 1984 (as amended) issued in terms of the CARA and IAP regulations.	Contractor, CEO	Prepare an alien plant management plan for implementation during the construction phase	Prior to construction	ECO	Monthly	Alien plant management plan available on site
– Landscape and re-vegetate all denuded areas as soon as possible.	Contractor, CEO	Prepare a rehabilitation plan for the site	Prior to construction	ECO	Monthly	Rehabilitation plan available on site

Impact management outcome: Minimised impacts on surface water quality and runoff, erosion and sedimentation are reduced

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– The contractors used for the construction phase should have spill kits available onsite prior to construction to ensure that any fuel, oil or hazardous substance spills are cleaned-up and discarded correctly	Developer	Make contractors aware of the requirement for a spill kit on site	Construction phase	ECO	Monthly	Visual observation of spills kits
– During construction activities, all rubble generated must be kept in a skip (or similar) and removed from the site to a licensed facility.	Contractor	Provision of appropriate skips which are strategically placed throughout the site Disposal of general waste at licensed waste disposal facilities must be undertaken as per the waste management plan	During the construction phase	ECO	Weekly	Appropriate skips are available throughout the site Disposal certificates of disposal at licensed facilities to be provided

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All chemicals and toxicants to be used for the construction must be stored in a bunded area.	Contractor	Ensure that storage areas are impermeable and are sufficiently bunded, and have sumps and roofing	During the Construction Phase	ECO	Monthly	Photographic proof that storage areas are impermeable, and have bunds, sumps and roofing
– All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off-site at designed areas.	Contractor, cEO	Make contractors aware of the requirement for regular inspection of their machinery and equipment	Prior to construction and during construction	ECO	Monthly	Inspection checklists available on request
– Adequate sanitary facilities and ablutions on the servitude must be provided for all personnel throughout the project area. Use of these facilities must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding vegetation).	Contractor	Ablution facilities must be provided and must be placed appropriately and in areas which avoid environmental sensitivities	During the Construction Phase	ECO	Weekly	Ablution facilities are installed and avoid environmental sensitivities
– All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as	cEO and Contractor	Prepare induction material which includes	Pre-construction and Construction	ECO	Monthly	Register of attendance available on request

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
the need to avoid littering, the reporting and cleaning of spills and leaks and general good "housekeeping".		environmental awareness				
– During construction activities, all rubble generated must be kept in a skip (or similar) and the removed from the site to a licensed facility.	Contractor, CEO	Develop and implement a waste management plan for the site.	Pre-construction and Construction	ECO	Monthly	Waste managed in accordance with the waste management plan for the site.
– All removed soil and material stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds.	Contractor	Prepare a method statement for the handling of soil	During the construction phase	ECO	Monthly	Method statement available on file at the site
– No dumping of material on site may take place.	Contractor	Toolbox talks must include topics on the handling of waste material	During the construction pahse	ECO	Monthly	No dumping of material observed on site Register of attendance of toolbox talks on the handling of waste material available on site
– All waste generated on site during construction must be adequately managed. Separation and recycling of different waste materials should be supported.	Contractor, CEO	Develop and implement a waste management plan for the site.	Pre-construction and Construction	ECO	Monthly	Waste managed in accordance with the waste management plan for the site.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- Landscape and re-vegetate all unnecessarily denuded areas as soon as possible.	Contractor	Develop and implement a rehabilitation plan for the rehabilitation of all disturbed areas.	Pre-construction & Rehabilitation	ECO	Weekly	Rehabilitation of the disturbed areas is undertaken as per the rehabilitation plan.

7.3 Avifauna

Impact management outcome: Displacement of priority species due to disturbance and habitat transformation associated with construction of the Great Karoo EGI 132kV central collector substation and 132kV overhead power line is reduced

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- Construction activity should be restricted to the immediate footprint of the infrastructure.	cEO, Contractor	Visual inspection of the construction activities to observe whether they remain within the defined footprint area Demarcate project footprint	Duration of construction phase	ECO	Monthly	No evidence of construction activity outside the immediate footprint of the infrastructure

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species.	cEO, Contractor	Demarcate sensitive areas to restrict access to these areas	Duration of construction phase	ECO	Monthly	Sensitive areas appropriately demarcated and fenced off for the duration of the construction phase
– Conduct a pre-construction inspection (avifaunal walk-through) of the final central collector substation layout and power line alignment to identify priority species that may be breeding within the substation area and to record the status of the eagle nests on the existing transmission power lines. If a nest is occupied, the avifaunal specialist must consult with the contractor to find ways of minimising the potential disturbance to the breeding pair of eagles during the construction period. This could include measures such as delaying some of the activities until after the breeding season.	DPM	Appoint a qualified avifauna specialist to conduct a pre-construction walk-through of the final central collector substation layout	Pre-construction	ECO	Once off at the commencement of construction	Walk-through report available on file
– Measures to control noise and dust should be applied according to current best practice in the industry	Contractor	Ensure that measures to control noise and dust are applied throughout construction	During the construction phase	ECO	Monthly	No noise or dust complaints reported
– Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum.	Contractor	Existing access routes to be used must be specified and the development of new roads must	Construction	cEO	Weekly	Implementation of the approved layout

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		be avoided as far as possible				
– Vegetation clearance should be limited to what is absolutely necessary.	cEO and contractor	Demarcate areas of indigenous vegetation to be avoided before clearance is undertaken	During the construction phase	ECO	Weekly, and as and when required	No unnecessary clearance of indigenous vegetation is undertaken

7.4 Land Use, Soils and Agricultural Potential

Impact management outcome: Minimise loss of land capability

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Prevent any spills from occurring. Machines must be parked within hard park areas and must be checked daily for fluid leaks.	Contractor cEO	Vehicle and equipment storage areas must have hard surfaces and must be appropriately bunded.	During the construction phase	ECO	Monthly	Vehicle and equipment storage areas have hard surfaces and are appropriately bunded. No spills recorded in the site incident register.
– Proper invasive plant control must be undertaken quarterly.	Contractor cEO	Ensure that invasive plant control is undertaken on an	During the construction phase	ECO	As and when required	Photographic proof of invasive plant control being undertaken on site.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		ongoing basis (at least quarterly).				
– All excess soil (soil that are stripped and stockpiled to make way for foundations) must be stored, continuously managed / maintained to be used for rehabilitation of eroded areas.	Contractor cEO	Development a procedure for the removal, handling, and storage of soil and ensure implementation of this procedure during the construction phase.	During the construction phase	ECO	Monthly	Copy of procedure for the removal, handling, and storage of soil provided during the review. Visual observation of appropriate soil storage and handling practices on site.
– Rip all compacted areas outside of the developed areas that have been compacted.	Contractor cEO	Ensure that ripping is undertaken on all compacted areas outside of the development areas.	Following completion of the construction phase.	ECO	Monthly	Visual observation of ripping being undertaken on compacted areas outside the development areas.
– Ripping must be done by means of a commercial ripper that has at least two rows of tines.	Contractor Developer	Utilise a commercial ripper with at least two rows of tines for ripping purposes.	During the construction phase	ECO	As and when required	Ripping undertaken using a commercial ripper with at least two rows of tines.
– Ripping must take place between 1 and 3 days after seeding and following a rainfall event (seeding must therefore be carried out directly after a rainfall event).	Contractor cEO	Ensure that ripping is undertaken between 1 and 3 days after seeding	During the construction phase	ECO	As and when required	Visual observation of ripping being undertaken between 1 and 3

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		and following a rainfall event.				days after seeding and following a rainfall event.

7.5 Heritage

Impact management outcome: Impacts on archaeological and palaeontological heritage resources are reduced

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Should any significant archaeological resources be uncovered during the course of the construction phase, work must cease in the area of the find and SAHRA must be contacted regarding an appropriate way forward.	Contractor, cEO, Specialist (if required)	If any evidence of unrecorded archaeological resources or possible burials is observed during the course of construction activities, all work must cease immediately within the vicinity of the find and the find be reported to the SAHRA.	Duration of Construction Phase	ECO, cEO	Ongoing (cEO), Monthly (ECO)	Evidence of communication with SAHRA where any evidence of unrecorded archaeological resources or possible burials is found
– The Chance Fossil Finds Procedure must be implemented for the duration of construction activities:	Developer, Contractor	The chance fossil finds procedure must be include in	During the construction phase	ECO	Monthly	Chance fossil finds procedure is included in the contractor's pack

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> ○ Once alerted to fossil occurrence(s): alert site foreman, stop work in area immediately (N.B. safety first!), safeguard site with security tape / fence / sand bags if necessary. ○ Record key data while fossils remain in situ: <ul style="list-style-type: none"> * Accurate geographic location – describe and mark on site map / 1: 50 000 map / satellite image / aerial photo. * Context – describe position of fossils within stratigraphy (rock layering), depth below surface. * Photograph fossil(s) in situ with scale, from different angles, including images showing context (e.g. rock layering). ○ If feasible to leave fossils in situ: <ul style="list-style-type: none"> * Alert Heritage Resources Agency and project palaeontologist (if any) who will advise on any necessary mitigation. * Ensure fossil site remains safeguarded until clearance is given by the Heritage Resources Agency for work to resume. ○ If not feasible to leave fossils in situ (emergency procedure only): <ul style="list-style-type: none"> * Carefully remove fossils, as far as possible still enclosed within the original sedimentary matrix (e.g. entire block of fossiliferous rock). * Photograph fossils against a plain, level background, with scale. * Carefully wrap fossils in several layers of newspaper / tissue paper / plastic bags. 		the contractor's pack				and evidence of implementation of the procedure is observed

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> * Safeguard fossils together with locality and collection data (including collector and date) in a box in a safe place for examination by a palaeontologist. * Alert Heritage Resources Agency and project palaeontologist (if any) who will advise on any necessary mitigation. <ul style="list-style-type: none"> o If required by Heritage Resources Agency, ensure that a suitably-qualified specialist palaeontologist is appointed as soon as possible by the developer. <p>Implement any further mitigation measures proposed by the palaeontologist and Heritage Resources Agency.</p>						

7.6 Visual

Impact management outcome: Visual impact of construction activities on sensitive visual receptors, and the potential impact on the sense of place is reduced.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> - Retain and maintain natural vegetation immediately adjacent to the development footprint. 	<p>Project proponent/ design consultant</p> <p>Contractor</p> <p>cEO</p>	<p>Visual inspection of the layout to ensure that vegetation immediately adjacent to the development footprint will not be disturbed</p>	<p>Prior to construction and during construction</p>	<p>ECO</p>	<p>Ongoing throughout construction</p>	<p>Onsite evidence that natural vegetation immediately adjacent to the development footprint/servitude is retained and maintained.</p>

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		Ensure that natural vegetation immediately adjacent to the development footprint/servitude is retained and maintained.				
– Ensure that vegetation is not unnecessarily removed during the construction phase.	Contractor cEO	Visual inspection of the project site to ensure that no unnecessary vegetation clearance is being undertaken. Include this mitigation in the contractor's environmental awareness training.	During construction	ECO	Daily, during the vegetation clearance phase and monthly thereafter	Onsite evidence that not unnecessary vegetation clearance is being undertaken.
– Plan the placement of laydown areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e., in already disturbed areas) wherever possible.	Project proponent/ design consultant Contractor cEO	Ensure that temporary construction infrastructure in the final layout is placed within already disturbed areas, where possible.	Prior to construction and during construction	ECO	Once-off review of the final layout prior to construction and as and when required during the	Photographic proof that temporary construction infrastructure is placed in already disturbed areas, where possible.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		Ensure that temporary construction infrastructure is established within already disturbed areas, where possible, during the construction phase.			construction phase	Final layout shows placement of temporary construction infrastructure within already disturbed areas.
– Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.	Contractor	Demarcate construction site to restrict movement within the construction site and immediate area. Inform the contractors, through inclusion of this condition in the environmental awareness training and contractor's packs, that movement should be restricted to existing access roads.	Duration of the construction phase	ECO	Monthly	Reduced duration of the construction phase. Copy of construction programme provided during audit

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.	Contractor	Waste to be appropriately stored in designated areas. Disposal of waste at licensed waste disposal facilities must be undertaken as per the waste management plan	Duration of the construction phase	ECO	Monthly	Appropriate storage of waste in designated areas. Disposal certificates of disposal at licensed facilities to be provided
– Reduce and control construction dust using approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).	Contractor	Apply appropriate dust suppression techniques.	Duration of the construction phase	ECO	Weekly	Contractor to provide proof of use of appropriate dust suppression technique. Photographic evidence that dust suppression is being undertaken on site
– Restrict construction activities to daylight hours whenever possible in order to reduce lighting impacts.	Developer Contractor cEO	Ensure that working hours are clearly communicated to construction workers and that the working hours are restricted to	Duration of the construction phase	ECO	Daily	Limited construction activities taking place at night.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		daylight hours and are adhered to.				
– Rehabilitate all disturbed areas immediately after the completion of construction works.	Contractor cEO	Ensure that disturbed areas are rehabilitated immediately after completion of construction works and that this is communicated to the contractor. Develop and implement a rehabilitation plan for the site.	Following completion of construction	ECO	As and when required	Visual observation that disturbed areas are rehabilitated immediately after the completion of construction works.

7.7 Socio-Economic

Impact management outcome: Enhanced socio-economic development and reduction in potential negative social impacts.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Where reasonable and practical, the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in	Developer	Develop and implement a "locals first" policy for the provision of	Prior to construction	ECO	Once, prior to the commencement of construction and monthly	The "locals first" policy is considered in terms of the

the area, the majority of skilled posts are likely to be filled by people from outside the area.		employment opportunities			during the construction phase	employment and training opportunities
– Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria.	Developer	Develop and implement a “locals first” policy for the provision of employment opportunities that states that first preference will be given to contractors that are compliant with BBBEE criteria	Prior to construction	ECO	Once, prior to the commencement of construction and monthly during the construction phase	The “locals first” policy is considered in terms of the employment and gives first preference to contractors that are compliant with BBBEE criteria
– Before the construction phase commences the proponent should meet with representatives from the MLM to establish the existence of a skills database for the area. If such a database exists it should be made available to the contractors appointed for the construction phase.	Developer	Identify and implement appropriate strategies for communication with representatives from the MLM	Prior to construction	ECO	Once, prior to the commencement of construction and monthly during the construction	Communication is undertaken as per the identified strategies and evidence of the meeting with the MLM (meeting minutes) is provided during the audit
– The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project.	Developer	Identify and implement appropriate strategies to communicate the availability of job opportunities to interested and affected parties	Prior to construction	ECO	Once, prior to the commencement of construction and monthly during the construction	Evidence indicating that interested and affected parties were informed of the job opportunities is provided during the audit

		and ensure that all interested and affected parties are aware of the job opportunities associated with the project				
- Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase.	Developer	Develop and implement a "locals first" policy for the provision of employment opportunities	Pre-construction & Construction	ECO	Once, prior to the commencement of construction and monthly during the construction phase	The "locals first" policy is considered in terms of the employment and training opportunities
- The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.	Developer	Develop and implement a "locals first" policy for the provision of employment opportunities and ensure that the policy promotes gender equality and women empowerment	Pre-construction & Construction	ECO	Once, prior to the commencement of construction and monthly during the construction phase	The "locals first" policy, which promotes gender equality and women empowerment is considered in terms of the employment
- The proponent should liaise with the ULM with regards the establishment of a database of local companies, specifically BBEE companies, which qualify as potential service providers (e.g., construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction contractors. These companies should be notified of the tender process and invited to bid for project-related work.	Developer	Establish communication channels with the ULM	Pre-construction & Construction	ECO	Once, prior to the commencement of construction and monthly during the construction phase	Documentary evidence indicating liaison between the developer and the ULM

- Where possible, the proponent should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically for semi and low-skilled job categories.	Developer	Develop and implement a "locals first" policy for the provision of employment opportunities	Pre-construction & Construction	ECO	Once, prior to the commencement of construction and monthly during the construction phase	The "locals first" policy is considered in terms of the employment
- Ongoing consultation with stakeholders must be undertaken throughout the construction phase.	Developer	Establish communication channels with stakeholders and implement a grievance mechanism	During the construction phase	ECO	Monthly	Documentary evidence indicating liaison between the developer and stakeholders
- The proponent and the contractor(s) should develop a code of conduct for the construction phase. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be dismissed. All dismissals must comply with the South African labour legislation.	Developer, in consultation with the Monitoring Forum	Develop and implement code of conduct for the construction phase	Prior to construction and during the construction phase	ECO	Monthly	Code of conduct evident during audit
- The proponent and the contractor should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase.	cEO / Contractor in consultation with the ECO	The effects of sexually transmitted diseases and HIV/AIDS must be covered in the Environmental Awareness Training	Pre-construction & Construction	ECO	Once, prior to the commencement of construction and monthly during construction	Environmental awareness training material requirements checklist
- The contractor should provide transport for workers to and from the site on a daily basis. This will enable the contractor to effectively manage and monitor the movement of construction workers on and off the site.	cEO	Provide daily transport to and from site for employees	During the Construction Phase	ECO	Monthly, and as and when required	Proof of transportation services provided
- The contractor must ensure that all construction workers from outside the area are transported back to their place of residence within 2 days for their contract coming to an end.	cEO	Provide transport from site to employees within 2 days of their	Towards the end of the construction phase	ECO	As and when required, towards the end of the	Proof of transportation services provided

		contract coming to an end			construction phase	
- It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.	Not Applicable - no on-site housing is envisaged with daily commute to and from site expected of construction staff.					
- The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for. The agreement should be signed before the construction phase commences.	DPM Contractor	Develop agreements for compensation for the damage of farm property etc. with the affected landowners. Ensure that agreements are approved and signed	Pre-construction	dEO ECO	Once, prior to construction	Availability of approved and signed agreements
- Traffic movement and construction related activities should be contained within clearly designated areas.	Contractor, cEO	Ensure that traffic and activities are contained within designated areas	During the construction phase	ECO	Weekly	Traffic and activities are contained within designated areas
- Strict traffic speed limits must be enforced on the farm.	cEO / dEO / Contractor	Inform all drivers of speed limits and place appropriate signage along the relevant roads	During the construction and operation phase	ECO Operation and Maintenance team	Monthly	No complaints regarding speeding on site are received
- All farm gates must be closed after passing through.	DSS and Contractor	Ensure farm gates are closed after passing through as required through the implementation of a formalised process	During the construction phase	cEO	Weekly and as and when required	Farm gates are closed after passing through and no complaints from landowners are received.

<p>– Contractors appointed by the proponent should provide daily transport for low and semi-skilled workers to and from the site. This would reduce the potential risk of trespassing on the remainder of the farm and adjacent properties.</p>	cEO	Provide daily transport to and from site for employees	During the construction phase	ECO	Monthly, and as and when required	Proof of transportation services provided during audit
<p>– The proponent should hold contractors liable for compensating farmers and communities in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors' and neighbouring landowners. The agreement should also cover loses and costs associated with fires caused by construction workers or construction related activities (see below).</p>	DPM Contractor	Develop agreements with the contractors regarding their liability for compensating farmers and communities in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. Ensure that agreements are approved and signed	Pre-construction	dEO ECO	Once, prior to construction	Availability of approved and signed agreement
<p>– The Environmental Management Plan (EMP) must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested.</p>	cEO	Ensure that the EMP contains measures for managing and storing waste on site	Pre-construction and during the construction and operation phase	dEO, ECO, cEO	Once, at the onset of the construction phase, and again on the onset of the operation phase	Measures for managing and storing waste included in the EMP and the implementation thereof observed during audit
<p>– Contractors appointed by the proponent must ensure that all workers are informed at the outset of the construction phase of the conditions contained on the</p>	cEO and Contractor in consultation with the ECO	Compile a Code of Conduct for staff. Ensure that the conditions of the	Pre-construction	ECO	Once, prior to the commencement of construction	No complaints registered in this regard

Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.		Code of Conduct are communicated staff at the outset of construction				
– Contractors appointed by the proponent must ensure that construction workers who are found guilty of stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation.	Developer	Compile a Code of Conduct for staff. Ensure that any dismissals are done in accordance with South African labour legislation	During the construction phase	ECO	As and when necessary	No complaints from dismissed staff Code of Conduct observed during audit
– No construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.	Not Applicable - no on-site housing is envisaged with daily commute to and from site expected of construction staff.					
– Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas.	ECO / cEO / dEO	Hold environmental awareness training workshops. Training material should include the fact that open fires for cooking or heating are prohibited, in designated areas	Pre-construction construction and operations	ECO dEO	Monthly and as and when required	Attendance register and training minutes / notes for the record
– Smoking on site should be confined to designated areas.		Erect signage indicating designated smoking areas, and ensure that smoking is only confined to these areas	Construction and operations	ECO dEO cEO	Monthly, and as and when required	Photographic evidence of signage indicating designated smoking areas
– Contractor to ensure that construction related activities that pose a potential fire risk, such as welding, are effectively managed and are confined to areas	dEO / cEO / Contractor	Ensure that construction related activities	Pre-construction, construction and operations	ECO	Prior to the commencement of the	No fire outbreaks occurred

where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high risk dry, windy winter months.		that pose a potential fire risk, such as welding, are effectively managed and are confined to areas where the risk of fires has been reduced Develop environmental awareness training material which covers conditions under which work should not be undertaken to reduce the risk of fires			environmental awareness training, once during the construction phase and once during the operation phase	Environmental awareness training material observed
- Contractor should provide adequate fire-fighting equipment on-site, including a fire fighting vehicle.	Contractor	The site must be fitted with adequate fire-fighting equipment	During the Construction Phase	ECO	Monthly	Adequate fire-fighting equipment is available and has been serviced
- Contractor to provide fire-fighting training to selected construction staff.	cEO and Contractor	Provide training on the use of fire-fighting equipment to the relevant employees	Pre-construction	ECO	Once, prior to the commencement of construction	Proof of training to be provided by the contractor
- As per the conditions of the Code of Conduct, in the event of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage	DPM Contractor	Develop agreements with the contractors regarding their	Pre-construction	dEO ECO	Once, prior to construction	Availability of approved and signed agreement

caused to their farms. The contractor should also compensate the fire-fighting costs borne by farmers and local authorities.		liability for damage as a result of fires caused by construction workers and or construction activities. Ensure that agreements are approved and signed				
– Dust suppression measures must be implemented on un-surfaced roads, such as wetting on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers.	Contractor	Appropriate dust suppression measures are implemented	During the construction phase	cEO, ECO	Weekly	Photographic record of measures being implemented and the results thereof
– All vehicles must be road-worthy, and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits.	cEO / dEO / Contractor	Regular inspection of vehicles Inform all drivers of speed limits and place appropriate signage along the relevant roads	During construction and operations	ECO Operation and Maintenance team	Monthly	No complaints from community members are submitted Vehicle inspection checklists available
– An Environmental Control Officer (ECO) should be appointed to monitor the construction phase. The Environmental Control Officer (ECO) should conduct regular inspections (daily or weekly) of affected farms to ensure farm gates are closed and damage to fences is addressed timeously.	Developer	Ensure that an ECO is appointed prior to the commencement of construction activities	Pre-construction	cEO	Once, prior to construction	Appointment letter provided for review
– Ongoing communication with landowners and road users during the construction period.	dEO / cEO	Identify and implement appropriate strategies for	Pre-construction & Construction	ECO	Once, prior to the commencement of construction and monthly	Communication is undertaken as per the identified

		communication with landowners and road users			during the construction	strategies and no complaints are submitted regarding communication
- Establishment of a Grievance Mechanism that provides local farmers and other road users with an effective and efficient mechanism to address issues related to construction related impacts, including damage to local gravel farm roads.	Contractor	Development and implement a Grievance Mechanism which provides procedures for communication / liaison with neighbouring landowners and residents	Pre-construction & Construction	ECO	Once, prior to the commencement of construction and monthly during the construction phase	Communication / liaison with neighbouring landowners and residents are undertaken in line with the requirements of the Grievance Mechanism. No complaints on communication with neighbouring landowners and residents is submitted
- Repair of all affected road portions at the end of construction period where required.	dEO / cEO	Record the conditions of private roads to be used (prior to use) and get into an agreement with the landowner on requirement for repairing of the affected roads portions at the end of the construction period	During the construction phase and post-construction	ECO	Prior to the use of private roads and after completion of construction	Photographic record and proof of the road conditions pre-construction Agreement between the developer and landowner

<ul style="list-style-type: none"> – Implementation of a road maintenance programme throughout the construction phase to ensure that the affected roads are maintained in a good condition and repaired once the construction phase is completed. 	Contractor	Develop and implement a road maintenance programme that provides procedures on how affected roads can be maintained in good condition	Pre-construction & Construction	ECO	Once, prior to the commencement of construction and monthly during the construction phase	Road maintenance programme available on file and no bad road conditions resulting from the construction activities are observed
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OPERATIONAL PHASE OUTCOMES AND ACTIONS

7.8 Ecology (Fauna and Flora)

Impact management outcome: Direct loss and/or fragmentation of indigenous natural vegetation is minimised

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Timeframe	Evidence of compliance
<ul style="list-style-type: none"> – Restrict impact to development footprint only and limit disturbance creeping into surrounding areas. 	Operator	Place a barricade around the development footprint to indicate that no disturbance is allowed beyond that point	During the operational phase	dEO	Monthly	No evidence of disturbance beyond the development footprint

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Timeframe	Evidence of compliance
– Protect sensitive features and habitats during operation activities.	Design Engineer and Operator	Develop a facility layout that avoids areas of high sensitivity Provide layout to the operator and demarcate areas of high sensitivity	Prior to and during the operational phase	dEO	Monthly	Infrastructure avoids areas of high sensitivity
– Compile a rehabilitation plan	Operator, cEO	Make operator aware of the requirement for a rehabilitation plan for the site	During the operational phase	dEO	Monthly	Rehabilitation Plan available on request
– Implement Alien Plant Management Plan, including monitoring, to ensure minimal impacts on surrounding areas.	Operator, cEO	Make operator aware of the requirement for an alien plant management plan for the site	During the operational phase	dEO	Monthly	Alien Plant Management Plan available on request
– No additional clearing of vegetation should take place during the operation phase without a proper assessment of the environmental impacts and authorization from relevant authorities, unless for maintenance purposes, in which case all reasonable steps should be taken to limit damage to natural areas	Operator	Place a barricade around the development footprint to indicate that no disturbance is allowed beyond that point	During the operational phase	dEO	Monthly	No vegetation clearing observed beyond the barricaded development footprint

Impact management outcome: Establishment and spread of declared weeds and alien invader plants is minimised

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Timeframe	Evidence of compliance
– Undertake regular monitoring to detect alien invasions early so that they can be controlled.	Operator	Prepare alien management plan for implementation for the duration of the operational phase	During the operational phase	dEO	Monthly	Alien Plant Management Plan available on request

Impact management outcome: Runoff and erosion are reduced

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Timeframe	Evidence of compliance
– Compile and implement a stormwater management plan.	Operator	Make operator aware of the requirement for a stormwater management plan for the site	During the operational phase	dEO	Monthly	Stormwater Management Plan available on request
– Speed limits should be set for all roads on site, as well as access roads to the site. These limits should not exceed 40 km/h, but may be set lower, depending on local circumstances. Strict enforcement of speed limits should occur – install speed control measures, such as speed humps, if necessary.	Operator	Install speed signature throughout site, include speed limit into induction and ensure all staff entering site is	During the operational phase	dEO	Monthly	Minimal instances of speeding as observed on site during audits and as evidenced in

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Timeframe	Evidence of compliance
		aware of the requirement to implement speed limits. Institute verbal and written warnings for violations and appropriate fines for repeat contraventions. Written log of fines and warning issued kept on site				the written log of warnings and fines issued for contraventions
– Maintain adequate buffer zones around hydrological features so that these do not become degraded from runoff and erosion	Design Engineer and Operator	Ensure layout has been informed by the environmental sensitivities as determined by the environmental impact assessment and specialist studies	Prior to and during the operational phase	dEO	Once off review that the layout used is the approved one, and monthly thereafter	Hydrological features clearly demarcated No evidence of construction activities taking place within the 'no-go' areas during audit
– Surface runoff and erosion must be properly controlled during the operational phase, and any issues addressed as quickly as possible.	Contractor	Implement measures for the control and management of runoff	During the operation phase	dEO	Monthly	No mismanagement of runoff

Impact management outcome: Minimal to no impacts to fauna species

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Timeframe	Evidence of compliance
– No dogs or other pets should be allowed on site, except those confined to landowners' dwellings.	Operator, cEO	Include topic on 'no dogs allowed on site' in induction training material	During the operational phase	dEO	Monthly	Topic on 'no dogs allowed on site' included in induction training material
– Personnel on site should undergo environmental induction training, including the need to abide by speed limits, the increased risk of collisions with wild animals on roads in rural areas.	cEO, Operator	Include topic on speed limits and collision with wild animals in induction material	During the operational phase	dEO	Monthly	Topic on speed limits and collision with wild animals included in induction material
– Proper waste management must be implemented, ensuring no toxic or dangerous substances are accessible to wildlife. This should also apply to stockpiles of new and used materials to ensure that they do not become a hazard.	Operator	Compile a waste management plan for implementation during the operational phase	During the operational phase	dEO	Monthly	Waste management plan available on site and waste is being managed in accordance with the plan
– No collecting, hunting or poaching of any animal species should take place. Report any mortality of protected species to conservation authorities.	cEO, Operator	Requirement for induction of all staff prior to entry, in particular about the collection, hunting or harvesting of and animals	Duration of the project	dEO	Monthly	No evidence of fauna mortality, and induction roster of all staff completed, maintained and available on site

7.9 Aquatic Ecology

Impact management outcome: Minimise erosion and sedimentation

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Monitor and maintain stormwater management features.	Operator	Develop and implement a maintenance programme for stormwater management features	During the operational phase	dEO	Monthly	Stormwater management features are in good condition and functioning appropriately
– No activities are permitted within the watercourses and associated buffer areas.	Operator, cEO	Ensure layout has been informed by the environmental sensitivities as determined by the environmental impact assessment and specialist studies	During the operational phase	dEO	Once off review that the layout used is the approved one	Confirm no activities are taking place within the watercourses and associated buffer areas as per the authorised layout by reviewing the as-built designs (once-off confirmation)
– Monitor and maintain all landscaped and re-vegetated areas.	Operator, cEO	Prepare a rehabilitation plan for the site	During the operational phase	ECO	Monthly	Rehabilitation plan available on site

7.10 Avifauna

Impact management outcome: Mortality of priority species due to electrocution within the Great Karoo EGI central collector substation is reduced.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– The hardware within the proposed central collector substation yard is too complex to warrant any mitigation for electrocution at this stage. It is recommended that if on-going impacts are recorded once operational, site-specific mitigation (insulation) be applied reactively. This is an acceptable approach because Red List priority species are unlikely to frequent the switching station and substation and be electrocuted.	Developer	Consult with an avifauna specialist determine ways to mitigate impacts on avifauna.	During the operational phase	dEO	Annually	Proof of consultation with avifauna specialist.

7.11 Land Use, Soils and Agricultural Potential

Impact management outcome: Minimise loss of land capability

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Prevent any spills from occurring. Machines must be parked within hard park areas and must be checked daily for fluid leaks.	Operator	Vehicle and equipment storage areas must have hard surfaces and must be appropriately bundled.	During the operational phase	dEO	Monthly	Vehicle and equipment storage areas have hard surfaces and are appropriately bundled.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
						No spills recorded in the site incident register.
– Proper invasive plant control must be undertaken quarterly.	Operator	Ensure that invasive plant control is undertaken on an ongoing basis (at least quarterly).	During the operational phase	dEO	As and when required	Photographic proof of invasive plant control being undertaken on site.
– Rip all compacted areas outside of the developed areas that have been compacted.	Operator	Ensure that ripping is undertaken on all compacted areas outside of the development areas.	During the operational phase	dEO	Monthly	Visual observation of ripping being undertaken on compacted areas outside the development areas.
– Ripping must be done by means of a commercial ripper that has at least two rows of tines.	Operator Developer	Utilise a commercial ripper with at least two rows of tines for ripping purposes.	During the operational phase	dEO	As and when required	Ripping undertaken using a commercial ripper with at least two rows of tines.
– Ripping must take place between 1 and 3 days after seeding and following a rainfall event (seeding must therefore be carried out directly after a rainfall event).	Operator cEO	Ensure that ripping is undertaken between 1 and 3 days after seeding and following a rainfall event.	During the operational phase	dEO	As and when required	Visual observation of ripping being undertaken between 1 and 3 days after seeding and following a rainfall event.

7.12 Visual

Impact management outcome: Visual impact on observers travelling along the roads and residents at homesteads in close proximity to the grid connection infrastructure is reduced

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Maintain the general appearance of the infrastructure.	Operator	Ensure regular maintenance of the infrastructure area is undertaken so that the appearance of the infrastructure is maintained	During the operation phase	dEO	Monthly	General appearance of the infrastructure is maintained

7.13 Socio-Economic

Impact management outcome: Enhanced socio-economic development and reduction in potential negative social impacts.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Implement training and skills development programs for members from the local community.	Developer	Develop and implement a “locals first” policy for the provision of employment and training opportunities	During the operation phase	dEO	Once prior to the commencement of operation and monthly during the operation phase	The “locals first” policy is considered in terms of the employment and training opportunities

– Maximise opportunities for local content and procurement.	Developer	Develop and implement a “locals first” policy in the procurement process	During the operation phase	dEO	Once prior to the commencement of operation and monthly during the operation phase	The “locals first” policy is considered in terms of procuring goods and services
– Maximise the number of employment opportunities for local community members.	Developer	Develop and implement a “locals first” policy in the procurement process	During the operation phase	dEO	Once prior to the commencement of operation and monthly during the operation phase	The “locals first” policy is considered in terms of procuring goods and services
– Where reasonable and practical, the proponent should appoint local contractors and implement a ‘locals first’ policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area.	Developer	Develop and implement a “locals first” policy for the provision of employment opportunities	During the operational phase	dEO	Once, prior to the commencement of the operational phase and monthly during the operational phase	The “locals first” policy is considered in terms of the employment and training opportunities
– Where feasible, efforts should be made to employ local contractors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria.	Developer	Develop and implement a “locals first” policy for the provision of employment opportunities that states that first preference will be given to contractors that are compliant with BBBEE criteria	During the operational phase	dEO	Once, prior to the commencement of operations and monthly during the operational phase	The “locals first” policy is considered in terms of the employment and gives first preference to contractors that are compliant with BBBEE criteria
– Before the construction phase commences the proponent should meet with representatives from the MLM to establish the existence of a skills database for the area. If such as database exists it should be made	Developer	Identify and implement appropriate strategies for	During the operational phase	dEO	Once, prior to the commencement of operations and monthly during	Communication is undertaken as per the identified

available to the contractors appointed for the construction phase.		communication with representatives from the MLM			the operational phase	strategies and evidence of the meeting with the MLM (meeting minutes) is provided during the audit
– The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project.	Developer	Identify and implement appropriate strategies to communicate the availability of job opportunities to interested and affected parties and ensure that all interested and affected parties are aware of the job opportunities associated with the project	During the operational phase	dEO	Once, prior to the commencement of operations and monthly during the operational phase	Evidence indicating that interested and affected parties were informed of the job opportunities is provided during the audit
– Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase.	Developer	Develop and implement a "locals first" policy for the provision of employment opportunities	Pre-operations & during the operational phase	dEO	Once, prior to the commencement of operations and monthly during the operational phase	The "locals first" policy is considered in terms of the employment and training opportunities
– The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.	Developer	Develop and implement a "locals first" policy for the provision of employment	Pre-operations & during the operational phase	dEO	Once, prior to the commencement of operations and monthly during	The "locals first" policy, which promotes gender equality and women

		opportunities and ensure that the policy promotes gender equality and women empowerment			the operational phase	empowerment is considered in terms of the employment
– The proponent should liaise with the ULM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g., construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction contractors. These companies should be notified of the tender process and invited to bid for project-related work.	Developer	Establish communication channels with the ULM	Pre-operations & during the operational phase	dEO	Once, prior to the commencement of operations and monthly during the operational phase	Documentary evidence indicating liaison between the developer and the ULM
– Implement agreements with affected landowners.	DPM	Develop agreements for compensation of landowners for use of their properties. Ensure that agreements are approved and signed	During the operational phase	dEO	Once, prior to commencement of operations	Availability of approved and signed agreements

Impact management outcome: Potential risk to safety to farming operations and livestock associated with the presence of maintenance workers on the site is reduced.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance

- Affected property owners should be notified in advance of the timing and duration of maintenance activities.	Developer and Operator	Ensure that affected property owners are notified of maintenance activities in advance	During the operational phase	dEO	As and when necessary	Proof of notification of maintenance activities to the affected property owners is available on site
- Maintenance teams must ensure that all farm gates must be closed after passing through.	Operator	Ensure farm gates are closed after passing through as required through the implementation of a formalised process	During the operational phase	dEO	As and when required	Farm gates are closed after passing through and no complaints from landowners are received
- Property owners should be compensated for damage to farm property and or loss of livestock or game associated maintenance related activities.	DPM Contractor	Develop agreements for compensation for the damage of farm property etc. with the affected landowners. Ensure that agreements are approved and signed	Pre-operation	dEO	Once, at the commencement of the operational phase	Availability of approved and signed agreements
- Movement of traffic and maintenance related activities should be strictly contained within designated areas associated with transmission lines and substations.	Developer, Operator	Develop and implement code for the operational and maintenance phase to control the movement of maintenance staff on site	Prior to operations and during the operational phase	dEO	Monthly	Code of conduct evident during audit No movement of traffic and maintenance related activities outside

						designated areas
- Strict traffic speed limits must be enforced on the farm.	Operator	Install speed signature throughout site, include speed limit into induction and ensure all staff entering site is aware of the requirement to implement speed limits. Institute verbal and written warnings for violations and appropriate fines for repeat contraventions. Written log of fines and warning issued kept on site	During the operational phase	dEO	Monthly	Minimal instances of speeding as observed on site during audits and as evidenced in the written log of warnings and fines issued for contraventions
- No maintenance workers should be allowed to stay overnight on the affected properties.	Not applicable – the development of new accommodation is not proposed. Employees will be accommodated in the nearby towns such as Richmond and Victoria West and transported to and from site daily.					

APPENDIX 1: METHOD STATEMENTS

To be prepared by the contractor prior to commencement of the activity. The method statements are **not required** to be submitted to the CA.

APPENDIX 2: CV OF THE EAP

CURRICULUM VITAE OF MMAKOENA MMOLA

Profession : Senior Environmental Assessment Practitioner

Specialisation: Environmental Permitting, Environmental Assessments, and Compliance

Work Experience: 5 years

VOCATIONAL EXPERIENCE

Mmakoena is an Environmental Consultant with 5 years of experience in the environmental field. She holds a B.Sc. (Hons) in Geochemistry from the University of the Witwatersrand and is currently completing her B.Sc. (Hons) in Environmental Management with the University of South Africa. She is registered as a Professional Natural Scientist with the South African Council for Natural Scientific Professions (SACNASP), Registration Number: 126748 and an Environmental Assessment Practitioner with the Environmental Assessment Practitioners Association of South Africa, Number 2019/260.

Mmakoena's experience includes Environmental Impact Assessment (EIA) permitting for a variety of projects, ranging from infrastructure (transport services and localised infrastructure), mining, waste management services, and renewable energy. These include Environmental Authorisations (Basic Assessments and Scoping and Environmental Impact Assessments), Water Use Authorisations, compliance auditing and mining permitting. She therefore has a wide ranging experience with various legislation including the National Environmental Management Act (NEMA), National Heritage Resources Act (NHRA), National Environmental Management Waste Management Act (NEM:WA), National Environmental Management Biodiversity Act (NEM:BA), the Mineral and Petroleum Resources Development Act (MPRDA) and the National Water Act (NWA), having applied them for numerous small, medium and large-scale projects across various industries. Mmakoena also has experience beyond the permitting sphere through screening assessments for potential developers, including pre-feasibility desktop screening and regulatory and permitting approval screening.

SKILLS BASE AND CORE COMPETENCIES

- Environmental management, environmental impacts assessments, environmental permitting and compliance monitoring
- Project management
- Public participation and stakeholder engagement
- Field work skills
- Adaptability and ability to handle pressure
- Organisational skills
- MS Office Package (Word, PowerPoint and Excel)
- Google Earth
- ArcGIS (basic)

EDUCATION AND PROFESSIONAL STATUS

Degrees:

- Bachelor of Science (Hons) Environmental Management, in progress, University of South Africa
- Bachelor of Science (Hons) Geochemistry, 2016, University of the Witwatersrand
- Bachelor of Science Geology, 2015, University of the Witwatersrand

Short Courses and Workshops Attended:

- Environmental Law Update Webinar, 2021, Inlexso
- Environmental Management and Regulations, 2018, Kuvimbika
- Research Methodology and Report Writing, 2017, Imsimbi Training

Professional Society Affiliations:

- Professional Natural Scientist, Environmental Science, South African Council for Natural and Scientific Professions – Registration Number: 126748
- Environmental Assessment Practitioner with the Environmental Assessment Practitioners Association of South Africa - Number 2019/260.

EMPLOYMENT

Date	Company	Roles and Responsibilities
2022 - Current	Savannah Environmental (Pty) Ltd	<p><i>Senior Environmental Assessment Practitioner</i></p> <p><u>Tasks include:</u></p> <ul style="list-style-type: none">• Undertake environmental screening assessments, environmental permitting and environmental authorisation applications.• Undertake water use authorisation applications on the e-WULAA system.• Complete Part 1 and Part 2 EA amendment applications and prepare motivation reports in support of applications for Part 2 EA amendments.• Undertake environmental compliance audits and provide ECO services.• Efficient and quality report writing to execute and manage the delivery of environmental impact assessment (EIA) reports and Environmental Management Programmes in line with the requirements of the National Environmental Management Act and EIA Regulations.• Liaison with relevant environmental authorities.• Execution of the public participation process.• Professional client liaison.• Project management.• Manage third parties or sub-consultants to which functions have been outsourced.• Preparation of proposals and budgets.• Mentoring and advising junior environmental consultants and evaluating their work.

Date	Company	Roles and Responsibilities
2021 - Current:	Savannah Environmental (Pty) Ltd	<p><i>Environmental Assessment Practitioner</i></p> <p><u>Tasks include:</u></p> <ul style="list-style-type: none"> • Undertake environmental screening assessments, environmental permitting and environmental authorisation applications. • Undertake water use authorisation applications on the e-WULAA system. • Complete Part 1 and Part 2 EA amendment applications and prepare motivation reports in support of applications for Part 2 EA amendments. • Undertake environmental compliance audits and provide ECO services. • Efficient and quality report writing to execute and manage the delivery of environmental impact assessment (EIA) reports and Environmental Management Programmes in line with the requirements of the National Environmental Management Act and EIA Regulations. • Liaison with relevant environmental authorities. • Execution of the public participation process. • Professional client liaison. • Project management. • Manage third parties or sub-consultants to which functions have been outsourced. • Preparation of proposals and budgets.
2019 - 2020	Golder Associates Africa (Pty) Ltd	<p><i>Junior Environmental Consultant</i></p> <p><u>Tasks included:</u></p> <ul style="list-style-type: none"> • Providing assistance on local environmental and social impact assessments. • Completing water use license applications. • Undertaking environmental compliance and water use license audits. • Providing ECO Services. • Conducting annual integrated water and waste management plan updates. • Preparing environmental screening reports. • Preparing project proposal documents and budgets. • Assisting in the compilation of terrestrial ecology and wetland impact assessment reports and mine closure plans. • Undertaking field work. • Liaising with clients and regulatory authorities. • Providing administrative support to project managers.
2017 - 2019	Shango Solutions	<p><i>Junior Consultant</i></p> <p><u>Tasks included:</u></p> <ul style="list-style-type: none"> • Completing environmental authorisation, prospecting and mining permit applications. • Completing Section 102 amendment applications.

Date	Company	Roles and Responsibilities
		<ul style="list-style-type: none"> • Conducting performance assessments and financial provisioning assessments in accordance with the Mineral and Petroleum Resources Development Act (MPRDA). • Compiling basic assessment reports and synthesizing work from other environmental specialists for inclusion in the basic assessment reports. • Identifying potential environmental impacts and preparing environmental management programmes detailing suitable mitigation measures. • Identification of key stakeholders, landowners, neighbours, organs of state and other applicable interested and affected parties for specific projects and compilation of Interested and Affected Party (I&AP) databases. • Drafting public participation documentation according to regulatory requirements: Background Information Documents; site notices and adverts; letters to stakeholders and/or Interested and Affected Parties; and comments and responses reports. • Arranging and facilitating public meetings. • Conducting consultations with community leaders, tribal chiefs, affected landowners, etc. • Providing administrative support to project managers.

PROJECT EXPERIENCE

RENEWABLE POWER GENERATION PROJECTS: SOLAR ENERGY FACILITIES AND WIND ENERGY FACILITIES

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
400MW (4x 100MW) Mutsho Solar PV, Limpopo Province	CRI Eagle	EAP
Angora Wind Energy Facility, Northern Cape Province	Great Karoo Renewable Energy (Pty) Ltd	EAP
Merino Wind Energy Facility, Northern Cape Province	Great Karoo Renewable Energy (Pty) Ltd	EAP
Vrede and Rondavel Solar PV Facilities, Free State Province	Mainstream Renewable Energy Developments (Pty) Ltd	Assistant EAP
40MW Buffelspoort Solar PV Energy Facility, North-West Province	Buffelspoort Solar Project	EAP
100MW Northam Solar PV Energy Facility, Limpopo Province	Zondereinde Solar Proprietary Limited	EAP
Umbila Emoyeni Renewable Farm, Mpumalanga Province	Emoyeni Renewable Energy Farm (Pty) Ltd	EAP

Basic Assessments

Project Name & Location	Client Name	Role
Northam Solar Photovoltaic (PV) Facility, Limpopo Province	Northam Platinum Limited	EAP
Hamlett Wind Energy Facility, Eastern Cape Province (project in progress)	Hamlett (Pty) Ltd	EAP
19.99MW Becrux Solar PV Facility, Mpumalanga Province	The SOLA Group	EAP
10MW Becrux Two Solar PV Facility, Free State Province	The SOLA Group	EAP
Aberdeen Wind Farm cluster - 4x 170MW Wind	Atlantic Energy Partners (Pty) Ltd	EAP

Screening Studies

Project Name & Location	Client Name	Role
Environmental Screening for the Proposed Secunda and Sasolburg Solar PV Facilities, Free State Province and Mpumalanga Province	The SOLA Group	EAP
Pre-feasibility Desktop Screening and Fatal Flaw Scan for wind project near Saldanha, Western Cape	SaldaWind (Pty) Ltd	EAP

Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Biodiversity Permitting and General Authorisation Applications for the Harmony Tshepong, Nyala and Eland Solar PV Facilities, Free State Province	Nyala Photovoltaic (Pty) Ltd Tshepong Photovoltaic (Pty) Ltd Eland Photovoltaic (Pty) Ltd	EAP
General Authorisation Application for the Northam Solar PV Facility, Limpopo Province	Northam Platinum Limited	EAP

Environmental Authorisation Amendment Applications

Project Name & Location	Client Name	Role
Part I Amendment: Proposed 75MW Sannaspos PV Plant (Phase 1) and its associated infrastructure, Free State Province	ENGIE BU Africa	EAP
Part I Amendment: Construction of the 140MW Korana Wind Energy Facility, Northern Cape Province	Mainstream Renewable Energy Developments (Pty) Ltd	EAP
Part I Amendment: Construction of the 75MW Korana Solar Energy Facility, Northern Cape Province	Mainstream Renewable Energy Developments (Pty) Ltd	EAP
Part I Amendment: Construction of the 140MW Khai-Ma Wind Energy Facility, Northern Cape Province	Mainstream Renewable Energy Developments (Pty) Ltd	EAP

GRID INFRASTRUCTURE PROJECTS

Basic Assessments

Project Name & Location	Client Name	Role
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Electrical Grid Infrastructure for the Kolkies and Sadawa PV clusters, Western Cape Province	Mainstream Renewable Energy Developments (Pty) Ltd	EAP
Electrical Grid Infrastructure for the Vrede and Rondavel Solar PV Facilities, Free State Province	Mainstream Renewable Energy Developments (Pty) Ltd	EAP
Sadawa Collector Substation, Western Cape Province	Mainstream Renewable Energy Developments (Pty) Ltd	EAP
Main Transmission Substation (MTS) associated with the Choje Wind Farm cluster, Eastern Cape Province (project in progress)	Wind Relic (Pty) Ltd	EAP
Great Karoo Electrical Grid Infrastructure, Northern Cape Province	Great Karoo Renewable Energy (Pty) Ltd	EAP
Electrical Grid Infrastructure for the Umbhila Emoyeni Renewable Farm, Mpumalanga Province	Emoyeni Renewable Energy Farm (Pty) Ltd	EAP
Electrical Grid Infrastructure for the Aberdeen Wind Farm Cluster	Atlantic Energy Partners (Pty) Ltd	EAP

Environmental Authorisation Amendment Applications

Project Name & Location	Client Name	Role
Part I Amendment: Construction of a 132kV power lines associated with the Poortjies Wind Energy Facility, Northern Cape Province	Mainstream Renewable Energy Developments (Pty) Ltd	EAP
Part I Amendment: Construction of a 132kV power lines associated with the Khai-Ma Wind Energy Facility, Northern Cape Province	Mainstream Renewable Energy Developments (Pty) Ltd	EAP
Part II Amendment: Korana solar power line Part 2 EA amendment, Northern Cape Province	Mainstream Renewable Energy Developments (Pty) Ltd	EAP

GAS EXPLORATION PROJECTS

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Kroonstad Gas Exploration Right and Environmental Authorisation, Free State Province	Western Allen Ridge Gold Mines (Pty) Ltd	Assistant EAP and Public Participation Consultant

MINING PROJECTS

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Pure Source Mine Mining Right Application, Free State Province	Monte Cristo Commercial Park (Pty) Ltd	Assistant EAP and Public Participation Consultant

Basic Assessments

Project Name & Location	Client Name	Role
Basic Assessment for the Western Margin Gap West Prospecting Right, Free State Province	White Rivers Exploration (Pty) Ltd	Assistant EAP

Basic Assessment for the Ventersburg Consolidated Prospecting Right, Free State Province	White Rivers Exploration (Pty) Ltd	Assistant EAP
Basic Assessment for the Nkunzana Prospecting Right, KwaZulu-Natal Province	WRE Base Metals (Pty) Ltd	Junior EAP
Basic Assessment for the Kroonstad North Prospecting Right, Free State Province	White Rivers Exploration (Pty) Ltd	Junior EAP
Basic Assessment for the Vredefort West Extension Prospecting Right, Free State Province	White Rivers Exploration (Pty) Ltd	Junior EAP
Basic Assessment for the Beisa North Prospecting Right, Free State Province	Sunshine Mineral Reserves (Pty) Ltd	EAP
Basic Assessment for the Palmietfontein Mining Permit, North-West Province	Palm Chrome (Py) Ltd	Assistant EAP

Specialist Studies

Project Name & Location	Client Name	Role
New Largo Mine Closure and Rehabilitation Plan, Mpumalanga Province	Seriti Coal	Junior Environmental Consultant
Smarty Minerals Integrated Environmental Authorisation: Wetland Impact Assessment Report, Limpopo Province	Smarty Minerals Investment (Pty) Ltd	Junior Environmental Consultant
Glencore Water Treatment Plant Pipeline: Wetland Monitoring, Mpumalanga Province	Glencore	Junior Environmental Consultant

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
Glencore Merafe Wonderkop Smelter, Regulation 34 Audit, North West Province	Glencore	Auditor
Tshipi Borwa Mine Water Use Licence Audit, Northern Cape Province	Tshipi Borwa Mine	Auditor
Samancor Middelburg Ferrochrome: Construction of ore dryer, Mpumalanga Province	Samancor Middelburg Ferrochrome	ECO
Various Annual Financial Provision and Environmental Compliance Audits for prospecting sites as per the MPRDA, Free State and KwaZulu-Natal Province	White River's Exploration (Pty) Ltd	Auditor
Impala Platinum Limited – Springs annual external Water Use Licence Audit, Gauteng Province	Impala Platinum Limited	Auditor

INFRASTRUCTURE DEVELOPMENT PROJECTS (BRIDGES, PIPELINES, ROADS, WATER RESOURCES, STORAGE, ETC)

Specialist Studies

Project Name & Location	Client Name	Role
Closure cost model estimate and closure cost report for the Proposed Surface Pipeline and Associated Infrastructure, Gauteng Province	AngloGold Ashanti	Junior Environmental Consultant
Wetland Impact Assessment report for Proposed Surface Pipeline and Associated Infrastructure, Gauteng Province	AngloGold Ashanti	Junior Environmental Consultant

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
MWCAP-2A Environmental Management Audit, Limpopo Province	Nexia SAB&T	Auditor

AGRICULTURE PROJECTS**Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications**

Project Name & Location	Client Name	Role
Dew Crisp Water Use Licence Application, Gauteng Province	Dew Crisp (Pty) Ltd	Junior Environmental Consultant (providing assistance)

OTHER**Environmental Impact Assessments and Environmental Management Programmes**

Project Name & Location	Client Name	Role
Anglo African Metals Zero Waste Recovery Solution, Mpumalanga Province	Anglo African Metals (Pty) Ltd	EAP
Eskom Majuba Landfill, Mpumalanga Province (project in progress)	Eskom	EAP
Expansion of Recreational and Sports Facilities at the Country Club Johannesburg	Country Club Johannesburg	EAP

CURRICULUM VITAE OF JO-ANNE THOMAS

Profession:	Environmental Management and Compliance Consultant; Environmental Assessment Practitioner
Specialisation:	Environmental Management; Strategic environmental advice; Environmental compliance advice & monitoring; Environmental Impact Assessments; Policy, strategy & guideline formulation; Project Management; General Ecology
Work experience:	Twenty four (24) years in the environmental field

VOCATIONAL EXPERIENCE

Provide technical input for projects in the environmental management field, specialising in Strategic Environmental Advice, Environmental Impact Assessment studies, environmental auditing and monitoring, environmental permitting, public participation, Environmental Management Plans and Programmes, environmental policy, strategy and guideline formulation, and integrated environmental management. Key focus on integration of the specialist environmental studies and findings into larger engineering-based projects, strategic assessment, and providing practical and achievable environmental management solutions and mitigation measures. Responsibilities for environmental studies include project management (including client and authority liaison and management of specialist teams); review and manipulation of data; identification and assessment of potential negative environmental impacts and benefits; review of specialist studies; and the identification of mitigation measures. Compilation of the reports for environmental studies is in accordance with all relevant environmental legislation.

Undertaking of numerous environmental management studies has resulted in a good working knowledge of environmental legislation and policy requirements. Recent projects have been undertaken for both the public- and private-sector, including compliance advice and monitoring, electricity generation and transmission projects, various types of linear developments (such as National Road, local roads and power lines), waste management projects (landfills), mining rights and permits, policy, strategy and guideline development, as well as general environmental planning, development and management.

SKILLS BASE AND CORE COMPETENCIES

- Project management for a range of projects
- Identification and assessment of potential negative environmental impacts and benefits through the review and manipulation of data and specialist studies
- Identification of practical and achievable mitigation and management measures and the development of appropriate management plans
- Compilation of environmental reports in accordance with relevant environmental legislative requirements
- External and peer review of environmental reports & compliance advice and monitoring
- Formulation of environmental policies, strategies and guidelines
- Strategic and regional assessments; pre-feasibility & site selection
- Public participation processes for a variety of projects
- Strategic environmental advice to a wide variety of clients both in the public and private sectors
- Working knowledge of environmental planning processes, policies, regulatory frameworks and legislation

EDUCATION AND PROFESSIONAL STATUS

Degrees:

- B.Sc Earth Sciences, University of the Witwatersrand, Johannesburg (1993)
- B.Sc Honours in Botany, University of the Witwatersrand, Johannesburg (1994)
- M.Sc in Botany, University of the Witwatersrand, Johannesburg (1996)

Short Courses:

- Environmental Impact Assessment, Potchefstroom University (1998)
- Environmental Law, Morgan University (2001)
- Environmental Legislation, IMBEWU (2017)
- Mining Legislation, Cameron Cross & Associates (2013)
- Environmental and Social Risk Management (ESRM), International Finance Corporation (2018)

Professional Society Affiliations:

- Registered EAP with the Environmental Assessment Practitioners Association of South Africa (EAPASA) (2019/726)
- Registered with the South African Council for Natural Scientific Professions as a Professional Natural Scientist: Environmental Scientist (400024/00)
- Registered with the International Association for Impact Assessment South Africa (IAIASa): 5601
- Member of the South African Wind Energy Association (SAWEA)

EMPLOYMENT

Date	Company	Roles and Responsibilities
January 2006 - Current:	Savannah Environmental (Pty) Ltd	Director Project manager Independent specialist environmental consultant, Environmental Assessment Practitioner (EAP) and advisor.
1997 – 2005:	Bohlweki Environmental (Pty) Ltd	Senior Environmental Scientist at. Environmental Management and Project Management
January – July 1997:	Sutherland High School, Pretoria	Junior Science Teacher

PROJECT EXPERIENCE

Project experience includes large infrastructure projects, including electricity generation and transmission, wastewater treatment facilities, mining and prospecting activities, property development, and national roads, as well as strategy and guidelines development.

RENEWABLE POWER GENERATION PROJECTS: PHOTOVOLTAIC SOLAR ENERGY FACILITIES

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Christiana PV 2 SEF, North West	Solar Reserve South Africa	Project Manager & EAP
De Aar PV facility, Northern Cape	iNca Energy	Project Manager & EAP
Everest SEF near Hennenman, Free State	FRV Energy South Africa	Project Manager & EAP
Graafwater PV SEF, Western Cape	iNca Energy	Project Manager & EAP
Grootkop SEF near Allanridge, Free State	FRV Energy South Africa	Project Manager & EAP
Hertzogville PV 2 SEF with 2 phases, Free State	SunCorp / Solar Reserve	Project Manager & EAP

Project Name & Location	Client Name	Role
Karoshhoek CPV facility on site 2 as part of the larger Karoshhoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP
Kgabalatsane SEF North-East for Brits, North West	Built Environment African Energy Services	Project Manager & EAP
Kleinbegin PV SEF West of Groblershoop, Northern Cape	MedEnergy Global	Project Manager & EAP
Lethabo Power Station PV Installation, Free State	Eskom Holdings SoC Limited	Project Manager & EAP
Majuba Power Station PV Installation, Mpumalanga	Eskom Holdings SoC Limited	Project Manager & EAP
Merapi PV SEF Phase 1 – 4 South-East of Excelsior, Free State	SolaireDirect Southern Africa	Project Manager & EAP
Sannaspos Solar Park, Free State	SolaireDirect Southern Africa	Project Manager & EAP
Ofir-Zx PV Plant near Keimoes, Northern Cape	S28 Degrees Energy	Project Manager & EAP
Oryx SEF near Virginia, Free State	FRV Energy South Africa	Project Manager & EAP
Project Blue SEF North of Kleinsee, Northern Cape	WWK Development	Project Manager & EAP
S-Kol PV Plant near Keimoes, Northern Cape	S28 Degrees Energy	Project Manager & EAP
Sonnenberg PV Plant near Keimoes, Northern Cape	S28 Degrees Energy	Project Manager & EAP
Tutuka Power Station PV Installation, Mpumalanga	Eskom Transmission	Project Manager & EAP
Two PV sites within the Northern Cape	MedEnergy Global	Project Manager & EAP
Two PV sites within the Western & Northern Cape	iNca Energy	Project Manager & EAP
Upington PV SEF, Northern Cape	MedEnergy Global	Project Manager & EAP
Vredendal PV facility, Western Cape	iNca Energy	Project Manager & EAP
Waterberg PV plant, Limpopo	Thupela Energy	Project Manager & EAP
Watershed Phase I & II SEF near Litchtenburg, North West	FRV Energy South Africa	Project Manager & EAP
Alldays PV & CPV SEF Phase 1, Limpopo	BioTherm Energy	Project Manager & EAP
Hyperion PV Solar Development 1, 2, 3, 4, 5 & 6, Northern Cape	Building Energy	Project Manager & EAP
Vrede & Rondavel PV, Free State	Mainstream Renewable Energy Developments	Project Manager & EAP

Basic Assessments

Project Name & Location	Client Name	Role
Aberdeen PV SEF, Eastern Cape	BioTherm Energy	Project Manager & EAP
Christiana PV 1 SEF on Hartebeestpan Farm, North-West	Solar Reserve South Africa	Project Manager & EAP
Heuningspruit PV1 & PV 2 facilities near Koppies, Free State	Sun Mechanics	Project Manager & EAP
Kakamas PV Facility, Northern Cape	iNca Energy	Project Manager & EAP
Kakamas II PV Facility, Northern Cape	iNca Energy	Project Manager & EAP
Machadodorp 1 PV SEF, Mpumalanga	Solar To Benefit Africa	Project Manager & EAP
PV site within the Northern Cape	iNca Energy	Project Manager & EAP
PV sites within 4 ACSA airports within South Africa, National	Airports Company South Africa (ACSA)	Project Manager & EAP
RustMo1 PV Plant near Buffelspoort, North West	Momentous Energy	Project Manager & EAP
RustMo2 PV Plant near Buffelspoort, North West	Momentous Energy	Project Manager & EAP
RustMo3 PV Plant near Buffelspoort, North West	Momentous Energy	Project Manager & EAP
RustMo4 PV Plant near Buffelspoort, North West	Momentous Energy	Project Manager & EAP

Project Name & Location	Client Name	Role
Sannaspos PV SEF Phase 2 near Bloemfontein, Free State	SolaireDirect Southern Africa	Project Manager & EAP
Solar Park Expansion within the Rooiwal Power Station, Gauteng	AFRKO Energy	Project Manager & EAP
Steynsrus SEF, Free State	SunCorp	Project Manager & EAP
Sirius Solar PV Project Three and Sirius Solar PV Project Four (BA in terms of REDZ regulations), Northern Cape	SOLA Future Energy	Project Manager & EAP
Northam PV, Limpopo Province	Northam Platinum	Project Manager & EAP
Kolkies PV Suite (x 6 projects) and Sadawa PV Suite (x 4 projects), Western Cape	Mainstream Renewable Energy Developments	Project Manager & EAP

Screening Studies

Project Name & Location	Client Name	Role
Allemans Fontein SEF near Noupoot, Northern Cape	Fusion Energy	Project Manager & EAP
Amandel SEF near Thabazimbi, Limpopo	iNca Energy	Project Manager & EAP
Arola/Doomplaat SEF near Ventersdorp, North West	FRV & iNca Energy	Project Manager & EAP
Bloemfontein Airport PV Installation, Free State	The Power Company	Project Manager & EAP
Brakspuit SEF near Klerksorp, North West	FRV & iNca Energy	Project Manager & EAP
Carolus Poort SEF near Noupoot, Northern Cape	Fusion Energy	Project Manager & EAP
Damfontein SEF near Noupoot, Northern Cape	Fusion Energy	Project Manager & EAP
Everest SEF near Welkom, Free State	FRV & iNca Energy	Project Manager & EAP
Gillmer SEF near Noupoot, Northern Cape	Fusion Energy	Project Manager & EAP
Grootkop SEF near Allansridge, Free State	FRV & iNca Energy	Project Manager & EAP
Heuningspruit PV1 & PV 2 near Koppies, Free State	Cronimat	Project Manager & EAP
Kimberley Airport PV Installation, Northern Cape	The Power Company	Project Manager & EAP
Kolonnade Mall Rooftop PV Installation in Tshwane, Gauteng	Momentous Energy	Project Manager & EAP
Loskop SEF near Groblersdal, Limpopo	S&P Power Unit	Project Manager & EAP
Marble SEF near Marble Hall, Limpopo	S&P Power Unit	Project Manager & EAP
Morgenson PV1 SEF South-West of Windsorton, Northern Cape	Solar Reserve South Africa	Project Manager & EAP
OR Tambo Airport PV Installation, Gauteng	The Power Company	Project Manager & EAP
Oryx SEF near Virginia, Free State	FRV & iNca Energy	Project Manager & EAP
Rhino SEF near Vaalwater, Limpopo	S&P Power Unit	Project Manager & EAP
Rustmo2 PV Plant near Buffelspoort, North West	Momentous Energy	Project Manager & EAP
Spitskop SEF near Northam, Limpopo	FRV & iNca Energy	Project Manager & EAP
Steynsrus PV, Free State	Suncorp	Project Manager & EAP
Tabor SEF near Polokwane, Limpopo	FRV & iNca Energy	Project Manager & EAP
Upington Airport PV Installation, Northern Cape	The Power Company	Project Manager & EAP
Valeria SEF near Hartebeestpoort Dam, North West	Solar to Benefit Africa	Project Manager & EAP
Watershed SEF near Lichtenburg, North West	FRV & iNca Energy	Project Manager & EAP
Witkop SEF near Polokwane, Limpopo	FRV & iNca Energy	Project Manager & EAP
Woodmead Retail Park Rooftop PV Installation, Gauteng	Momentous Energy	Project Manager & EAP

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO and bi-monthly auditing for the construction of the Adams Solar PV Project Two South of Hotazel,	Enel Green Power	Project Manager

Project Name & Location	Client Name	Role
Northern Cape		
ECO for the construction of the Kathu PV Facility, Northern Cape	REISA	Project Manager
ECO and bi-monthly auditing for the construction of the Pulida PV Facility, Free State	Enel Green Power	Project Manager
ECO for the construction of the RustMo1 SEF, North West	Momentous Energy	Project Manager
ECO for the construction of the Sishen SEF, Northern Cape	Windfall 59 Properties	Project Manager
ECO for the construction of the Upington Airport PV Facility, Northern Cape	Sublary Trading	Project Manager
Quarterly compliance monitoring of compliance with all environmental licenses for the operation activities at the Kathu PV facility, Northern Cape	REISA	Project Manager
ECO for the construction of the Konkoonsies II PV SEF and associated infrastructure, Northern Cape	BioTherm Energy	Project Manager
ECO for the construction of the Aggeneys PV SEF and associated infrastructure, Northern Cape	BioTherm Energy	Project Manager

Compliance Advice and ESAP Reporting

Project Name & Location	Client Name	Role
Aggeneys Solar Farm, Northern Cape	BioTherm Energy	Environmental Advisor
Airies II PV Facility SW of Kenhardt, Northern Cape	BioTherm Energy	Environmental Advisor
Kalahari SEF Phase II in Kathu, Northern Cape	Engle	Environmental Advisor
Kathu PV Facility, Northern Cape	Building Energy	Environmental Advisor
Kenhardt PV Facility, Northern Cape	BioTherm Energy	Environmental Advisor
Kleinbegin PV SEF West of Groblershoop, Northern Cape	MedEnergy	Environmental Advisor
Konkoonsies II SEF near Pofadder, Northern Cape	BioTherm Energy	Environmental Advisor
Konkoonsies Solar Farm, Northern Cape	BioTherm Energy	Environmental Advisor
Lephalale SEF, Limpopo	Exxaro	Environmental Advisor
Pixley ka Seme PV Park, South-East of De Aar, Northern Cape	African Clean Energy Developments (ACED)	Environmental Advisor
RustMo1 PV Plant near Buffelspoort, North West	Momentous Energy	Environmental Advisor
Scuitdrift 1 SEF & Scuitdrift 2 SEF, Limpopo	Building Energy	Environmental Advisor
Sirius PV Plants, Northern Cape	Aurora Power Solutions	Environmental Advisor
Upington Airport PV Power Project, Northern Cape	Sublary Trading	Environmental Advisor
Upington SEF, Northern Cape	Abengoa Solar	Environmental Advisor
Ofir-ZX PV SEF near Keimoes, Northern Cape	Network S28 Energy	Environmental Advisor
Environmental Permitting for the Steynsrus PV1 & PV2 SEF's, Northern Cape	Cronimet Power Solutions	Environmental Advisor
Environmental Permitting for the Heuningspruit PV SEF, Northern Cape	Cronimet Power Solutions	Environmental Advisor

Due Diligence Reporting

Project Name & Location	Client Name	Role
5 PV SEF projects in Lephalale, Limpopo	iNca Energy	Environmental Advisor
Prieska PV Plant, Northern Cape	SunEdison Energy India	Environmental Advisor
Sirius Phase One PV Facility near Upington, Northern Cape	Aurora Power Solutions	Environmental Advisor

Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Biodiversity Permit & WULA for the Aggeneys SEF near Aggeneys, Northern Cape	BioTherm Energy	Project Manager & EAP
Biodiversity Permit for the Konkoonises II SEF near Pofadder, Northern Cape	BioTherm Energy	Project Manager & EAP
Biodiversity Permitting for the Lephallale SEF, Limpopo	Exxaro Resources	Project Manager & EAP
Environmental Permitting for the Kleinbegin PV SEF West of Groblershoop, Northern Cape	MedEnergy	Project Manager & EAP
Environmental Permitting for the Upington SEF, Northern Cape	Abengoa Solar	Project Manager & EAP
Environmental Permitting for the Kathu PV Facility, Northern Cape	Building Energy	Project Manager & EAP
Environmental Permitting for the Konkoonsies Solar Farm, Northern Cape	BioTherm Energy	Project Manager & EAP
Environmental Permitting for the Lephallale SEF, Limpopo	Exxaro Resources	Project Manager & EAP
Environmental Permitting for the Scuitdrift 1 SEF & Scuitdrift 2 SEF, Limpopo	Building Energy	Project Manager & EAP
Environmental Permitting for the Sirius PV Plant, Northern Cape	Aurora Power Solutions	Project Manager & EAP
Environmental Permitting for the Steynsrus PV1 & PV2 SEF's, Northern Cape	Cronimet Power Solutions	Project Manager & EAP
Environmental Permitting for the Heuningspruit PV SEF, Northern Cape	Cronimet Power Solutions	Project Manager & EAP
Permits for the Kleinbegin and UAP PV Plants, Northern Cape	MedEnergy Global	Project Manager & EAP
S53 Application for Arriesfontein Solar Park Phase 1 – 3 near Danielskuil, Northern Cape	Solar Reserve / SunCorp	Project Manager & EAP
S53 Application for Hertzogville PV1 & PV 2 SEFs, Free State	Solar Reserve / SunCorp	Project Manager & EAP
S53 Application for the Bloemfontein Airport PV Facility, Free State	Sublunary Trading	Project Manager & EAP
S53 Application for the Kimberley Airport PV Facility, Northern Cape	Sublunary Trading	Project Manager & EAP
S53 Application for the Project Blue SEF, Northern Cape	WWK Developments	Project Manager & EAP
S53 Application for the Upington Airport PV Facility, Free State	Sublunary Trading	Project Manager & EAP
WULA for the Kalahari SEF Phase II in Kathu, Northern Cape	Engie	Project Manager & EAP

RENEWABLE POWER GENERATION PROJECTS: CONCENTRATED SOLAR FACILITIES (CSP)

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Ilanga CSP 2, 3, 4, 5, 7 & 9 Facilities near Upington, Northern Cape	Emvelo Holdings	Project Manager & EAP
Ilanga CSP near Upington, Northern Cape	Ilangethu Energy	Project Manager & EAP

Project Name & Location	Client Name	Role
Ilanga Tower 1 Facility near Upington, Northern Cape	Emvelo Holdings	Project Manager & EAP
Karoshhoek CPVPD 1-4 facilities on site 2 as part of the larger Karoshhoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP
Karoshhoek CSP facilities on sites 1.4; 4 & 5 as part of the larger Karoshhoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP
Karoshhoek Linear Fresnel 1 Facility on site 1.1 as part of the larger Karoshhoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO for the construction of the !Khi CSP Facility, Northern Cape	Abengoa Solar	Project Manager
ECO for the construction of the Ilanga CSP 1 Facility near Upington, Northern Cape	Karoshhoek Solar One	Project Manager
ECO for the construction of the Solar Park, Northern Cape	Kathu Solar	Project Manager
ECO for the construction of the KaXu! CSP Facility, Northern Cape	Abengoa Solar	Project Manager
Internal audit of compliance with the conditions of the IWUL issued to the Karoshhoek Solar One CSP Facility, Northern Cape	Karoshhoek Solar One	Project Manager

Screening Studies

Project Name & Location	Client Name	Role
Upington CSP (Tower) Plant near Kanoneiland, Northern Cape	iNca Energy and FRV	Project Manager & EAP

Compliance Advice and ESAP reporting

Project Name & Location	Client Name	Role
Ilanga CSP Facility near Upington, Northern Cape	Ilangethu Energy	Environmental Advisor
Ilangalethu CSP 2, Northern Cape	FG Emvelo	Environmental Advisor
Kathu CSP Facility, Northern Cape	GDF Suez	Environmental Advisor
Lephalale SEF, Limpopo	Cennergi	Environmental Advisor
Solis I CSP Facility, Northern Cape	Brightsource	Environmental Advisor

Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Environmental Permitting for the Ilanga CSP Facility near Upington, Northern Cape	Ilangethu Energy	Project Manager & EAP
Environmental Permitting for the Kathu CSP, Northern Cape	GDF Suez	Project Manager & EAP
WULA for the Solis I CSP Facility, Northern Cape	Brightsource	Project Manager & EAP

RENEWABLE POWER GENERATION PROJECTS: WIND ENERGY FACILITIES

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Sere WEF, Western Cape	Eskom Holdings SoC Limited	EAP
Aberdeen WEF, Eastern Cape	Eskom Holdings SoC Limited	Project Manager & EAP
Amakhala Emoyeni WEF, Eastern Cape	Windlab Developments	Project Manager & EAP
EXXARO West Coast WEF, Western Cape	EXXARO Resources	Project Manager & EAP
Goereesoe Wind Farm near Swellendam, Western Cape	iNca Energy	Project Manager & EAP
Hartneest WEF, Western Cape	Juwi Renewable Energies	Project Manager & EAP
Hopefield WEF, Western Cape	Umoya Energy	EAP
Kleinsee WEF, Northern Cape	Eskom Holdings SoC Limited	Project Manager & EAP
Klipheuwel/Dassiesfontein WEF within the Overberg area, Western Cape	BioTherm Energy	Project Manager & EAP
Moorreesburg WEF, Western Cape	iNca Energy	Project Manager & EAP
Oyster Bay WEF, Eastern Cape	Renewable Energy Resources Southern Africa	Project Manager & EAP
Project Blue WEF, Northern Cape	Windy World	Project Manager & EAP
Rhebokfontein WEF, Western Cape	Moyeng Energy	Project Manager & EAP
Spitskop East WEF near Riebeeck East, Eastern Cape	Renewable Energy Resources Southern Africa	Project Manager & EAP
Suurplaat WEF, Western Cape	Moyeng Energy	Project Manager & EAP
Swellendam WEF, Western Cape	IE Swellendam	Project Manager & EAP
Tsitsikamma WEF, Eastern Cape	Exxarro	Project Manager & EAP
West Coast One WEF, Western Cape	Moyeng Energy	Project Manager & EAP

Basic Assessments

Project Name & Location	Client Name	Role
Amakhala Emoyeni Wind Monitoring Masts, Eastern Cape	Windlab Developments	Project Manager & EAP
Beaufort West Wind Monitoring Masts, Western Cape	Umoya Energy	Project Manager & EAP
Hopefield Community Wind Farm near Hopefield, Western Cape	Umoya Energy	Project Manager & EAP
Koekenaap Wind Monitoring Masts, Western Cape	EXXARO Resources	Project Manager & EAP
Koingnaas WEF, Northern Cape	Just Palm Tree Power	Project Manager & EAP
Laingsburg Area Wind Monitoring Masts, Western Cape	Umoya Energy	Project Manager & EAP
Overberg Area Wind Monitoring Masts, Western Cape	BioTherm Energy	Project Manager & EAP
Oyster Bay Wind Monitoring Masts, Eastern Cape	Renewable Energy Systems Southern Africa (RES)	Project Manager & EAP
Wind Garden & Fronteer WEFs, Eastern Cape	Wind Relc	Project Manager & EAP

Screening Studies

Project Name & Location	Client Name	Role
Albertinia WEF, Western Cape	BioTherm Energy	Project Manager & EAP
Koingnaas WEF, Northern Cape	Just Pal Tree Power	Project Manager & EAP
Napier Region WEF Developments, Western Cape	BioTherm Energy	Project Manager & EAP
Tsitsikamma WEF, Eastern Cape	Exxarro Resources	Project Manager & EAP

Project Name & Location	Client Name	Role
Various WEFs within an identified area in the Overberg area, Western Cape	BioTherm Energy	Project Manager & EAP
Various WEFs within an identified area on the West Coast, Western Cape	Investec Bank Limited	Project Manager & EAP
Various WEFs within an identified area on the West Coast, Western Cape	Eskom Holdings Limited	Project Manager & EAP
Various WEFs within the Western Cape	Western Cape Department of Environmental Affairs and Development Planning	Project Manager & EAP
Velddrift WEF, Western Cape	VentuSA Energy	Project Manager & EAP
Wind 1000 Project	Thabo Consulting on behalf of Eskom Holdings	Project Manager & EAP
Wittekleibosch, Snylip & Doriskraal WEFs, Eastern Cape	Exxarro Resources	Project Manager & EAP

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO for the construction of the West Coast One WEF, Western Cape	Aurora Wind Power	Project Manager
ECO for the construction of the Gouda WEF, Western Cape	Blue Falcon	Project Manager
EO for the Dassiesklip Wind Energy Facility, Western Cape	Group 5	Project Manager
Quarterly compliance monitoring of compliance with all environmental licenses for the operation activities at the Gouda Wind Energy facility near Gouda, Western Cape	Blue Falcon	Project Manager
Annual auditing of compliance with all environmental licenses for the operation activities at the West Coast One Wind Energy facility near Vredenburg, Western Cape	Aurora Wind Power	Project Manager
External environmental and social audit for the Amakhala Wind Farm, Eastern Cape	Cennergi	Project Manager
External environmental and social audit for the Tsitsikamma Wind Farm, Eastern Cape	Cennergi	Project Manager
ECO for the construction of the Excelsior Wind Farm and associated infrastructure, Northern Cape	BioTherm Energy	Project Manager
External compliance audit of the Dassiesklip Wind Energy Facility, Western Cape	BioTherm Energy	Project Manager

Compliance Advice

Project Name & Location	Client Name	Role
Amakhala Phase 1 WEF, Eastern Cape	Cennergi	Environmental Advisor
Dassiesfontein WEF within the Overberg area, Western Cape	BioTherm Energy	Environmental Advisor
Excelsior Wind Farm, Western Cape	BioTherm Energy	Environmental Advisor
Great Karoo Wind Farm, Northern Cape	African Clean Energy Developments (ACED)	Environmental Advisor
Hopefield Community WEF, Western Cape	African Clean Energy Developments (ACED)	Environmental Advisor

Rheboksfontein WEF, Western Cape	Moyeng Energy	Environmental Advisor
Tiqua WEF, Western Cape	Cennergi	Environmental Advisor
Tsitsikamma WEF, Eastern Cape	Cennergi	Environmental Advisor
West Coast One WEF, Western Cape	Moyeng Energy	Environmental Advisor

Due Diligence Reporting

Project Name & Location	Client Name	Role
Witteberg WEF, Western Cape	EDPR Renewables	Environmental Advisor
IPD Vredenburg WEF within the Saldanha Bay area, Western Cape	IL&FS Energy Development Company	Environmental Advisor

Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Biodiversity Permitting for the Power Line between the Tsitsikamma Community WEF & the Diep River Substation, Eastern Cape	Cennergi	Project Manager & EAP
Biodiversity Permitting for the West Coast One WEF, Western Cape	Aurora Wind Power	Project Manager & EAP
Environmental Permitting for the Excelsior WEF, Western Cape	BioTherm Energy	Project Manager & EAP
Plant Permits & WULA for the Tsitsikamma Community WEF, Eastern Cape	Cennergi	Project Manager & EAP
S24G and WULA for the Rectification for the commencement of unlawful activities on Ruimsig AH in Honeydew, Gauteng	Hossam Soror	Project Manager & EAP
S24G Application for the Rheboksfontein WEF, Western Cape	Ormonde - Theo Basson	Project Manager & EAP
S53 Application & WULA for Suurplaat and Gemini WEFs, Northern Cape	Engie	Project Manager & EAP
S53 Application for the Hopefield Community Wind Farm near Hopefield, Western Cape	Umoya Energy	Project Manager & EAP
S53 Application for the Project Blue WEF, Northern Cape	WWK Developments	Project Manager & EAP
S53 for the Oyster Bay WEF, Eastern Cape	RES	Project Manager & EAP
WULA for the Great Karoo Wind Farm, Northern Cape	African Clean Energy Developments (ACED)	Project Manager & EAP

CONVENTIONAL POWER GENERATION PROJECTS (COAL)

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Mutsho Power Station near Makhado, Limpopo	Mutsho Consortium	Project Manager & EAP
Coal-fired Power Station near Ogies, Mpumalanga	Ruukki SA	Project Manager & EAP
Thabametsi IPP Coal-fired Power Station, near Lephalale, Limpopo	Axia	Project Manager & EAP
Transalloys Coal-fired Power Station, Mpumalanga	Transalloys	Project Manager & EAP
Tshivasho IPP Coal-fired Power Station (with WML), near Lephalale, Limpopo	Cennergi	Project Manager & EAP
Umbani Coal-fired Power Station, near Kriel, Mpumalanga	ISS Global Mining	Project Manager & EAP

Project Name & Location	Client Name	Role
Waterberg IPP Coal-Fired Power Station near Lephallale, Limpopo	Exxaro Resources	Project Manager & EAP

Basic Assessments

Project Name & Location	Client Name	Role
Coal Stockyard on Medupi Ash Dump Site, Limpopo	Eskom Holdings	Project Manager & EAP
Biomass Co-Firing Demonstration Facility at Arnot Power Station East of Middleburg, Mpumlanaga	Eskom Holdings	Project Manager & EAP

Screening Studies

Project Name & Location	Client Name	Role
Baseload Power Station near Lephallale, Limpopo	Cennergi	Project Manager & EAP
Coal-Fired Power Plant near Delmas, Mpumalanga	Exxaro Resources	Project Manager & EAP
Makhado Power Station, Limpopo	Mutsho Consortium, Limpopo	Project Manager & EAP

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO for the Camden Power Station, Mpumalanga	Eskom Holdings	Project Manager

Compliance Advice

Project Name & Location	Client Name	Role
Thabametsi IPP Coal-fired Power Station, near Lephallale, Limpopo	Axia	Environmental Advisor

Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Permit application for the Thabametsi Bulk Water Pipeline, near Lephallale, Limpopo	Axia	Project Manager & EAP
S53 & WULA for the Waterberg IPP Coal-Fired Power Station near Lephallale, Limpopo	Exxaro Resources	Project Manager & EAP
S53 Application for the Tshivasho Coal-fired Power Station near Lephallale, Limpopo	Cennergi	Project Manager & EAP

CONVENTIONAL POWER GENERATION PROJECTS (GAS)

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Ankerlig OCGT to CCGT Conversion project & 400 kV transmission power line between Ankerlig and the Omega Substation, Western Cape	Eskom Holdings SoC Limited	Project Manager & EAP
Gourikwa OCGT to CCGT Conversion project & 400kV transmission power line between Gourikwa & Proteus Substation, Western Cape	Eskom Holdings SoC Limited	Project Manager & EAP
Richards Bay Gas to Power Combined Cycle Power Station, KwaZulu-Natal	Eskom Holdings SoC Limited	Project Manager & EAP
Richards Bay Gas to Power Plant, KwaZulu-Natal	Richards Bay Gas Power 2	Project Manager & EAP
Decommissioning & Recommissioning of 3 Gas Turbine Units at Acacia Power Station & 1 Gas Turbine Unit at Port Rex Power Station to the existing	Eskom Holdings	Project Manager & EAP

Project Name & Location	Client Name	Role
Ankerlig Power Station in Atlantis Industria, Western Cape		
320MW gas-to-power station in Richards Bay, KwaZulu-Natal	Phinda Power Projects	Project Manager & EAP

Screening Studies

Project Name & Location	Client Name	Role
Fatal Flaw Analysis for 3 area identified for the establishment of a 500MW CCGT Power Station	Globeleq Advisors Limited	Project Manager & EAP
Richards Bay Gas to Power Combined Cycle Power Station, KwaZulu-Natal	Eskom Holdings SoC Limited	Project Manager & EAP

GRID INFRASTRUCTURE PROJECTS

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Aggeneis-Oranjemond Transmission Line & Substation Upgrade, Northern Cape	Eskom Transmission	Project Manager & EAP
Ankerlig-Omega Transmission Power Lines, Western Cape	Eskom Transmission	Project Manager & EAP
Karoshhoek Grid Integration project as part of the Karoshhoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP
Koeberg-Omega Transmission Power Lines,, Western Cape	Eskom Transmission	Project Manager & EAP
Koeberg-Stikland Transmission Power Lines, Western Cape	Eskom Transmission	Project Manager & EAP
Kyalami Strengthening Project, Gauteng	Eskom Transmission	Project Manager & EAP
Mokopane Integration Project, Limpopo	Eskom Transmission	Project Manager & EAP
Saldanha Bay Strengthening Project, Western Cape	Eskom Transmission	Project Manager & EAP
Steelpoort Integration Project, Limpopo	Eskom Transmission	Project Manager & EAP
Transmission Lines from the Koeberg-2 Nuclear Power Station site, Western Cape	Eskom Transmission	Project Manager & EAP
Tshwane Strengthening Project, Phase 1, Gauteng	Eskom Transmission	Project Manager & EAP
Main Transmission Substation (MTS) associated with the Choje Wind Farm cluster, Eastern Cape	Wind Relic	Project Manager & EAP

Basic Assessments

Project Name & Location	Client Name	Role
Dassenberg-Koeberg Power Line Deviation from the Koeberg to the Ankerlig Power Station, Western Cape	Eskom Holdings	Project Manager & EAP
Golden Valley II WEF Power Line & Substation near Cookhouse, Eastern Cape	BioTherm Energy	Project Manager & EAP
Golden Valley WEF Power Line near Cookhouse, Eastern Cape	BioTherm Energy	Project Manager & EAP
Karoshhoek Grid Integration project as part of the Karoshhoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP

Project Name & Location	Client Name	Role
Konkoonsies II PV SEF Power Line to the Paulputs Substation near Pofadder, Northern Cape	BioTherm Energy	Project Manager & EAP
Perdekraal West WEF Powerline to the Eskom Kappa Substation, Western Cape	BioTherm Energy	Project Manager & EAP
Rheboksfontein WEF Powerline to the Aurora Substation, Western Cape	Moyeng Energy	Project Manager & EAP
Soetwater Switching Station near Sutherland, Northern Cape	African Clean Energy Developments (ACED)	Project Manager & EAP
Solis Power I Power Line & Switchyard Station near Upington, Northern Cape	Brightsource	Project Manager & EAP
Stormwater Canal System for the Ilanga CSP near Upington, Northern Cape	Karoshhoek Solar One	Project Manager & EAP
Tsitsikamma Community WEF Powerline to the Diep River Substation, Eastern Cape	Eskom Holdings	Project Manager & EAP
Two 132kV Chickadee Lines to the new Zonnebloem Switching Station, Mpumalanga	Eskom Holdings	Project Manager & EAP
Electrical Grid Infrastructure for the Kolkies and Sadawa PV clusters, Western Cape	Mainstream Renewable Energy Developments	Project Manager & EAP
Sadawa Collector substation, Western Cape	Mainstream Renewable Energy Developments	Project Manager & EAP
Electrical Grid Infrastructure for the Vrede and Rondavel PV facilities, Free State	Mainstream Renewable Energy Developments	Project Manager & EAP

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO for the construction of the Ferrum-Mookodi Transmission Line, Northern Cape and North West	Trans-Africa Projects on behalf of Eskom	Project Manager
EO for the construction of the Gamma-Kappa Section A Transmission Line, Western Cape	Trans-Africa Projects on behalf of Eskom	Project Manager
EO for the construction of the Gamma-Kappa Section B Transmission Line, Western Cape	Trans-Africa Projects on behalf of Eskom	Project Manager
EO for the construction of the Hydra IPP Integration project, Northern Cape	Trans-Africa Projects on behalf of Eskom	Project Manager
EO for the construction of the Kappa-Sterrekus Section C Transmission Line, Western Cape	Trans-Africa Projects on behalf of Eskom	Project Manager
EO for the construction of the Namaqualand Strengthening project in Port Nolloth, Western Cape	Trans-Africa Projects on behalf of Eskom	Project Manager
ECO for the construction of the Neptune Substation Soil Erosion Mitigation Project, Eastern Cape	Eskom	Project Manager
ECO for the construction of the Ilanga-Gordonia 132kV power line, Northern Cape	Karoshhoek Solar One	Project Manager

Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Environmental Permitting and WULA for the Rockdale B Substation & Loop in Power Lines,	Eskom Holdings	Project Manager & EAP
Environmental Permitting and WULA for the Steelpoort Integration project, Limpopo	Eskom Holdings	Project Manager & EAP
Environmental Permitting for Solis CSP near Upington, Northern Cape	Brightsource	Project Manager & EAP

MINING SECTOR PROJECTS

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Elitheni Coal Mine near Indwe, Eastern Cape	Elitheni Coal	Project Manager & EAP
Groot Letaba River Development Project Borrow Pits	Iiso	Project Manager & EAP
Grootegeluk Coal Mine for coal transportation infrastructure between the mine and Medupi Power Station (EMPr amendment), Limpopo	Eskom Holdings	Project Manager & EAP
Waterberg Coal Mine (EMPr amendment), Limpopo	Sesoko Resources	Project Manager & EAP
Aluminium Plant WML & AEL, Gauteng	GfE-MIR Alloys & Minerals	Project Manager & EAP

Basic Assessments

Project Name & Location	Client Name	Role
Rare Earth Separation Plant in Vredendal, Western Cape	Rareco	Project Manager & EAP
Decommissioning and Demolition of Kilns 5 & 6 at the Slurry Plant, Kwa-Zulu Natal	PPC	Project Manager & EAP

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO for the construction of the Duhva Mine Water Recovery Project, Mpumalanga	Eskom Holdings SoC Limited	Project Manager
External compliance audit of Palesa Coal Mine's Integrated Water Use License (IWUL), near KwaMhlanga, Mpumalanga	HCI Coal	Project Manager
External compliance audit of Palesa Coal Mine's Waste Management License (WML) and EMP, near KwaMhlanga, Mpumalanga	HCI Coal	Project Manager
External compliance audit of Mbali Coal Mine's Integrated Water Use License (IWUL), near Ogies, Mpumalanga	HCI Coal	Project Manager
Independent External Compliance Audit of Water Use License (WUL) for the Tronox Namakwa Sands (TNS) Mining Operations (Brand se Baai), Western Cape	Tronox Namakwa Sands	Project Manager
Independent External Compliance Audit of Water Use License (WUL) for the Tronox Namakwa Sands (TNS) Mineral Separation Plant (MSP), Western Cape	Tronox Namakwa Sands	Project Manager
Independent External Compliance Audit of Water Use License (WUL) for the Tronox Namakwa Sands (TNS) Smelter Operations (Saldanha), Western Cape	Tronox Namakwa Sands	Project Manager
Compliance Auditing of the Waste Management Licence for the PetroSA Landfill Site at the GTL Refinery, Western Cape	PetroSA	Project Manager

Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Waste Licence Application for the Rare Earth Separation Plant in Vredendal, Western Cape	Rareco	Project Manager & EAP

WULA for the Expansion of the Landfill site at Exxaro's Namakwa Sands Mineral Separation Plant, Western Cape	Exxaro Resources	Project Manager & EAP
S24G & WML for an Aluminium Plant, Gauteng	GfE-MIR Alloys & Minerals	Project Manager & EAP

INFRASTRUCTURE DEVELOPMENT PROJECTS (BRIDGES, PIPELINES, ROADS, WATER RESOURCES, STORAGE, ETC)

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Bridge across the Ngotwane River, on the border of South Africa and Botswana	Eskom Holdings	Project Manager & EAP
Chemical Storage Tanks, Metallurgical Plant Upgrade & Backfill Plant upgrade at South Deep Gold Mine, near Westonia, Gauteng	Goldfields	Project Manager & EAP
Expansion of the existing Welgedacht Water Care Works, Gauteng	ERWAT	Project Manager & EAP
Golden Valley WEF Access Road near Cookhouse, Eastern Cape	BioTherm Energy	Project Manager & EAP
Great Fish River Wind Farm Access Roads and Watercourse Crossings near Cookhouse, Eastern Cape	African Clean Energy Developments (ACED)	Project Manager & EAP
Ilanga CSP Facility Watercourse Crossings near Upington, Northern Cape	Karoshhoek Solar one	Project Manager & EAP
Modification of the existing Hartebeestfontein Water Care Works, Gauteng	ERWAT	Project Manager & EAP
N10 Road Realignment for the Ilanga CSP Facility, East of Upington, Northern Cape	SANRAL	Project Manager & EAP
Nxuba (Bedford) Wind Farm Watercourse Crossings near Cookhouse, Eastern Cape	African Clean Energy Developments (ACED)	Project Manager & EAP
Pollution Control Dams at the Medupi Power Station Ash Dump & Coal Stockyard, Limpopo	Eskom	Project Manager & EAP
Qoboshane borrow pits (EMPr only), Eastern Cape	Emalaheni Local Municipality	Project Manager & EAP
Tsitsikamma Community WEF Watercourse Crossings, Eastern Cape	Cennergi	Project Manager & EAP
Clayville Central Steam Plant, Gauteng	Bellmall Energy	Project Manager & EAP
Msenge Emoyeni Wind Farm Watercourse Crossings and Roads, Eastern Cape	Windlab	Project Manager & EAP

Basic Assessments

Project Name & Location	Client Name	Role
Harmony Gold WWTW at Doornkop Mine, Gauteng	Harmony Doornkop Plant	Project Manager & EAP
Ofir-ZX Watercourse Crossing for the Solar PV Facility, near Keimoes, Northern Cape	Networx S28 Energy	Project Manager & EAP
Qoboshane bridge & access roads, Eastern Cape	Emalaheni Local Municipality	Project Manager & EAP
Relocation of the Assay Laboratory near Carletonville, Gauteng	Sibanye Gold	Project Manager & EAP
Richards Bay Harbour Staging Area, KwaZulu-Natal	Eskom Holdings	Project Manager & EAP
S-Kol Watercourse Crossing for the Solar PV Facility, East of Keimoes, Northern Cape	Networx S28 Energy	Project Manager & EAP
Sonnenberg Watercourse Crossing for the Solar PV Facility, West Keimoes, Northern Cape	Networx S28 Energy	Project Manager & EAP

Project Name & Location	Client Name	Role
Kruisvallei Hydroelectric Power Generation Scheme, Free State	Building Energy	Project Manager & EAP
Masetjaba Water Reservoir, Pump Station and Bulk Supply Pipeline near Nigel, Gauteng	Naidu Consulting Engineers	Project Manager & EAP
Access Road for the Dwarsug Wind Farm, Northern Cape Province	South Africa Mainsteam Renewable Power	Project Manager & EAP

Screening Studies

Project Name & Location	Client Name	Role
Roodepoort Open Space Optimisation Programme (OSOP) Precinct, Gauteng	TIMAC Engineering Projects	Project Manager & EAP
Vegetable Oil Plant and Associated Pipeline, Kwa-Zulu Natal	Wilmar Oils and Fats Africa	Project Manager & EAP

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO and bi-monthly auditing for the construction of the Olifants River Water Resources Development Project (ORWRDP) Phase 2A: De Hoop Dam, R555 realignment and housing infrastructure	Department of Water and Sanitation	Project Manager Auditor
ECO for the Rehabilitation of the Blaaupan & Storm Water Channel, Gauteng	Airports Company of South Africa (ACSA)	Project Manager
Due Diligence reporting for the Better Fuel Pyrolysis Facility, Gauteng	Better Fuels	Project Manager
ECO for the Construction of the Water Pipeline from Kendal Power Station to Kendal Pump Station, Mpumalanga	Transnet	Project Manager
ECO for the Replacement of Low-Level Bridge, Demolition and Removal of Artificial Pong, and Reinforcement the Banks of the Crocodile River at the Construction at Walter Sisulu National Botanical Gardens, Gauteng Province	South African National Biodiversity Institute (SANBI)	Project Manager
External Compliance Audit of the Air Emission Licence (AEL) for a depot in Bloemfontein, Free State Province and in Tzaneen, Mpumalanga Province	PetroSA	Project Manager

Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
WULA for the Izubulo Private Nature Reserve, Limpopo	Kjell Bismeyer, Jann Bader, Laurence Saad	Project Manager & EAP
WULA for the Masodini Private Game Lode, Limpopo	Masodini Private Game Lodge	Environmental Advisor
WULA for the Ezulwini Private Nature Reserve, Limpopo	Ezulwini Investments	Project Manager & EAP
WULA for the Masodini Private Game Lode, Limpopo	Masodini Private Game Lodge	Project Manager & EAP
WULA for the N10 Realignment at the Ilanga SEF, Northern Cape	Karoshhoek Solar One	Project Manager & EAP
WULA for the Kruisvallei Hydroelectric Power Generation Scheme, Free State	Building Energy	Project Manager & EAP

Project Name & Location	Client Name	Role
S24G and WULA for the illegal construction of structures within a watercourse on EFF 24 Ruimsig Agricultural Holdings, Gauteng	Sorrer Language Services	Project Manager & EAP

HOUSING AND URBAN PROJECTS

Basic Assessments

Project Name & Location	Client Name	Role
Postmasburg Housing Development, Northern Cape	Transnet	Project Manager & EAP

Compliance Advice and reporting

Project Name & Location	Client Name	Role
Kampi ya Thude at the Olifants West Game Reserve, Limpopo	Nick Elliot	Environmental Advisor
External Compliance Audit of WUL for the Johannesburg Country Club, Gauteng	Johannesburg Country Club	Project Manager

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
Due Diligence Audit for the Due Diligence Audit Report, Gauteng	Delta BEC (on behalf of Johannesburg Development Agency (JDA))	Project Manager

ENVIRONMENTAL MANAGEMENT TOOLS

Project Name & Location	Client Name	Role
Development of the 3rd Edition Environmental Implementation Plan (EIP)	Gauteng Department of Agriculture and Rural Development (GDARD)	Project Manager & EAP
Development of Provincial Guidelines on 4x4 routes, Western Cape	Western Cape Department of Environmental Affairs and Development Planning	EAP
Compilation of Construction and Operation EMP for the Braamhoek Transmission Integration Project, Kwazulu-Natal	Eskom Holdings	Project Manager & EAP
Compilation of EMP for the Wholesale Trade of Petroleum Products, Gauteng	Munaca Technologies	Project Manager & EAP
Operational Environmental Management Programme (OEMP) for Medupi Power Station, Limpopo	Eskom Holdings	Project Manager & EAP
Operational Environmental Management Programme (OEMP) for the Dube TradePort Site Wide Precinct	Dube TradePort Corporation	Project Manager & EAP
Operational Environmental Management Programme (OEMP) for the Kusile Power Station, Mpumalanga	Eskom Holdings	Project Manager & EAP
Review of Basic Assessment Process for the Wittekleibosch Wind Monitoring Mast, Eastern Cape	Exxaro Resources	Project Manager & EAP
Revision of the EMP for the Sirius Solar PV	Aurora Power Solutions	Project Manager & EAP

APPENDIX 3: REHABILITATION MANAGEMENT PLAN

REVEGETATION AND REHABILITATION PLAN

1. PURPOSE

The purpose of the Revegetation and Rehabilitation Plan is to ensure that areas cleared or impacted during construction activities within the development footprint for the Merino Wind Farm, and that are not required for operation, are rehabilitated to their original state before the operation phase commences, and that the risk of erosion from these areas is reduced. The purpose of the Rehabilitation Plan for the site can be summarised as follows:

- » Achieve long-term stabilisation of all disturbed areas.
- » Re-vegetate all disturbed areas with suitable local plant species.
- » Minimise visual impact of disturbed areas.
- » Ensure that disturbed areas are rehabilitated to a condition similar to that found prior to disturbance.

This Revegetation and Rehabilitation Plan must be read in conjunction with other relevant site-specific plans. Prior to the commencement of construction, a detailed Revegetation and Rehabilitation Plan and Method Statement for the site must be compiled with the aid of a suitably qualified and professionally registered specialist (with a botanical or equivalent qualification).

2. RELEVANT ASPECTS OF THE SITE

The vegetation on site is not considered to be part of any threatened ecosystem and has not been assessed as being of high conservation value due to rates of transformation. The regional vegetation types that occur on site, i.e., Eastern Upper Karoo and Upper Karoo Hardeveld, are both widespread and have low rates of transformation across their geographical range.

There are three plant species listed as Rare (*Anisodonteia malavastroides*, *Aloe broomii* var. *tarkaensis* and *Tridentea virescens*) that could potentially occur on site, but these are all widespread species that are naturally rare where they are found. None have been previously recorded on this site. There are also two plant species protected according to National legislation (*Crinum bulbispermum* and *Harpagophytum procumbens*) that could potentially occur in the geographical area, but these are also very widespread species. The loss of some individuals, if they are found to occur on site, would not affect the conservation status of any of the species. It is, however, unlikely that any of them would be affected.

A total of 72 plant species were recorded during the field surveys (refer to Appendix 2 of the plant species compliance statement). If other observation data is taken into account from other ad hoc surveys in the area, then there are close to 200 plant species that are known to occur in the direct study area and nearly 470 that are known from the general area that includes the site. This is relatively diverse for an arid environment.

3. REHABILITATION METHODS AND PRACTISES

The following general management practices should be encouraged or strived for:

- » Clearing of invaded areas must be conducted as per the Alien Management Plan, included in the EMPr.

- » No harvesting of vegetation may be undertaken outside the area to be disturbed by construction activities.
- » Indigenous plant material must be kept separate from alien material.
- » Indigenous seeds may be harvested for purposes of revegetation in areas that are free of alien invasive vegetation, either at the site prior to clearance or from suitable neighbouring sites.
- » Topsoil must be reserved wherever possible on site, to be utilised during rehabilitation.
- » Sods used for revegetation must be obtained directly from the site, but not from the sensitive areas. Sods must contain at least a 50mm topsoil layer and be minimally disturbed, in particular to existing root systems. Sods must ideally be obtained from areas as close as possible to the region that is to be rehabilitated.
- » Water used for the irrigation of re-vegetated areas must be free of chlorine and other pollutants that might have a detrimental effect on the plants.
- » All seeded, planted or sodded grass areas and all shrubs or trees planted are to be irrigated at regular intervals.
- » On steep slopes and areas where seed and organic matter retention is low, it is recommended that soil savers are used to stabilise the soil surface. Soil savers are man-made materials, usually constructed of organic material such as hemp or jute and are usually applied in areas where traditional rehabilitation techniques are not likely to succeed.
- » In areas where soil saver is used, it must be pegged down to ensure that it captures soil and organic matter flowing over the surface.
- » The final rehabilitated area must resemble the current composition and structure of the soil as far as practicably possible.
- » Progressive rehabilitation is an important element of the rehabilitation strategy and must be implemented where feasible.
- » No construction equipment, vehicles or unauthorised personnel must be allowed onto areas that have been rehabilitated.
- » Where rehabilitation sites are located within actively grazed areas, they must be fenced off, this must be undertaken in consultation with the landowner.
- » Any runnels, erosion channels or wash-aways developing after revegetation must be backfilled and consolidated and the areas restored to a proper stable condition.
- » Re-vegetated areas must be monitored frequently and prepared and revegetation from scratch should inadequate signs of surface coverage or growth be evident after two growth seasons. Adequate recovery must be assessed by a qualified botanist or rehabilitation specialist.
- » The stockpiled vegetation from the clearing operations must be reduced to mulch where possible and retained along with topsoil to encourage seedbank regrowth and soil fertility.
- » Mulches must be collected in such a manner as to restrict the loss of seed.
- » Mulch must be stored for as short a period as possible.
- » Mulch is to be harvested from areas that are to be denuded of vegetation during construction activities, provided that they are free of seed-bearing alien invasive plants.
- » Where herbicides are used to clear vegetation, species-specific chemicals must be applied to individual plants only. General spraying must be strictly prohibited, and only the correct herbicide type must be applied.
- » Once rehabilitated, areas must be protected to prevent trampling and erosion.
- » Fencing must be removed once a sound vegetative cover has been achieved.

4. MONITORING AND FOLLOW-UP ACTION

Throughout the lifecycle of the development, regular monitoring and adaptive management must be in place to detect any new degradation of rehabilitated areas. During the construction phase, the Environmental Officer (EO) and EPC Contractor will be responsible for initiating and maintaining a suitable monitoring system. Once the development is operational, the Developer will need to identify a suitable entity that will be able to take over and maintain the monitoring cycle and initiate adaptive management as soon as it is required. Monitoring personnel must be adequately trained.

The following are the minimum criteria that must be monitored:

- » Associated nature and stability of surface soils.
- » Re-emergence of alien and invasive plant species. If noted, remedial action must be taken immediately, as per the alien management plan and mitigation measures contained within the EMPr.

Rehabilitation success, monitoring and follow-up actions are important to achieve the desired cover and soil protection. The following monitoring protocol is recommended:

- » Rehabilitation areas must be monitored every 4 months for the first 12 months following construction, or as per the recommendations of specialist.
- » Ensure that steep slopes are not de-vegetated unnecessarily and subsequently become hydrophobic (i.e. have increased runoff and a decreased infiltration rate) increasing the erosion potential.
- » Soil loss is related to the length of time that soils are exposed prior to rehabilitation or stabilisation. Therefore, the timeframe between construction activities and rehabilitation must be minimised. Phased construction and progressive rehabilitation, where practically possible, are therefore important elements of the erosion control and rehabilitation strategy.
- » Any areas showing erosion, must be adaptively managed with particular erosion control measures, depending on the situation.

If the current state of the environment prior to construction (which will be disturbed during the construction phase) is not achieved post impact, within the specified rehabilitation period, maintenance of these areas must continue until an acceptable state is achieved (excluding alien plant species or weeds). Additional rehabilitation methods may be necessary to achieve the current state before construction commences.

Monitoring of the rehabilitation success, as well as follow-up adaptive management, combined with the clearing of emerging alien plant species must all continue for as long as is considered necessary, depending on regrowth rates.

APPENDIX 4: PLANT RESCUE AND PROTECTION PLAN

PLANT RESCUE AND PROTECTION PLAN

1. PURPOSE

The purpose of the Plant Rescue and Protection Plan is to implement avoidance and mitigation measures, in addition to the mitigations included in the Environmental Management Programme (EMPr) to reduce the impact of the development of the wind farm and associated infrastructure on listed and protected plant species and their habitats during construction and operation. This subplan is required in order to ensure compliance with national and provincial legislation for vegetation clearing and any required destruction or translocation of provincially and nationally protected species within the footprint of the development.

The Plan first provides some legislative background on the regulations relevant to listed and protected species, under the Nature and Environmental Conservation Ordinance (Act 19 of 1974) and trees protected under the National List of Protected Tree Species. This is followed by an identification of protected species present within the development footprint and actions that should be implemented to minimise impact on these species and comply with legislative requirements.

2. IDENTIFICATION OF SPECIES OF CONSERVATION CONCERN

Plant species are protected at the national level as well as the provincial level and different permits may be required for different species depending on their protection level. At the national level, protected trees are listed by DEFF under the National List of Protected Trees, which is updated on a regular basis. Any clearing of nationally protected trees requires a permit from DAFF. At the provincial level, all species red-listed under the Red List of South African plants (<http://redlist.sanbi.org/>) as well as species listed under the Nature and Environmental Conservation Ordinance (Act 19 of 1974) are protected and require provincial permits. The Nature and Environmental Conservation Ordinance (Act 19 of 1974) lists a variety of species as protected.

3. IDENTIFICATION OF LISTED SPECIES

In this section, the listed species observed to occur within the broader area are identified and listed.

There are three species listed as Rare that are considered to occur within the geographical area under consideration and could potentially occur on site, namely, *Anisodonteia malavastroides*, *Aloe broomii* var. *tarkaensis* and *Tridentea virescens* (refer to **Table 1**). These are all species with wide geographical distributions, but which are rarely encountered. None of these species are considered to be threatened and none were observed on site.

Table 1: Plant species of conservation importance (Threatened, Near Threatened and Declining) that have historically been recorded in the study area

Family	Taxon	Status	Habitat	Likelihood of occurrence on site
Apocynaceae	<i>Tridentea virescens</i>	RARE	Warmbad in southern Namibia to Kakamas and Prieska in the Northern Cape stretching east to Prince Albert and Aberdeen. Stony ground, or hard loam in floodplains.	MEDIUM

Malvaceae	<i>Anisodonteamalavastroides</i>	RARE	This species is endemic to the mountains of the Great Karoo, where it occurs in the Nuweveld and Sneeu Berg mountains between Beaufort West and Middelburg. It occurs in arid grassland on summit plateaus and escarpments.	MEDIUM
Asphodelaceae	<i>Aloe broomii</i> var. <i>tarkaensis</i>	LC	Tarkastad, Middelburg and Graaff-Reinet districts, possibly also in the Victoria West district. Low, stony ridges.	MEDIUM

No plant species protected under the National Environmental Management: Biodiversity Act (No. 10 of 2004) were identified on site. However, several have a geographical distribution that includes the project site. Numerous plant species protected under the Northern Cape Nature Conservation Act (No. 9 of 2009) were identified on site. Despite not being threatened, any impacts on these species will require a permit from the relevant authority. There is a possibility that there may be additional protected plant species present on site that were not detected during the field survey. A comprehensive walk-through survey of the final footprint is required to compile a complete list of these protected species.

According to the National Web-Based Environmental screening tool, 2 plant species have been flagged as of concern for the area the current project is in, these are listed below. A description of each species is provided.

***Hereroa concava* (Aizoaceae)**

Vulnerable B1ab(iii)

Due to taxonomic uncertainty, this species' distribution range is not well known. It appears to be endemic to a small area in the Great Karoo between Beaufort West, Richmond and De Aar. It is known to occur in Eastern Upper Karoo and Upper Karoo Hardeveld vegetation types. Plants occur sheltered among shrubs on flats and plateaus with shale outcrops. There are very few records of this species, and these known records are scattered over a wide area. Herbarium collections, where the identity is confirmed, indicate that it is common in the Karoo National Park. Its abundance elsewhere is not well known. Known records from iNaturalist include the plains above the mountains north of Beaufort West, and a hilltop north of Hanover. The study site is almost exactly half way between these two locations and habitat on site fits the description of locations where this species has been previously recorded. There are two records of *Hereroa* species on site that have only been identified to genus level. Based on the distribution of known taxa, it is highly likely that they are *Hereroa concava*. It is therefore assumed that it probably occurs on site, and that rocky hills are the most likely habitat on site.

Sensitive species 945

A Near Threatened geophyte known from the summits of rocky dolerite ridges in the Nama Karoo. It is endemic to the karoo, occurring in the Sneeu Berg, Agter-Sneeu Berg and Nuweveld Mountains, extending inland to the area between Hanover and Beaufort West, broadly following the N1 road. There is a known photographic observation within the broad renewable energy cluster assessed for this overall project, which is near to the current Merino Wind Farm project. It is likely, based on the habitat requirements and distribution, that the species occurs on site, and that rocky hills are the most likely habitat on site.

Additional listed plant species for the study area

A database search identifies a number of additional listed plant species that could possibly occur on site that are not flagged in the Screening Tool output. This includes the following:

- » *Tridentia virescens* (Apocynaceae) (Rare): Warmbad in southern Namibia to Kakamas and Prieska in the Northern Cape stretching east to Prince Albert and Aberdeen. Stony ground, or hard loam in floodplains. It has a very wide geographical distribution but is rarely found. A relatively recent (2017) observation was made in the Doornkloof Nature Reserve north of Colesberg (www.ispotnature.org) and it was documented in 1957 from near Murraysburg in habitat similar to that found on site. There is therefore at least a moderate probability that it occurs on site.
- » *Anisodontea malvastroides* (Rare): This species is endemic to the mountains of the Great Karoo, where it occurs in the Nuweveld and Sneeuwberg mountains between Beaufort West and Middelburg in arid grassland on summit plateaus and escarpments. It has also been recorded on an inselberg-like outcrop north of Richmond. It could possibly occur on site, in which case it is likely to be found on the summit of prominent hills.
- » *Aloe broomii* var *tarkaensis* (Rare) is found from Tarkastad and Middelburg to Graaff-Reinet in low stony ridges associated with the escarpment. The distribution of var. *tarkaensis* is to the south-east of the current site. Two observations of *Aloe broomii* were made on site, but both are from var. *broomii* and not var. *tarkaensis*. *Aloe broomii* var *tarkaensis* is therefore unlikely to occur on site.

A total of seventy-two (72) plant species were recorded during the field surveys (Appendix 2 of the Terrestrial Plant Species Compliance Statement) If other observation data is taken into account from other ad hoc surveys in the area, then there are close to 200 plant species that are known to occur in the direct study area and nearly 470 that are known from the general area that includes the site. This is relatively diverse for an arid environment.

4. MITIGATION & AVOIDANCE OPTIONS

The primary mitigation and avoidance measure that must be implemented at the pre-construction phase is the Pre-construction Walk-Through of the development footprint. This defines which and how many individuals of listed and protected species are found within the development footprint. This information is required for the DFFE and Provincial Eastern Cape Department of Economic Development, Environmental Affairs and Tourism (DEDEAT) permits which must be obtained before construction can commence.

Where listed plant species fall within the development footprint and avoidance is not possible, then it may be possible to translocate the affected individuals outside of the development footprint. However, not all species are suitable for translocation. Recommendations in this regard would be made following the walk-through of the facility development footprint before construction, where all listed and protected species within the development footprint will be identified and located.

5. RESCUE AND PROTECTION PLAN

5.1. Pre-construction

- » Identification of all listed species which may occur within the site, based on the SANBI POSA database as well as the specialist BA studies for the site and any other relevant literature.
- » Before construction commences at the site, the following actions should be taken:
 - A walk-through of the final development footprint by a suitably qualified botanist/ecologist to locate and identify all listed and protected species which fall within the development footprint. This should happen during the flowering season at the site.

- A walk-through report following the walk-through which identifies areas where minor deviations to roads and other infrastructure can be made to avoid sensitive areas and important populations of listed species. The report should also contain a full list of localities where listed species occur within the development footprint and the number of affected individuals in each instance, so that this information can be used to comply with the permit conditions required by the relevant legislation. Those species suitable for search and rescue should be identified in the walk-through report.
- A permit to clear the site and relocate species of concern is required from Provincial Eastern Cape Department of Economic Development, Environmental Affairs and Tourism (DEDEAT) before construction commences. A tree clearing permit is also required from DEFF to clear protected trees from the site.
- Once the permits have been issued, there should be a search and rescue operation of all listed species that cannot be avoided, which have been identified in the walk-through report as being suitable for search and rescue within the development footprint. Affected individuals should be translocated to a similar habitat outside of the development footprint and marked for monitoring purposes.

5.2. Construction

- » Vegetation clearing should take place in a phased manner, so that large cleared areas are not left standing with no activity for long periods of time and pose a wind and water erosion risk. This will require coordination between the contractor and EO, to ensure that the EO is able to monitor activities appropriately.
- » All cleared material must be handled according to the Revegetation and Rehabilitation Plan and used to encourage the recovery of disturbed areas.
- » EO to monitor vegetation clearing at the site. Any deviations from the plans that may be required should first be checked for listed species by the EO and any listed species present which are able to survive translocation should be translocated to a safe site.
- » All areas to be cleared should be demarcated with construction tape, survey markers or similar. All construction vehicles should work only within the designated area.
- » Plants suitable for translocation or for use in rehabilitation of already cleared areas should be identified and relocated before general clearing takes place.
- » Any listed species observed within the development footprint that were missed during the pre-construction plant sweeps must be translocated to a safe site before clearing commences.
- » Many listed species are also sought after for traditional medicine or by collectors and so the EO and ECO must ensure that all staff attend environmental induction training in which the legal and conservation aspects of harvesting plants from the wild are discussed.
- » The EO must monitor construction activities in sensitive habitats such as in dune areas carefully to ensure that impacts to these areas are minimised.

5.3. Operation

- » Access to the site should be strictly controlled and all personnel entering or leaving the site must be required to sign in and out with the security officers.
- » The collecting of plants or their parts must be strictly forbidden and signs stating so must be placed at the entrance gates to the site.

6. MONITORING AND REPORTING REQUIREMENTS

The following reporting and monitoring requirements are recommended as part of the plant rescue and protection plan:

- » Pre-construction walk-through report detailing the location and distribution of all listed and protected species. This must include a walk-through of all infrastructure including all new access roads, cables, buildings and the substation. The report must include recommendations of route adjustments where necessary, as well as provide a full account of how many individuals of each listed species will be impacted by the development. Details of plants suitable for search and rescue must also be included.
- » Permit applications to DEDEAT and DEFF. This requires the walk-through report as well as the identification and quantification of all listed and protected species within the development footprint. The permit is required before any search and rescue or vegetation clearance can take place. Where large numbers of listed species are affected, a site inspection and additional requirements may be imposed by Provincial Eastern Cape Department of Economic Development, Environmental Affairs and Tourism (DEDEAT) and/or DEFF as part of the permit conditions. All documentation associated with this process needs to be retained and the final clearing permit must be kept at the site.
- » Active daily monitoring of clearing during construction by the EO to ensure that listed species and sensitive habitats are avoided. All incidents must be recorded along with the remedial measures implemented.
- » Post-construction monitoring of plants translocated during search and rescue to evaluate the success of the intervention. Monitoring for a year post-transplant should be sufficient to gauge success.

APPENDIX 5: ALIEN VEGETATION MANAGEMENT PLAN

ALIEN PLANT AND OPEN SPACE MANAGEMENT PLAN

1. PURPOSE

Invasive alien plant species pose the second largest threat to biodiversity after direct habitat destruction. The purpose of this Alien Plant and Open Space Management Plan is to provide a framework for the management of alien and invasive plant species during the construction and operation of the Great Karoo EGI. The broad objectives of the plan include the following:

- » Ensure alien plants do not become dominant in parts of the site, or the whole site, through the control and management of alien and invasive species presence, dispersal, and encroachment.
- » Develop and implement a monitoring and eradication programme for alien and invasive plant species.
- » Promote the natural re-establishment and planting of indigenous species in order to retard erosion and alien plant invasion.

This plan should be updated throughout the life cycle of the wind farm, as required in order to ensure that appropriate measures are in place to manage and control the establishment of alien and invasive plant species and to ensure compliance with relevant legislation.

2. LEGISLATIVE CONTEXT

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

In terms of the amendments to the regulations under the Conservation of Agricultural Resources Act (Act No. 43 of 1983), all declared alien plant species must be effectively controlled. Landowners are legally responsible for the control of invasive alien plants on their properties. In terms of this Act, alien invasive plant species are ascribed to one of the following categories:

- » Category 1: Prohibited and must be controlled.
- » Category 2 (commercially used plants): May be grown in demarcated areas provided that there is a permit and that steps are taken to prevent their spread.
- » Category 3 (ornamentally used plants): May no longer be planted. Existing plants may be retained as long as all reasonable steps are taken to prevent the spreading thereof, except within the flood line of watercourses and wetlands.

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

The National Environmental Management: Biodiversity Act (NEM:BA) regulates all invasive organisms in South Africa, including a wide range of fauna and flora. Regulations have been published in Government Notices R.506, R.507, R.508 and R.509 of 2013 under NEM:BA. According to this Act and the regulations, any species designated under Section 70 cannot be propagated, grown, bought or sold without a permit. Below is an explanation of the three categories:

- » **Category 1a:** Invasive species requiring compulsory control. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.

- » **Category 1b:** Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.
- » **Category 2:** Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Category 2 plants to exist in riparian zones.
- » **Category 3:** Invasive species regulated by activity. An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species. No permits will be issued for Category 3 plants to exist in riparian zones.

The following guide is a useful starting point for the identification of alien plant species: Bromilow, C. 2010. Problem Plants and Alien Weeds of South Africa. Briza, Pretoria.

It is important to note that alien plant species that are regulated in terms of the Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA) as weeds and invader plants are exempted from NEM:BA. This implies that the provisions of the CARA in respect of listed weed and invader plants supersede those of NEM: BA.

3. ALIEN PLANT MANAGEMENT PRINCIPLES

3.1. Prevention and early eradication

A prevention strategy should be considered and established, including regular surveys and monitoring for invasive alien plants, effective rehabilitation of disturbed areas and prevention of unnecessary disturbance of natural areas.

Monitoring plans should be developed which are designed to identify Invasive Alien Plant Species already on site, as well as those that are introduced to the site by the construction activities. Keeping up to date on which weeds are an immediate threat to the site is important, but efforts should be planned to update this information on a regular basis. When additional Invasive Alien Plant Species are recorded on site, an immediate response of locating the site for future monitoring and either hand-pulling the weeds or an application of a suitable herbicide (where permissible only) should be planned. It is, however, better to monitor regularly and act swiftly than to allow invasive alien plants to become established on site.

3.2. Containment and control

If any alien invasive plants are found to become established on site, action plans for their control should be developed, depending on the size of the infestations, budgets, manpower considerations and time. Separate plans of control actions should be developed for each location and/or each species. Appropriate registered chemicals and other possible control agents should be considered in the action plans for each site/species. The use of chemicals are not recommended for any wetland areas. Herbicides should be applied directly to the plant and not to the soil. The key is to ensure that no invasions get out of control. Effective containment and control will ensure that the least energy and resources are required to maintain this status over the long-term. This will also be an indicator that natural systems are impacted to the smallest degree possible.

3.3. General Clearing and Guiding Principles

Alien species control programmes are long-term management projects and should consist of a clearing plan which includes follow up actions for rehabilitation of the cleared area. The lighter infested areas should be cleared first to prevent the build-up of seed banks. Pre-existing dense mature stands ideally should be left for last, as they probably won't increase in density or pose a greater threat than they are currently. Collective management and planning with neighbours may be required in the case of large woody invaders as seeds of alien species are easily dispersed across boundaries by wind or watercourses. All clearing actions should be monitored and documented to keep records of which areas are due for follow-up clearing.

i. Clearing Methods

Different species require different clearing methods such as manual, chemical or biological methods or a combination of both. Care should however be taken so that the clearing methods used do not encourage further invasion and that they are appropriate to the specific species of concern. As such, regardless of the methods used, disturbance to the soil should be kept to a minimum.

Fire should not be used for alien species control or vegetation management at the site. The best-practice clearing method for each species identified should be used.

» Mechanical control

This entails damaging or removing the plant by physical action. Different techniques could be used, e.g. uprooting, felling, slashing, mowing, ringbarking or bark stripping. This control option is only really feasible in sparse infestations or on a small scale, and for controlling species that do not coppice after cutting. Species that tend to coppice, need to have the cut stumps or coppice growth treated with herbicides following the mechanical treatment. Mechanical control is labour intensive and therefore expensive and could cause severe soil disturbance and erosion.

» Chemical Control

Although it is usually preferable to use manual clearing methods where possible, such methods may create additional disturbance which stimulates alien plant invasion and may also be ineffective for many woody species which re-sprout. Where herbicides are to be used, the impact of the operation on the natural environment should be minimised by observing the following:

- * Area contamination must be minimised by careful, accurate application with a minimum amount of herbicide to achieve good control.
- * All care must be taken to prevent contamination of any water bodies. This includes due care in storage, application, cleaning equipment and disposal of containers, product and spray mixtures.
- * Equipment should be washed where there is no danger of contaminating water sources and washings carefully disposed of at a suitable site.
- * To avoid damage to indigenous or other desirable vegetation, products should be selected that will have the least effect on non-target vegetation.
- * Coarse droplet nozzles should be fitted to avoid drift onto neighbouring vegetation.
- * The appropriate health and safety procedures should also be followed regarding the storage, handling and disposal of herbicides.
- * The use of chemicals is not recommended for wetland areas.

For all herbicide applications, the following Regulations and guidelines should be followed:

- * Working for Water: Policy on the Use of Herbicides for the Control of Alien Vegetation.
- * Pesticide Management Policy for South Africa published in terms of the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947) – GNR 1120 of 2010.
- * South African Bureau of Standards, Standard SANS 10206 (2010).

According to Government Notice No. 13424 dated 26 July 1992, it is an offence to “*acquire, dispose, sell or use an agricultural or stock remedy for a purpose or in a manner other than that specified on the label on a container thereof or on such a container*”.

Contractors using herbicides need to have a valid Pest Control Operators License (limited weeds controller) according to the Fertilizer, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 36 of 1947). This is regulated by the Department of Environment, Forestry and Fisheries.

» **Biological control**

Biological weed control consists of the use of natural enemies to reduce the vigour or reproductive potential of an invasive alien plant. Biological control agents include insects, mites, and micro-organisms such as fungi or bacteria. They usually attack specific parts of the plant, either the reproductive organs directly (flower buds, flowers or fruit) or the seeds after they have dropped. The stress caused by the biological control agent may kill a plant outright or it might impact on the plant's reproductive capacity. In certain instances, the reproductive capacity is reduced to zero and the population is effectively sterilised. All of these outcomes will help to reduce the spread of the species.

To obtain biocontrol agents, provincial representatives of the Working for Water Programme or the Directorate: Land Use and Soil Management (LUSM), Department of Environment, Forestry and Fisheries (DEFF) can be contacted.

3.4. General management practices

The following general management practices should be encouraged or strived for:

- » Establish an on-going monitoring programme for the construction phase to detect and quantify any alien species that may become established.
- » Alien vegetation regrowth on areas disturbed by construction must be immediately controlled.
- » Care must be taken to avoid the introduction of alien invasive plant species to the site. Particular attention must be paid to imported material such as building sand or dirty earth-moving equipment.
- » Stockpiles should be checked regularly and any weeds emerging from material stockpiles should be removed.
- » Cleared areas that have become invaded by alien species can be sprayed with appropriate herbicides provided that these herbicides break down on contact with the soil. Residual herbicides should not be used.
- » The effectiveness of vegetation control varies seasonally, and this is also likely to impact alien species. Control early in the wet season will allow species to regrow, and follow-up control is likely to be required. It is tempting to leave control until late in the wet season to avoid follow-up control. However, this may allow alien species to set seed before control, and hence will not contribute towards reducing alien species abundance. Therefore, vegetation control should be aimed at the

middle of the wet season, with a follow-up event towards the end of the wet season. There are no exact dates that can be specified here as each season is unique and management must therefore respond according to the state and progression of the vegetation.

- » Alien plant management is an iterative process, and it may require repeated control efforts to significantly reduce the abundance of a species. This is often due to the presence of large and persistent seed banks. However, repeated control usually results in rapid decline once seed banks become depleted.
- » Some alien species are best individually pulled by hand. Regular vegetation control to reduce plant biomass within the site should be conducted. This should be timed so as to coincide with the critical growth phases of the most important alien species on site. This will significantly reduce the cost of alien plant management as this should contribute towards the control of the dominant alien species and additional targeted control will be required only for a limited number of species.
- » No alien species should be cultivated on-site. If vegetation is required for aesthetic purposes, then non-invasive, water-wise locally occurring species should be used.
- » During operation, surveys for alien species should be conducted regularly. It is recommended that this be undertaken every 6 months for the first two years after construction and annually thereafter. All alien plants identified should be cleared using appropriate means.

3.5. Monitoring

In order to assess the impact of clearing activities, follow-ups and rehabilitation efforts, monitoring must be undertaken. This section provides a description of a possible monitoring programme that will provide an assessment of the magnitude of alien plant invasion on site, as well as an assessment of the efficacy of the management programme.

In general, the following principles apply for monitoring:

- » Photographic records must be kept of areas to be cleared prior to work starting and at regular intervals during initial clearing activities. Similarly, photographic records should be kept of the area from immediately before and after follow-up clearing activities. Rehabilitation processes must also be recorded.
- » Simple records must be kept of daily operations, e.g., area/location cleared, labour units and, if ever used, the amount of herbicide used.
- » It is important that, if monitoring results in detection of invasive alien plants, that this leads to immediate action.

The following monitoring should be implemented to ensure management of alien invasive plant species.

Construction Phase

Monitoring Action	Indicator	Timeframe
Document alien species present at the site	List of alien plant species	Preconstruction Monthly during Summer and Autumn 3 Monthly during Winter and Spring
Document alien plant distribution	Alien plant distribution map within priority areas	3 Monthly
Document and record alien plant control measures implemented	Record of clearing activities	3 Monthly

Operation Phase

Monitoring Action	Indicator	Timeframe
Document alien plant species distribution and abundance over time at the site	Alien plant distribution map	Biannually
Document alien plant control measures implemented, and success rate achieved	Records of control measures and their success rate A decline in alien distribution and cover over time at the site	Biannually
Document rehabilitation measures implemented, and success achieved in problem areas	Decline in vulnerable bare areas over time	Biannually

