APPENDIX 7

EMPrs

APPENDIX 7.1

Generic 132kV Powerline EMPr

APPENDIX 1

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

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 overhead electricity transmission and distribution infrastructure, 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 overhead electricity transmission and distribution infrastructure. 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 overhead electricity transmission and distribution infrastructure requiring EA in terms of NEMA, i.e. with a capacity of 33 kilovolts or more. 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 realisation 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	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 overhead electricity transmission and distribution infrastructure, which are presented in the form of a template that has been pre-approved. 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. Where an impact management outcome is not relevant, the words "not applicable" can be inserted in the template under the "responsible persons" column. 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. 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.
	2	Site specific information	Contains preliminary infrastructure layout and a declaration that the applicant/holder of the EA

Part	Section	Heading	Content
			will comply with the pre-approved generic EMPr template contained in Part B: Section 1, 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 actions have been either pre-approved or approved in terms of Part C. 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 Part B: section 2 not be submitted. Once approved, this Section forms part of the EMPr for the development and is legally binding.
C		Site specific sensitivities/ attributes	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 (Part B: section 1) This section will not be required should the site contain no specific environmental sensitivities or attributes. However, if Part C 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

Part	Section	Heading	Content
			approved, Part C forms part of the EMPr for the site and is legally binding. 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 Part B: section 1.
Appendix 1			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.

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 corridor in which the proposed overhead electricity transmission and distribution 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. raptor nest, threatened plant species, archaeological site, etc. Sensitivity maps must identify features both within the planned working area and any known sensitive features in the surrounding landscape within 50m from the development footprint. The overhead transmission and distribution profile must be illustrated at an appropriate resolution to enable fine scale interrogation. It is recommended that <20 km of overhead transmission and distribution length is illustrated per page in A3 landscape format. Where considered appropriate, photographs of sensitive features in the context of tower positions must be used.

Sub-section 3 is the declaration that the applicant/proponent 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 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 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; and

"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	Environment 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&APs	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)	Role 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. Responsibilities - 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)	Role 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. Responsibilities - 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)	Role 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. 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&APs), 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

Responsible Person (s)	Role and Responsibilities
	variation, not allowed for in the 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. <u>Responsibilities</u> The responsibilities of the ECO will include the following: - 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;

Responsible Person (s)	Role and Responsibilities
	- Checking the cEO's public complaints register in which all complaints are recorded, as well as action taken; - 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.
developer Environmental Officer (dEO)	<u>Role</u> 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. <u>Responsibilities</u> - 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:

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

Responsible Person (s)	Role and Responsibilities
	- ensure that contractors' staff repair, at their own cost, any environmental damage as a result of a contravention of the specifications contained in EMPr, to the satisfaction of the ECO.
contractor Environmental Officer (cEO)	Role Each Contractor affected by the EMPr should appoint a cEO, who is responsible for the on-site implementation of the EMPr (or relevant sections of the EMPr). The Contractor's representative can be the site agent; site engineer; a dedicated environmental officer; or an independent consultant. The Contractor must ensure that the Contractor's Representative is suitably qualified to perform the necessary tasks and is appointed at a level such that she/he can interact effectively with other site Contractors, labourers, the Environmental Control Officer and the public. As a minimum the cEO shall meet the following criteria: Responsibilities - Be on site throughout the duration of the project and be dedicated to the project; - Ensure all their staff are aware of the environmental requirements, conditions and constraints with respect to all of their activities on site; - Implementing the environmental conditions, guidelines and requirements as stipulated within the EA, EMPr and Method Statements; - Attend the Environmental Site Meeting; - Undertaking corrective actions where non-compliances are registered within the stipulated timeframes; - Report back formally on the completion of corrective actions; - Assist the ECO in maintaining all the site documentation; - Prepare the site inspection reports and corrective action reports for submission to the ECO; - Assist the ECO with the preparing of the monthly report; and - Where more than one Contractor is undertaking work on site, each company appointed as a Contractor will appoint a cEO representing that company.

4. 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 overhead electricity transmission and distribution 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. At 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 Substances;
- 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 , 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. Where0 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 must be included in the EMPr file and be submitted to the CA at intervals as indicated in the EA.

An Environmental Audit Report must be prepared monthly. 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 overhead electricity transmission and distribution infrastructure. There is a list of aspects identified for the development or expansion of overhead electricity transmission and distribution infrastructure, 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 overhead electricity transmission and distribution infrastructure.

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 contactor 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 understand 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;						
– The Contractor must allow for sufficient sessions to train all personnel with no more than 20 personnel attending each course;						
– Refresher environmental awareness training is available as and when required;						
– 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;						
– The Contractor must erect and maintain information posters at key locations on site, and the posters must include the following information as a minimum: a) Safety notifications; and b) No littering.						
– Environmental awareness training must include as a minimum the following: 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;						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
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.						
– A record of all environmental awareness training courses undertaken as part of the EMPr must be available;						
– Educate workers on the dangers of open and/or unattended fires;						
– A staff attendance register of all staff to have received environmental awareness training must be available.						
– Course material must be available and presented in appropriate languages that all staff can understand.						

5.2 Site Establishment Development

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

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
– 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;						
– Location of construction 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;						
– Sites must be located where possible on previously disturbed areas;						
– The camp must be fenced in accordance with ***Section 5.5: Fencing and gate installation***; and						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
– The use of existing accommodation for contractor staff, where possible, is encouraged.						

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;						
– 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						
– Unauthorised access and development related activity inside access restricted areas is prohibited.						

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**
– Access to the servitude and tower positions must be negotiated with the relevant landowner and must fall within the assessed and authorised area;						
– An access agreement must be formalised and signed by the DPM, Contractor and landowner before commencing with the activities;						
– The access roads to tower positions must be signposted after access has been negotiated and before the commencement of the activities;						
– 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						
– All contractors must be made aware of all the access routes.						
– Any access route deviation from that in the written agreement must be closed and re-vegetated immediately, at the contractor's expense.						
– Maximum use of both existing servitudes and existing roads must be made to minimise further disturbance through the development of new roads;						
– 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;						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
– Access roads in flattish areas must follow fence lines and tree belts to avoid fragmentation of vegetated areas or croplands.						
– Access roads must only be developed on pre-planned and approved 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.						
– Existing and new gates to be recorded and documented in accordance with section 4.9: photographic record.						
– All gates must be fitted with locks and be kept locked at all times during the development phase, unless otherwise agreed with the landowner.						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
– At points where the line crosses an existing 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.						
– Care must be taken that the gates must be so erected that there is a gap of no more than 100mm between the bottom of the gate and the ground.						
– Where gates are installed in jackal proof fencing, a suitable reinforced concrete sill must be provided beneath the gate.						
– Original tension must be maintained in the fence wires.						
– All gates installed in electrified fencing must be re-electrified.						
– All demarcation fencing and barriers must be maintained in good working order for the duration of overhead transmission and distribution electricity infrastructure development activities.						
– Fencing must be erected around the camp, batching plants, hazardous storage areas, and all designated access restricted areas, where appropriate and would not cause harm to the sensitive flora.						
– Any temporary fencing to restrict the movement of livestock must only be erected with the permission of the landowner.						
– All fencing must be developed of high-quality material bearing the SABS mark.	Contractor	Make use of high-quality materials	During the construction phase	cEO		

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
		approved by SABS				
– The use of razor wire as fencing must be avoided as far as possible.						
– 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.						
– On completion of the development phase all temporary fences are to be removed.						
– The contractor must ensure that all fence uprights are appropriately removed, ensuring that no uprights are cut at ground level but rather removed completely.						

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**
– 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.						
– The Contractor must ensure the following: 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 riverbed 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.						
– Ensure water conservation is being practiced by: 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.						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
d. The use of grey water is encouraged.						

5.7 Storm and wastewater management

Impact management outcome: Impacts to the environment caused by stormwater 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**
– 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.						
– 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.						
– Natural stormwater 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.						
– 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.						

5.8 Solid and hazardous waste management

Impact management outcome: Waste is 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.						
– Sufficient, covered waste collection bins (scavenger and weatherproof) must be provided.						
– A suitably positioned and clearly demarcated waste collection site must be identified and provided.						
– The waste collection site must be maintained in a clean and orderly manner.						
– Waste must be segregated into separate bins and clearly marked for each waste type for recycling and safe disposal.						
– Staff must be trained in waste segregation.						
– Bins must be emptied regularly.						
– General waste produced onsite must be disposed of at registered waste disposal sites/ recycling company.						
– Hazardous waste must be disposed of at a registered waste disposal site.						
– Certificates of safe disposal for general, hazardous and recycled waste must be maintained.						

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.						
– In the event of a spill, prompt action must be taken to clear the polluted or affected areas.						
– Where possible, no development equipment must traverse any seasonal or permanent wetland.						
– No return flow into the estuaries must be allowed and no disturbance of the Estuarine Functional Zone should occur.						
– Development of permanent watercourse or estuary crossing must only be undertaken where no alternative access to tower position is available.						
– There must not be any impact on the long-term morphological dynamics of watercourses or estuaries.						
– Existing crossing points must be favoured over the creation of new crossings (including temporary access).						
– When working in or near any watercourse or estuary, the following environmental controls and consideration must be taken: a) Water levels during the period of construction; No altering of the bed, banks, course or characteristics of a watercourse b) During the execution of the works, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
e.g. including ensuring that construction equipment is well maintained; 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 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.						

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.						
– Protected or endangered species may occur on or near the development site. Special care should be taken not to damage such species.						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
– 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.						
– Permits for removal must be obtained from the Department of Agriculture, Forestry and Fisheries (DAFF) and the Northern Cape Department of Environment and Nature Conservation (DENC) prior to the cutting or clearing of the affected species, and they must be filed.						
– 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.						
– Trees felled due to construction must be documented and form part of the Environmental Audit Report.						
– Rivers and watercourses must be kept clear of felled trees, vegetation cuttings and debris.						
– 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 that is appropriately trained.						
– A daily register must be kept of all relevant details of herbicide usage.						
– No herbicides must be used in estuaries.						
– All protected species and sensitive vegetation not removed must be clearly marked and such areas						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
fenced off in accordance to **Section 5.3: Access restricted areas**.						
Servitude:						
– Vegetation that does not grow high enough to cause interference with overhead transmission and distribution infrastructures, or cause a fire hazard to any plantation, must not be cut or trimmed unless it is growing in the road access area, and then only at the discretion of the Project Manager.						
– Where clearing for access purposes is essential, the maximum width to be cleared within the servitude must be in accordance to distance as agreed between the landowner and the EA holder.						
– Alien invasive vegetation must be removed according to a plan (in line with relevant municipal and provincial procedures, guidelines and recommendations) and disposed of at a recognised waste disposal facility.						
– Vegetation must be trimmed where it is likely to intrude on the minimum vegetation clearance distance (MVCD) or will intrude on this distance before the next scheduled clearance. MVCD is determined from SANS 10280.						
– Debris resulting from clearing and pruning must be disposed of at a recognised waste disposal facility, unless the landowners wish to retain the cut vegetation.						
– In the case of the development of new overhead transmission and distribution infrastructures, a one metre "trace-line" must be cut through the vegetation						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
for stringing purposes only and no vehicle access must be cleared along the "trace-line". Alternative methods of stringing that limit impact to the environment must always be considered.						

5.11 Protection of fauna

Impact management outcome: Minimise disturbance to fauna and avifauna.

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.						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– The breeding sites of raptors and other wild bird species must be taken into consideration during the planning of the development programme.						
– 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.						
– Nesting sites on existing parallel lines must documented.						
– Special recommendations of the avian specialist must be adhered to at all times to prevent unnecessary disturbance of birds.						
– Bird guards and diverters must be installed on the new line as per the recommendations of the specialist.						
– 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.						
– No deliberate or intentional killing of fauna is allowed.						
– In areas where snakes are abundant, snake deterrents are to be deployed on the pylons to prevent snakes climbing up, being electrocuted and causing power outages; and						
– 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.						

5.12 Protection of heritage resources

Impact management outcome: Minimise impact to heritage resources.

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;						
– Carry out general monitoring of excavations for potential fossils, artefacts and material of heritage importance;						

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

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
– 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.;						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All unattended open excavations must be adequately fenced or demarcated;						
– Adequate protective measures must be implemented to prevent unauthorised access to and climbing of partly constructed towers and protective scaffolding;						
– Ensure structures vulnerable to high winds are secured; and						
– Maintain an incidents and complaints register in which all incidents or complaints involving the public are logged.						

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;						
– 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;						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Where mobile chemical toilets are required, the following must be ensured: a) Toilets are located no closer than 100m 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; and f) Toilets are serviced regularly and the ECO must inspect toilets to ensure compliance to health standards.						
– A copy of the waste disposal certificates must be maintained.						

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;						
– Ensure that the workforce is sensitised to the effects of sexually transmitted diseases, especially HIV/ AIDS;						
– The Contractor must ensure that information posters on HIV/ AIDS are displayed in the Contractor Camp area;						
– Information and education relating to sexually transmitted diseases to be made available to both construction workers and local community, where applicable;						
– Free condoms must be made available to all staff on site at central points;						
– Medical support must be made available; and						
– Provide access to Voluntary HIV Testing and Counselling Services.						

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;						
– The Emergency Plan must deal with accidents, potential spillages and fires in line with relevant legislation;						
– All staff must be made aware of emergency procedures as part of environmental awareness training;						
– The relevant local authority must be made aware of a fire as soon as it starts; and						
– In the event of emergency, necessary mitigation measures to contain the spill or leak must be implemented (see **Hazardous Substances section 5.17**).						

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;						
– All hazardous substances must be stored in suitable containers as defined in the Method Statement;						
– Containers must be clearly marked to indicate contents, quantities and safety requirements;						
– All storage areas must be bunded. The bunded area must be of sufficient capacity to contain a spill / leak from the stored containers;						
– Bunded areas to be suitably lined with a SABS approved liner;						
– An Alphabetical Hazardous Chemical Substance (HCS) control sheet must be drawn up and kept up to date on a continuous basis;						
– All hazardous chemicals that will be used on site must have Material Safety Data Sheets (MSDS);						
– All employees working with HCS must be trained in the safe use of the substance and according to the safety data sheet;						
– Employees handling hazardous substances / materials must be aware of the potential impacts and follow						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
appropriate safety measures. Appropriate personal protective equipment must be made available;						
– The Contractor must ensure that diesel and other liquid fuel, oil and hydraulic fluid is stored in appropriate storage tanks or in bowsers;						
– 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);						
– The floor of the bund must be sloped, draining to an oil separator;						
– Provision must be made for refuelling 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;						
– All empty externally dirty drums must be stored on a drip tray or within a bunded area;						
– No unauthorised access into the hazardous substances storage areas must be permitted;						
– No smoking must be allowed within the vicinity of the hazardous storage areas;						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
– Adequate fire-fighting equipment must be made available at all hazardous storage areas;						
– Where refuelling away from the dedicated refuelling station is required, a mobile refuelling unit must be used. Appropriate ground protection such as drip trays must be used;						
– 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;						
– The responsible operator must have the required training to make use of the spill kit in emergency situations;						
– An appropriate number of spill kits must be available and must be located in all areas where activities are being undertaken; and						
– 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 wastewater management and 5.8 for solid and hazardous waste management.						

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;						
– 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.						
– Leaking equipment must be repaired immediately or be removed from site to facilitate repair;						
– Workshop areas must be monitored for oil and fuel spills;						
– Appropriately sized spill kit kept onsite relevant to the scale of the activity taking place must be available;						
– 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;						
– Water drainage from the workshop must be contained and managed in accordance with Section 5.7: storm and wastewater management.						

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;						
– Batching plants areas must be fitted with a containment facility for the collection of cement laden water.						
– Dirty water from the batching plant must be contained to prevent soil and groundwater contamination						
– Bagged cement must be stored in an appropriate facility and at least 10m away from any water courses, gullies and drains;						
– A washout facility must be provided for washing of concrete associated equipment. Water used for washing must be restricted;						
– Hardened concrete from the washout facility or concrete mixer can either be reused or disposed of at an appropriate licensed disposal facility;						
– Empty cement bags must be secured with adequate binding material if these will be temporarily stored on site;						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
– Sand and aggregates containing cement must be kept damp to prevent the generation of dust (Refer to Section 5.20: Dust emissions)						
– 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; and						
– Temporary fencing must be erected around batching plants in accordance with Section 5.5: Fencing and gate installation.						

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;						
– 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;						
– Excavation, handling and transport of erodible materials must be avoided under high wind conditions or when a visible dust plume is present;						
– 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;						
– Where possible, soil stockpiles must be located in sheltered areas where they are not exposed to the erosive effects of the wind;						
– Where erosion of stockpiles becomes a problem, erosion control measures must be implemented at the discretion of the ECO;						
– Vehicle speeds must not exceed 40km/h along dust roads or 20km/h when traversing unconsolidated and non-vegetated areas;						
– Straw stabilisation must be applied at a rate of one bale/10m² and harrowed into the top 100mm of top material, for all completed earthworks;						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
– For significant areas of excavation or exposed ground, dust suppression measures must be used to minimise the spread of dust.						

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						
– Notification of surrounding landowners, emergency services site personnel of blasting activity 24 hours prior to such activity taking place on Site.						

5.22 Noise

Impact Management outcome: Unnecessary noise is prevented by ensuring that noise from construction activities 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;						
– All vehicles and machinery must be fitted with appropriate silencing technology and must be properly maintained;						
– 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;						
– 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.						

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;						
– Firefighting equipment must be available on all vehicles located on site;						
– The local Fire Protection Agency (FPA) must be informed of construction activities;						
– Contact numbers for the FPA and emergency services must be communicated in environmental awareness training and displayed at a central location on site;						
– Two-way swop of contact details between ECO and FPA.						

5.24 Stockpiling and stockpile areas

Impact management outcome: Erosion and sedimentation as a result of stockpiling are reduced.

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 and water bodies;						
– All stockpiled material must be maintained and kept clear of weeds and alien vegetation growth by undertaking regular weeding and control methods;						
– Topsoil stockpiles must 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.);						
– Where possible, sandbags (or similar) must be placed at the bases of the stockpiled material in order to prevent erosion of the material.						

5.25 Finalising tower positions

Impact management outcome: No environmental degradation occurs as a result of the survey and pegging operations.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
– No vegetation clearing must occur during survey and pegging operations;						
– No new access roads must be developed to facilitate access for survey and pegging purposes;						
– Project manager, botanical specialist and contractor to agree on final tower positions based on survey within assessed and approved areas;						
– The surveyor is to demarcate (peg) access roads/tracks in consultation with ECO. No deviations will be allowed without the prior written consent from the ECO.						

5.26 Excavation and Installation of foundations

Impact management outcome: No environmental degradation occurs as a result of excavation or installation of foundations.

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 recognised disposal site, if not used for backfilling purposes;						
– Spoil can however be used for landscaping purposes and must be covered with a layer of 150 mm topsoil for rehabilitation purposes;						
– Management of equipment for excavation purposes must be undertaken in accordance with Section 5.18: Workshop equipment maintenance and storage; and						
– Hazardous substances spills from equipment must be managed in accordance with Section 5.17: Hazardous substances.						
– Batching of cement to be undertaken in accordance with Section 5.19: Batching plants;						
– Residual cement must be disposed of in accordance with Section 5.8: Solid and hazardous waste management.						

5.27 Assembly and erecting towers

Impact management outcome: No environmental degradation occurs as a result of assembly and erecting of towers.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
– Prior to erection, assembled towers and tower sections must be stored on elevated surfaces (suggest wooden blocks) to minimise damage to the underlying vegetation;						
– In sensitive areas, tower assembly must take place off-site or away from sensitive positions;						
– The crane used for tower assembly must be operated in a manner which minimises impact to the environment;						
– The number of crane trips to each site must be minimised;						
– Wheeled cranes must be utilised in preference to tracked cranes;						
– Consideration must be given to erecting towers by helicopter or by hand where it is warranted to limit the extent of environmental impact;						
– Access to tower positions to be undertaken in accordance with access requirements specified in **Section 5.4: Access Roads**;						
– Vegetation clearance to be undertaken in accordance with general vegetation clearance requirements specified in **Section 5.10: Vegetation clearing**;						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
– No levelling at tower sites must be permitted unless approved by the Development Project Manager or Developer Site Supervisor;						
– Topsoil must be removed separately from subsoil material and stored for later use during rehabilitation of such tower sites;						
– Topsoil must be stored in heaps not higher than 2m to prevent destruction of the seed bank within the topsoil;						
– Excavated slopes must be no greater that 1:3, but where this is unavoidable, appropriate measures must be undertaken to stabilise the slopes;						
– Fly rock from blasting activity must be minimised and any pieces greater than 150 mm falling beyond the Working Area, must be collected and removed;						
– Only existing disturbed areas are utilised as spoil areas;						
– Drainage is provided to control groundwater exit gradient with the spill areas such that migration of fires is kept to a minimum;						
– Surface water runoff is appropriately channelled through or around spoil areas;						
– During backfilling operations, care must be taken not to dump the topsoil at the bottom of the foundation and then put spoil on top of that;						
– The surface of the spoil is appropriately rehabilitated in accordance with the requirements specified in Section 5.29: Landscaping and rehabilitation;						
– The retained topsoil must be spread evenly over areas to be rehabilitated and suitably compacted to effect re-vegetation of such areas to prevent erosion as soon						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
as construction activities on the site is complete. Spreading of topsoil must not be undertaken at the beginning of the dry season.						

5.28 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**
– Where possible, previously disturbed areas must be used for the siting of winch and tensioner stations. In all other instances, the siting of the winch and tensioner must avoid Access restricted areas and other sensitive areas;						
– The winch and tensioner station must be equipped with drip trays in order to contain any fuel, hydraulic fuel or oil spills and leaks;						
– Refuelling of the winch and tensioner stations must be undertaken in accordance with **Section 5.17: Hazardous substances;**						
– In the case of the development of overhead transmission and distribution infrastructure, a one metre "trace-line" may be cut through the vegetation for stringing purposes only and no vehicle access must be cleared along "trace-lines". Vegetation clearing must be undertaken by hand, using chainsaws and handheld implements, with vegetation being cut off at ground level. No tracked or wheeled mechanised equipment must be used;						
– Alternative methods of stringing which limit impact to the environment must always be considered e.g. by hand or by using a helicopter;						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
– Where the stringing operation crosses a public or private road or railway line, the necessary scaffolding/ protection measures must be installed to facilitate access. If, for any reason, such access has to be closed for any period(s) during development, the persons affected must be given reasonable notice, in writing;						
– No services (electrical distribution lines, telephone lines, roads, railways lines, pipelines fences etc.) must be damaged because of stringing operations. Where disruption to services is unavoidable, persons affected must be given reasonable notice, in writing;						
– Where stringing operations cross cultivated land, damage to crops is restricted to the minimum required to conduct stringing operations, and reasonable notice (10 workdays minimum), in writing, must be provided to the landowner;						
– Necessary scaffolding protection measures must be installed to prevent damage to the structures supporting certain high value agricultural areas such as vineyards, orchards, nurseries.						

5.29 Socio-economic

Impact management outcome: Socio-economic development is enhanced.

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;						
– Develop and implement a collaborative and constructive approach to conflict resolution as part of the external stakeholder engagement process;						
– Sustain continuous communication and liaison with neighbouring owners and residents						
– Create work and training opportunities for local stakeholders; and						
– 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.						

5.30 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:**						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
management of hazardous substances and **5.18 workshop, equipment maintenance and storage**;						
– Hazardous storage areas must be well ventilated;						
– Fire extinguishers must be serviced and accessible. Service records to be filed and audited at last service;						
– Emergency and contact details must be displayed;						
– Security personnel must be briefed and have the facilities to contact or be contacted by relevant management and emergency personnel;						
– Night hazards such as reflectors, lighting, traffic signage etc. must have been checked;						
– Fire hazards identified and the local authority must have been notified of any potential threats e.g. large brush stockpiles, fuels etc.;						
– Structures vulnerable to high winds must be secured;						
– Wind and dust mitigation must be implemented;						
– Cement and materials stores must have been secured;						
– Toilets must have been emptied and secured;						
– Refuse bins must have been emptied and secured;						
– Drip trays must have been emptied and secured.						

5.31 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 to a registered waste site and certificates of disposal provided;						
– 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						
– 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;						
– 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;						
– 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;						
– Rehabilitation of tower sites and access roads outside of farmland;						
– Indigenous species must be used for with species and/grasses to where it compliments or approximates the original condition;						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Stockpiled topsoil must be used for rehabilitation (refer to **Section 5.24: Stockpiling and stockpiled areas**);						
– Stockpiled topsoil must be evenly spread so as to facilitate seeding and minimise loss of soil due to erosion;						
– Before placing topsoil, all visible weeds from the placement area and from the topsoil must be removed;						
– Subsoil must be ripped before topsoil is placed;						
– The rehabilitation must be timed so that rehabilitation can take place at the optimal time for vegetation establishment;						
– Where impacted through construction related activity, all sloped areas must be stabilised to ensure proper rehabilitation is effected and erosion is controlled;						
– 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;						
– Spoil can be used for backfilling or landscaping as long as it is covered by a minimum of 150mm of topsoil.						
– 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:						

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						

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 Contact details and description of the project

7.1.1. Details of the Applicant:

Applicant Name	**South Africa Mainstream Renewable Power Developments (Pty) Ltd**
Contact Person	Eugene Marais
Physical Address	4th Floor Mariendahl House, Newlands on Main, Corner Main and Campground Road, Claremont, Cape Town, 7708
Postal Address	PO Box 45063, Claremont, 7735
Telephone	021 657 4045
Fax	N/A
Cell	(073) 871 5781
Email Address	Eugene.Marais@mainstreamrp.com

7.1.2. Details and Expertise of Environmental Assessment Practitioner (EAP)

EAP Name	**Stuart Heather-Clark- SLR Consulting South Africa (Pty) Ltd**
EAP Qualifications	(Curriculum Vitae included):
Professional Affiliation/Registration	(Curriculum Vitae included):
Telephone	+27 21 461 1118
Fax	n/a
Email Address	shclark@slrconsulting.com

Refer to **Appendix A** of the EMPr for the detailed experience of the EAP and the Project Team.

7.1.3. Project Details

Project Name:

BASIC ASSESSMENT FOR THE PROPOSED CONSTRUCTION AND OPERATION OF A RADIO MAST, 132KV POWERLINE AND 400KV LOOP IN LOOP OUT (LILO) POWERLINES LOCATED NEAR DEALESVILLE IN THE TOKOLOGO LOCAL MUNICIPALITY, LEJWELEPUTSWA DISTRICT IN THE FREE STATE PROVINCE (DFFE: xxx)

7.1.4. Project Description

South Africa Mainstream Renewable Power Developments (Pty) Ltd ('Mainstream') is proposing the development of one (1) Radio Mast, two (2) x 400kV powerlines and one (1) x 132kV powerline that will connect to the authorised 132kV/400kV Main Transmission Substation (MTS) (14/12/16/3/3/1/2460/AM1) as well as to the approved 100MW Kentani Solar Photovoltaic (PV) Energy Facility (14/12/16/3/3/2/724/AM3) respectively. The Kentani Solar PV Energy Facility is one (1) of eleven (11) solar PV projects collectively known as the Kentani Cluster located near the town of Dealesville, within the Tokologo Local Municipality (Lejweleputswa District) in the Free State Province.

The Kentani Cluster consists of eleven (11) solar PV projects and associated electrical infrastructure (including a powerline), each of which received their own Environmental Authorisation (EA) in 2016 from the Department of Environmental Affairs (DEA) [now referred to as the Department of Forestry, Fisheries and the Environment (DFFE)].

It should be noted that on 28 October 2021, the Minister of Mineral Resources and Energy, namely Gwede Mantashe, announced the Preferred Bidders of the Round 5 Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) and six (6) of the aforementioned Solar Energy Facilities, collectively referred to as the "Kentani Cluster", received Preferred Bidder status i.e.:

- Kentani Solar PV (14/12/16/3/3/2/724/AM3)
- Sonoblomo Solar PV (14/12/16/3/3/2/723/AM2)
- Klipfontein Solar PV (14/12/16/3/3/2/722/AM2)
- Klipfontein 2 Solar PV (14/12/16/3/3/2/726/1/AM1)
- Leliehoek Solar PV (14/12/16/3/3/2/728/AM2)
- Braklaagte Solar PV (14/12/16/3/3/2/727/1)

These Solar Energy Facilities have now become Strategic Infrastructure Projects i.e. SIPs 8 and 10. SIPs 8 and 10 target the development of green energy in support of the South African economy and the provision of electricity transmission and distribution respectively.

- SIP 8 supports sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP2010) and support bio-fuel production facilities.
- SIP 10 Expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development. Align the 10-year transmission plan, the services backlog, the national broadband roll-out and the freight rail line development to leverage off regulatory approvals, supply chain and project development capacity.

The approved MTS and associated infrastructure will service eleven (11) of Mainstream's solar PV projects authorised as part of the Kentani Cluster.

The powerlines and the Radio Mast are located within the Kimberly Renewable Energy Development Zone (REDZ) (namely REDZ 4) and Central Strategic Transmission Corridor, as defined and in terms of the procedures laid out in Government Notices No. 113 and No. 145 which were formally gazetted on 16 February 2018 and 26 February 2021 respectively. The respective powerlines which are being proposed as part of this application and BA process are as follows:

1. Two (2) 400kV overhead powerlines (approx. 700km in length) are being proposed and will connect the approved MTS (14/12/16/3/3/1/2460/AM1) to the existing Eskom 400kV powerline, located west of the approved MTS site, via a Loop-In-Loop Out (LILO) connection; and
2. One (1) 132kV powerline (approx. 5km in length) is being proposed and will connect the approved MTS to the authorised Kentani on-site substation (14/12/16/3/3/2/724/AM3), located approx. 4.85km north-west of the approved MTS site.
3. One (1) Radio Mast (approx. 90m in height) is being proposed and will be situated within the approved MTS site.

A road in the servitude under the proposed powerlines as well as an access road (approx. 4-8m wide) to the R64 provincial route will also be required.

As part of the BA process, powerline corridors with widths of 300m (150m on either side of centre line) are being proposed and assessed for the 400kV and 132kV powerlines. This is to allow flexibility when routing the powerlines within the authorised corridor (should the EA be granted).

It must be noted that the majority of the proposed powerlines being proposed are located within existing approved powerline corridors and that only small sections will traverse outside of the approved corridors:

- The portion of the 132kV powerline outside of an existing approved corridors and Eskom servitudes is approximately 7000m
- The portion of the each of the 400kV powerlines outside of an existing approved corridors and Eskom servitudes is approximately 150m and 250m respectively.

Considering the above, it is important to note that the location of the corridors for the powerlines being proposed as part of this application have previously been assessed as part of the development footprint for the approved Artemis MTS and powerline corridors (14/12/16/3/3/1/2460/AM1) as well as the Kentani Cluster of solar PV developments, each of which received their own EA in 2016[1].

[1] It should be noted that the validity period of the EA issued for the Klipfontein Solar PV Energy Facility in 2016 was extended by the Holder of the EA in April 2021 (14/12/16/3/3/2/722/AM1). The EA issued in 2016 is now valid until 06 June 2026 (i.e., EA lapses on 06 June 2026).

This Generic EMPr is applicable to the proposed 132kV powerline and 400kV LILO powerlines and associated infrastructure located near Dealesville in the Tokologo Local Municipality, Lejweleputswa District in the Free State Province.

7.1.5. Project Location

Location details of the proposed 132Kv powerline and 400kV powerlines development:

Province	Free State
District Municipality	Lejweleputswa District Municipality
Local Municipality	Tokologo Local Municipality
Ward number(s)	Ward 1
Nearest town(s)	Dealesville
Affected Properties: Farm name(s), number(s) and portion numbers	» Remaining Extent of the Farm Klipfontein No. 305 ; » The Farm Leliehoek No. 748 ; » The Farm Overschot No. 31; » Remainder of the Farm Oxford No. 1030; and
SG 21 Digit Code (s)	» Remaining Extent of the Farm Klipfontein No. 305 (F00400000000030500000); » The Farm Leliehoek No. 748 (F00400000000074800000); » The Farm Overschot No. 31 (F00400000000003100000); » Remainder of the Farm Oxford No. 1030 (F00400000000103000000
Current zoning and land use	Agriculture

132kV powerlines and 400kV powerlines and associated infrastructure development

Infrastructure	**Footprint, dimensions and technical details**
Radio Mast[2]	• One (1) new Radio Mast • Total height 90m The radio mast will be with the Authorised MTS footprint (14/12/16/3/3/1/2460/AM2).
Grid Connection (Powerlines)	• Two (2) new 400kV overhead powerlines connecting the approved MTS to existing Eskom 400kV powerline (approx. 700m each) via LILO connection. • One (1) new 132kV overhead powerline (approx. 5km) connection from the approved MTS to the authorised Kentani on-site substation (14/12/16/3/3/2/724) (approx. 4km north-west of MTS site); • Length of 400kV powerlines = approx. 700m each • Length of 132kV powerline = approx. 5km • Area occupied by powerlines unknown at this stage • Powerline corridors with widths of 300m (150m on either side of centre line) being proposed and assessed for 400kV and 132kV powerlines to allow flexibility when routing powerlines within authorised corridor (should EA be granted)

[2] It should be noted the proposed radio mast will be placed with the Authorised MTS footprint (14/12/16/3/3/1/2460/AM2).

Infrastructure	Footprint, dimensions and technical details
	• Powerline servitude of 400kV powerlines= approx. 55m per 1 x 400kV powerline • Powerline servitude of 132kV powerline = approx. 32m Eight (8) 132kV powerlines within grid connection corridor authorised as part of Kentani Cluster will also be re-routed and provision has been made for this routing in the approved MTS
Roads	• New road in servitude under proposed powerlines Widths of up to approx. 4-8m

It should be noted that Eskom's requirements for work in or near Eskom servitudes should be adhered to.

7.1 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. raptor nest, threatened plant species, archaeological site, etc. Sensitivity maps shall identify features both within the planned working area and any known sensitive features in the surrounding landscape. The overhead transmission and distribution profile shall be illustrated at an appropriate resolution to enable fine scale interrogation. It is recommended that <20 km of overhead transmission and distribution length is illustrated per page in A3 landscape format. Where considered appropriate, photographs of sensitive features in the context of tower positions shall be used.

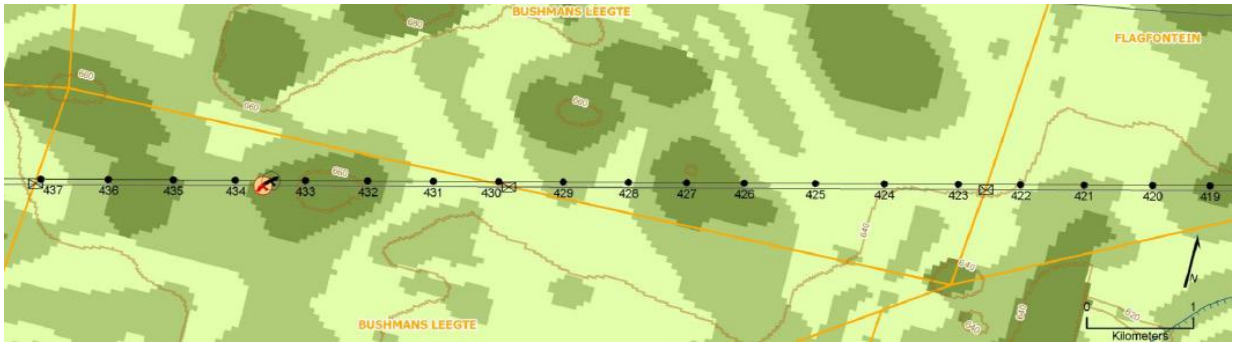


Figure 1: Example of an environmental sensitivity map in the context of a final overhead transmission and distribution profile

The national web-based environmental screening tool was utilised for this project and the grid connection corridor sensitivity maps can be seen in Figures 3 to 7. The site-specific environmental sensitivity map included in the BA Report is included as Figure 2.

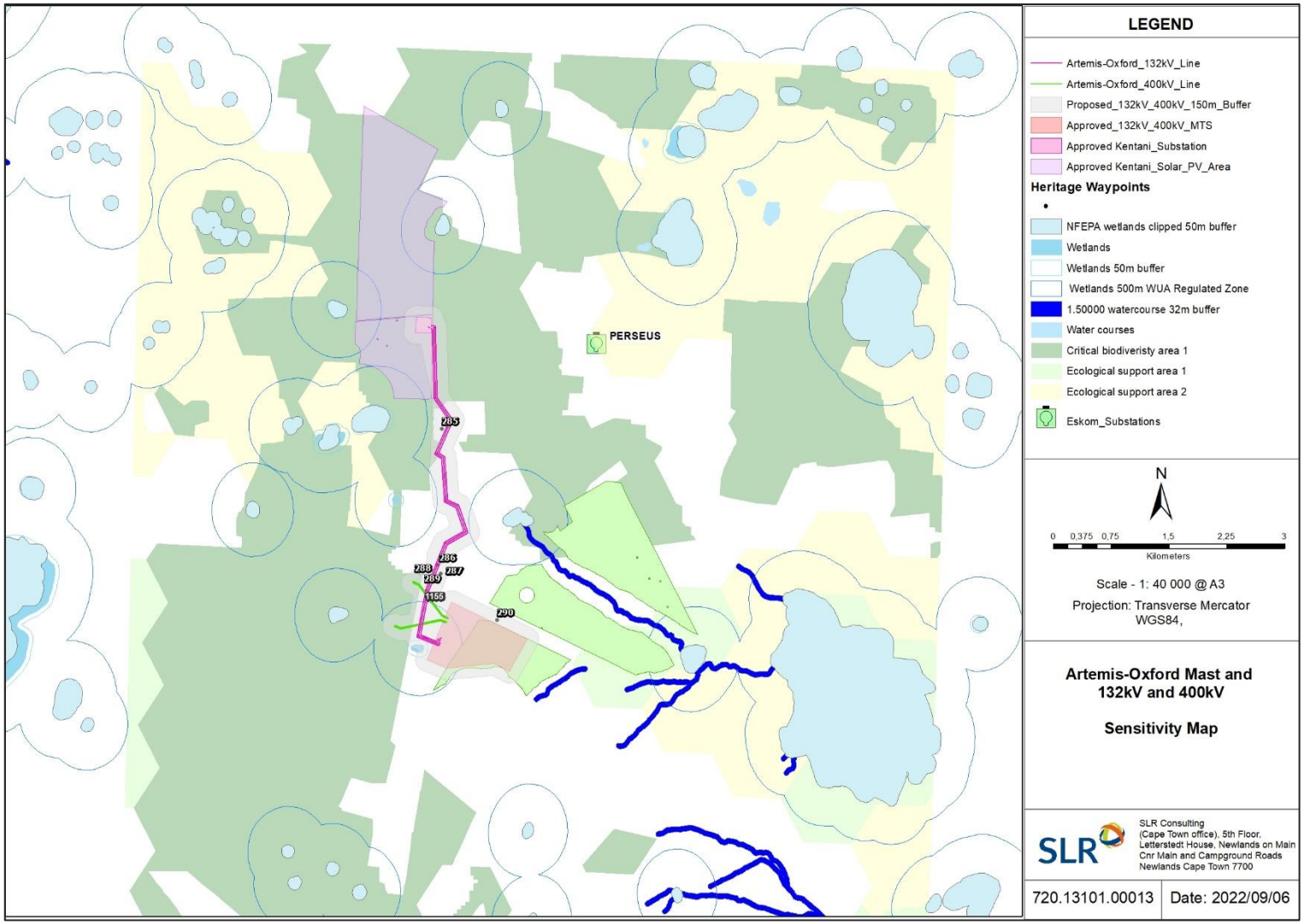


Figure 2: Environmental sensitivity map based on Specialist Findings.

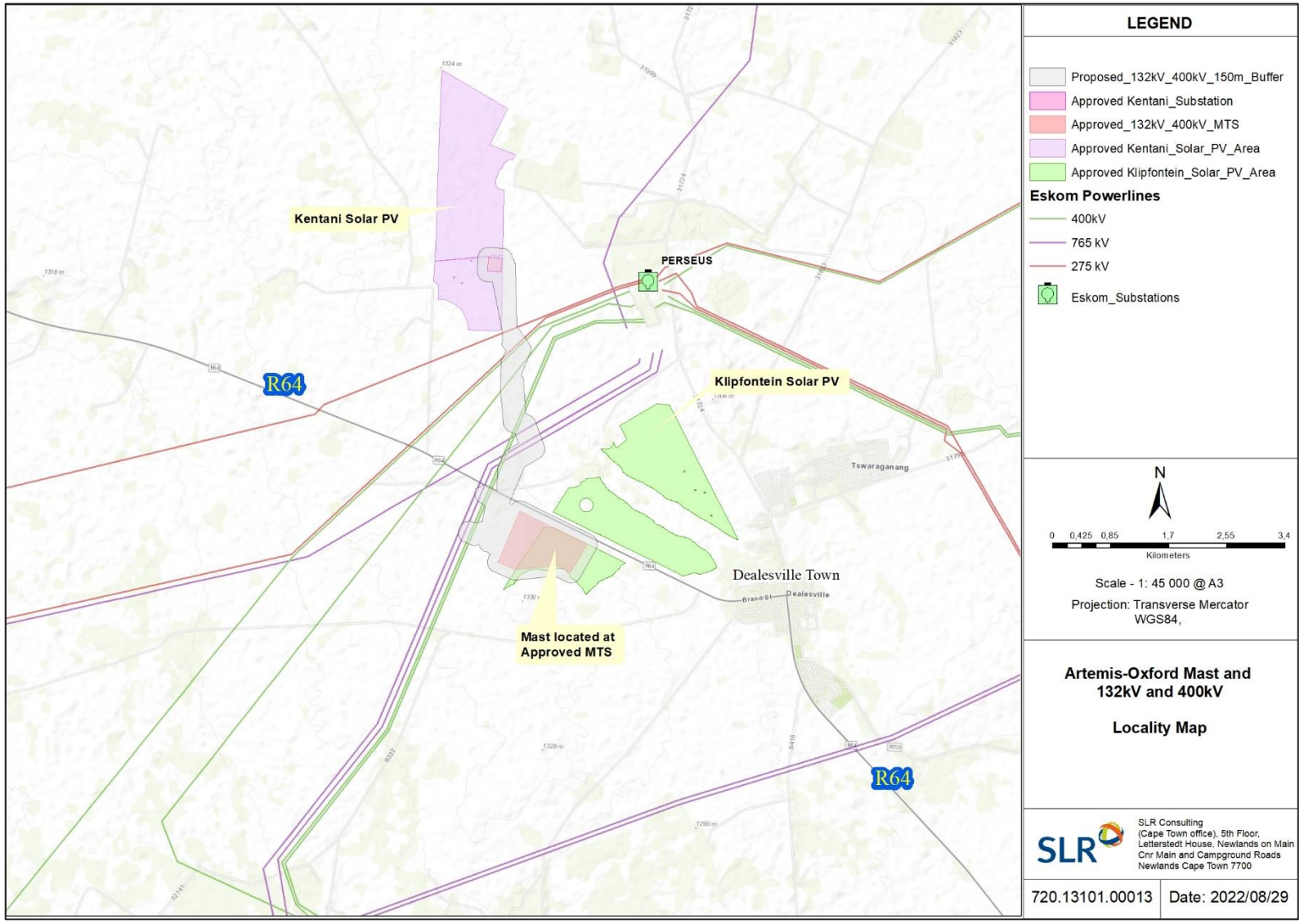

Kentani Solar PV
PERSEUS
R64
Klipfontein Solar PV
Tswaraganang
Dealesville Town
Brand St
Dealesville
Mast located at
Approved MTS
R64
LEGEND
Proposed_132kV_400kV_150m_Buffer
Approved Kentani_Substation
Approved_132kV_400kV_MTS
Approved Kentani_Solar_PV_Area
Approved Klipfontein_Solar_PV_Area
Eskom Powerlines
400kV
765 kV
275 kV
Eskom_Substations
N
0 0,425 0,85 1,7 2,55 3,4
Kilometers
Scale - 1: 45 000 @ A3
Projection: Transverse Mercator
WGS84,
Artemis-Oxford Mast and
132kV and 400kV
Locality Map
SLR
SLR Consulting
(Cape Town office), 5th Floor,
Letterstedt House, Newlands on Main
Cnr Main and Campground Roads
Newlands Cape Town 7700
720.13101.00013
Date: 2022/08/29

Figure 3: Proposed Site Layout

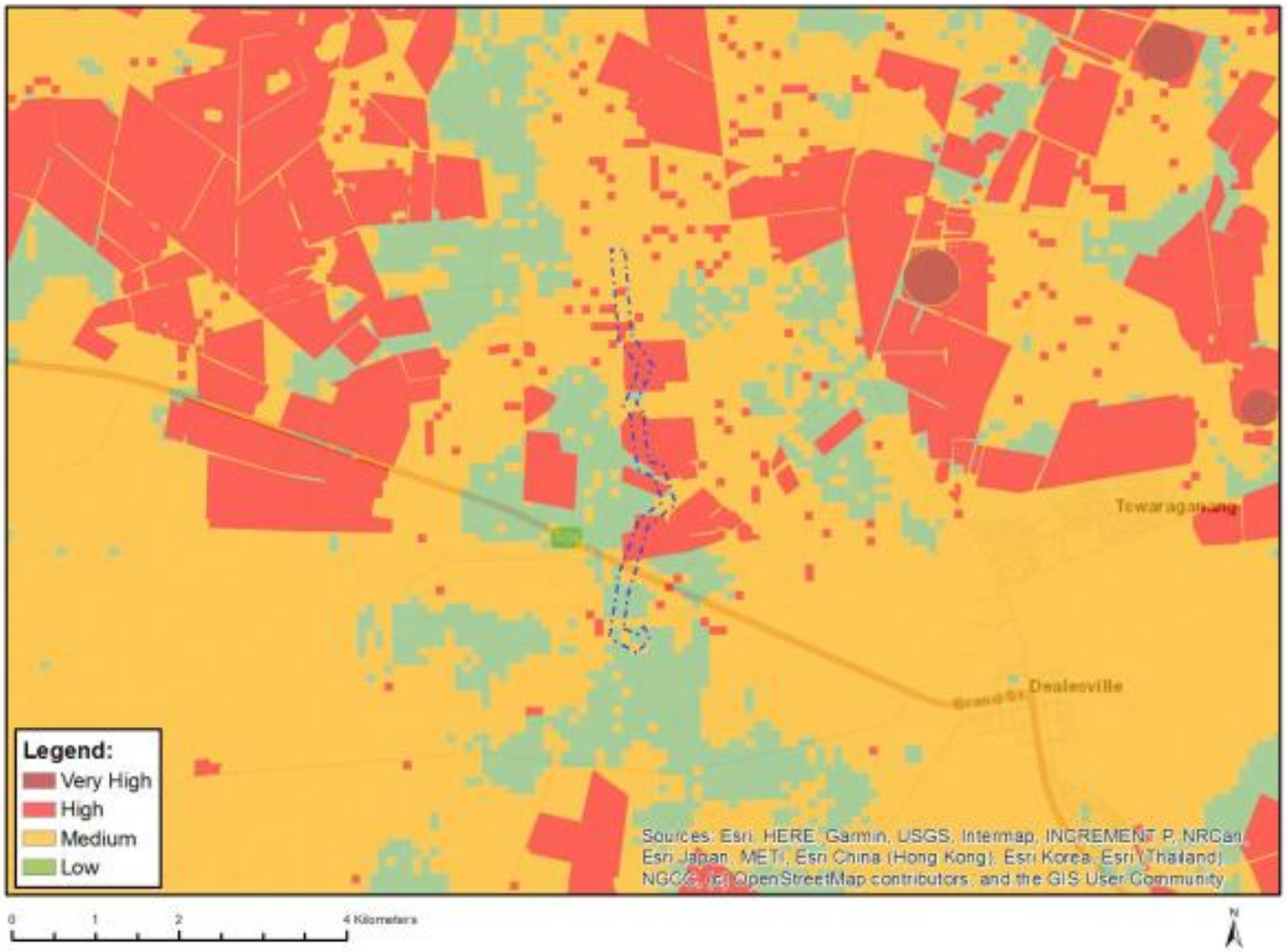


Figure 4: Map of Relative Agriculture Theme Sensitivity

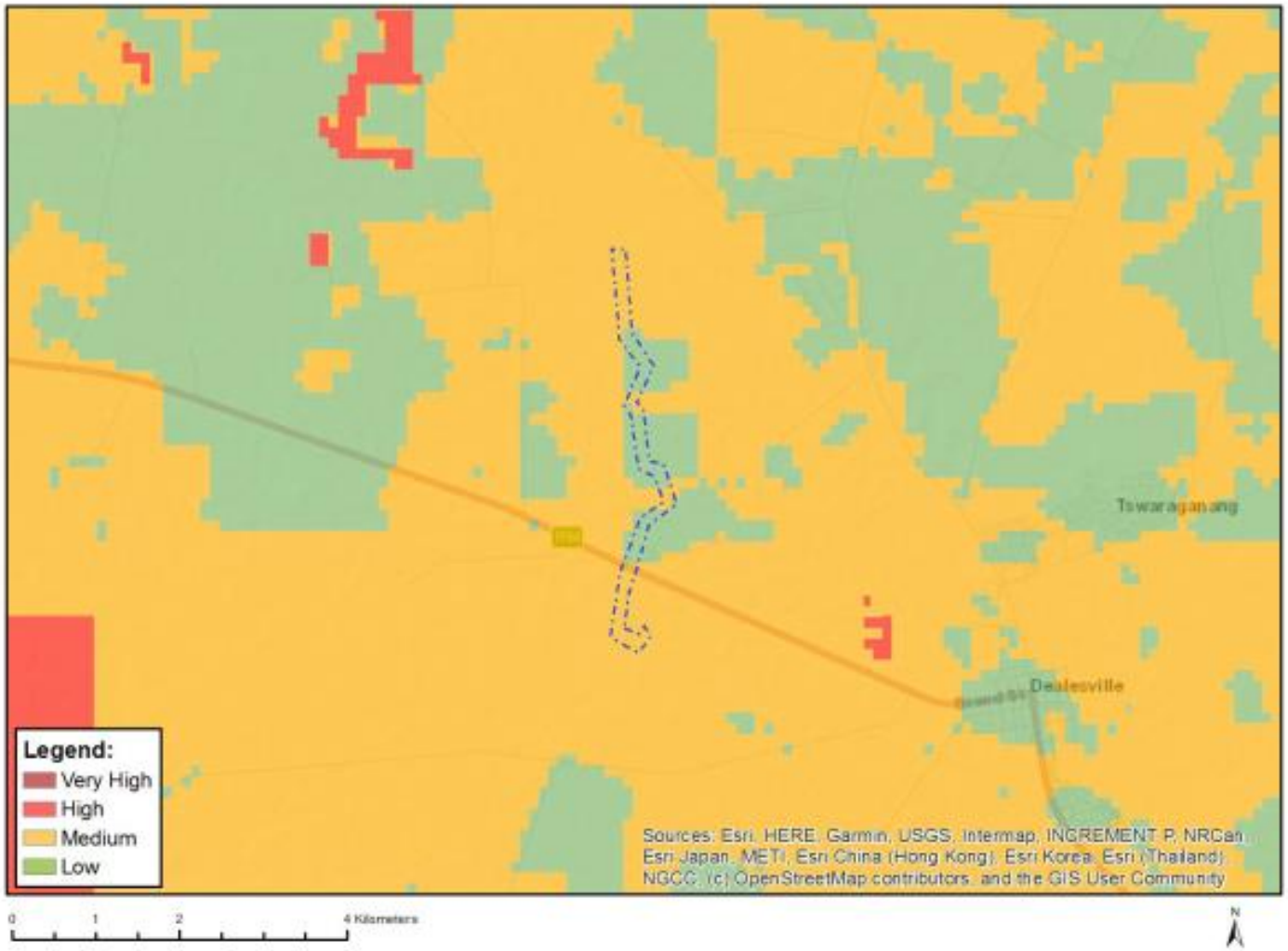


Figure 5: Map of Animal Species Theme Sensitivity

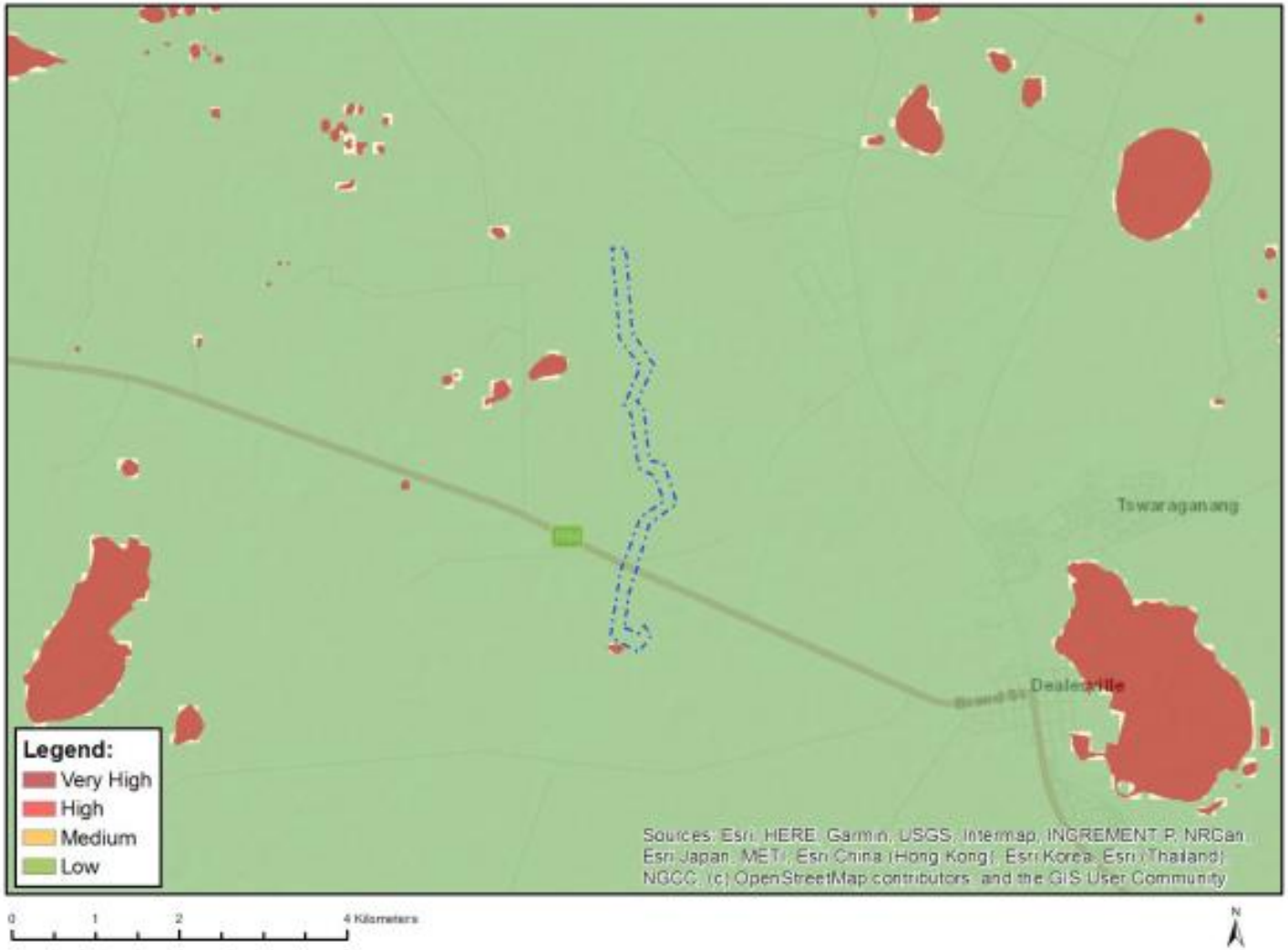


Figure 6: Map of Aquatic Biodiversity Theme Sensitivity

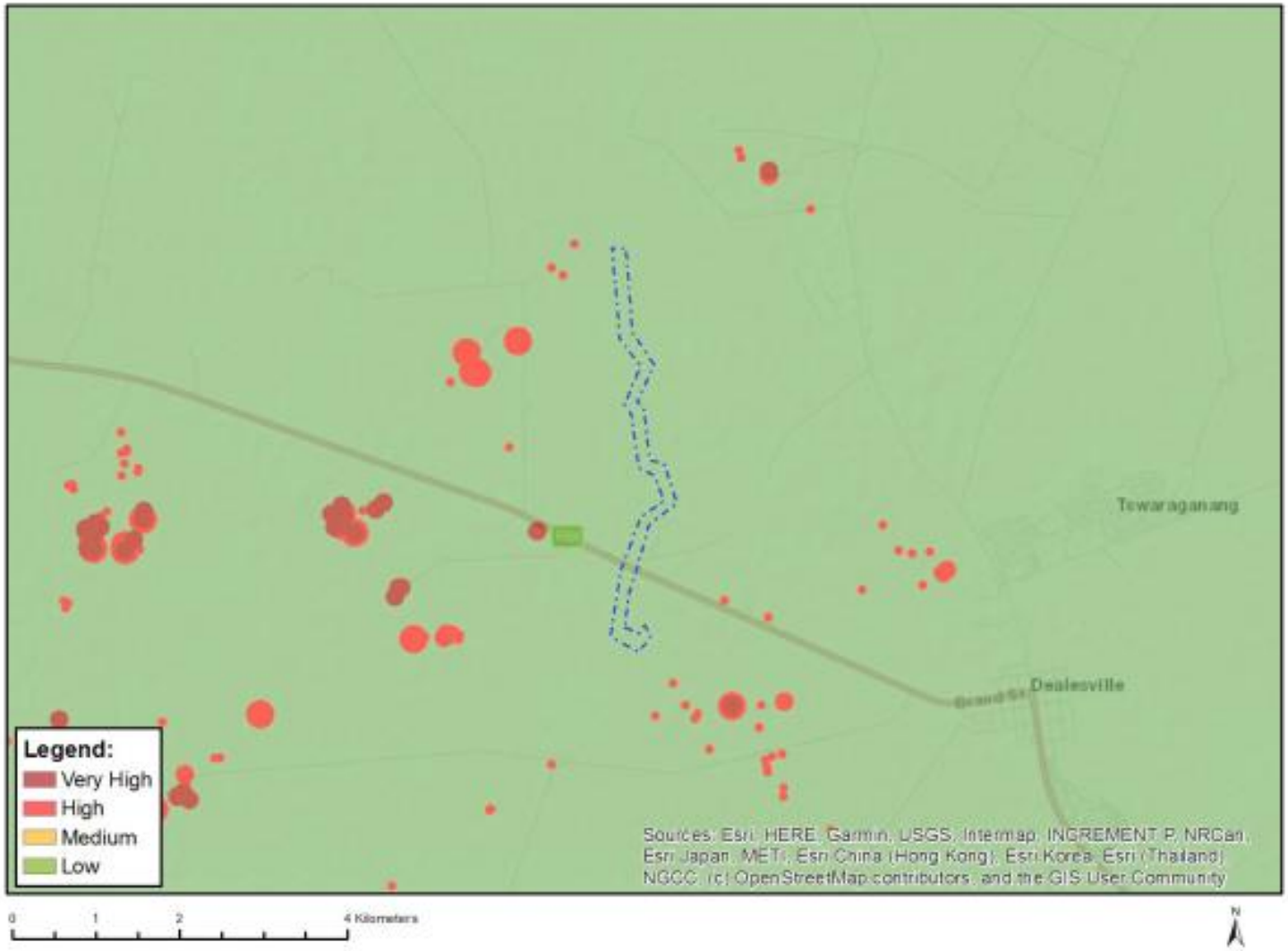


Figure 7: Map of Archaeological and Cultural Heritage Species Theme Sensitivity

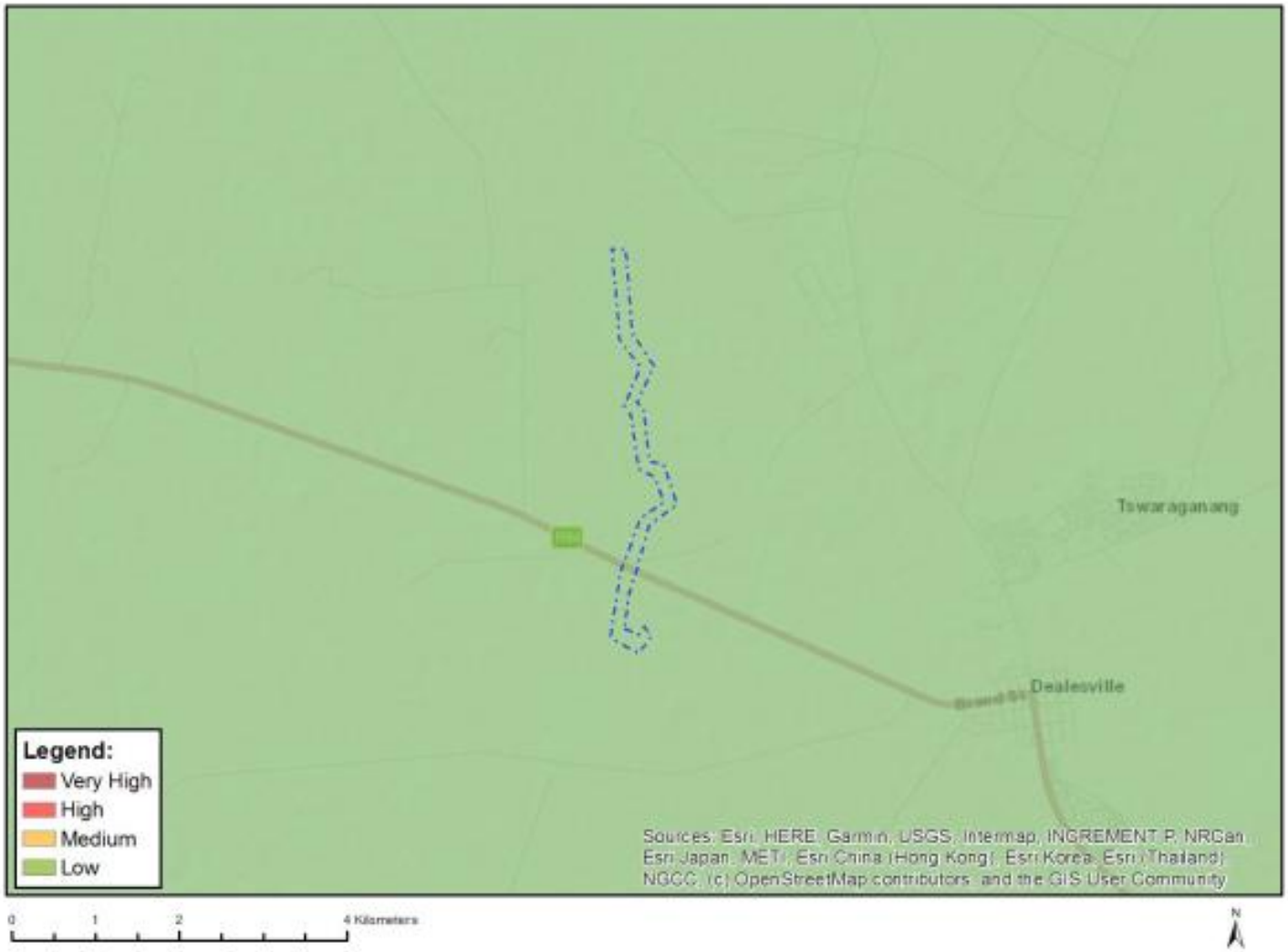


Figure 9: Map of Relative Plant Species Theme Sensitivity

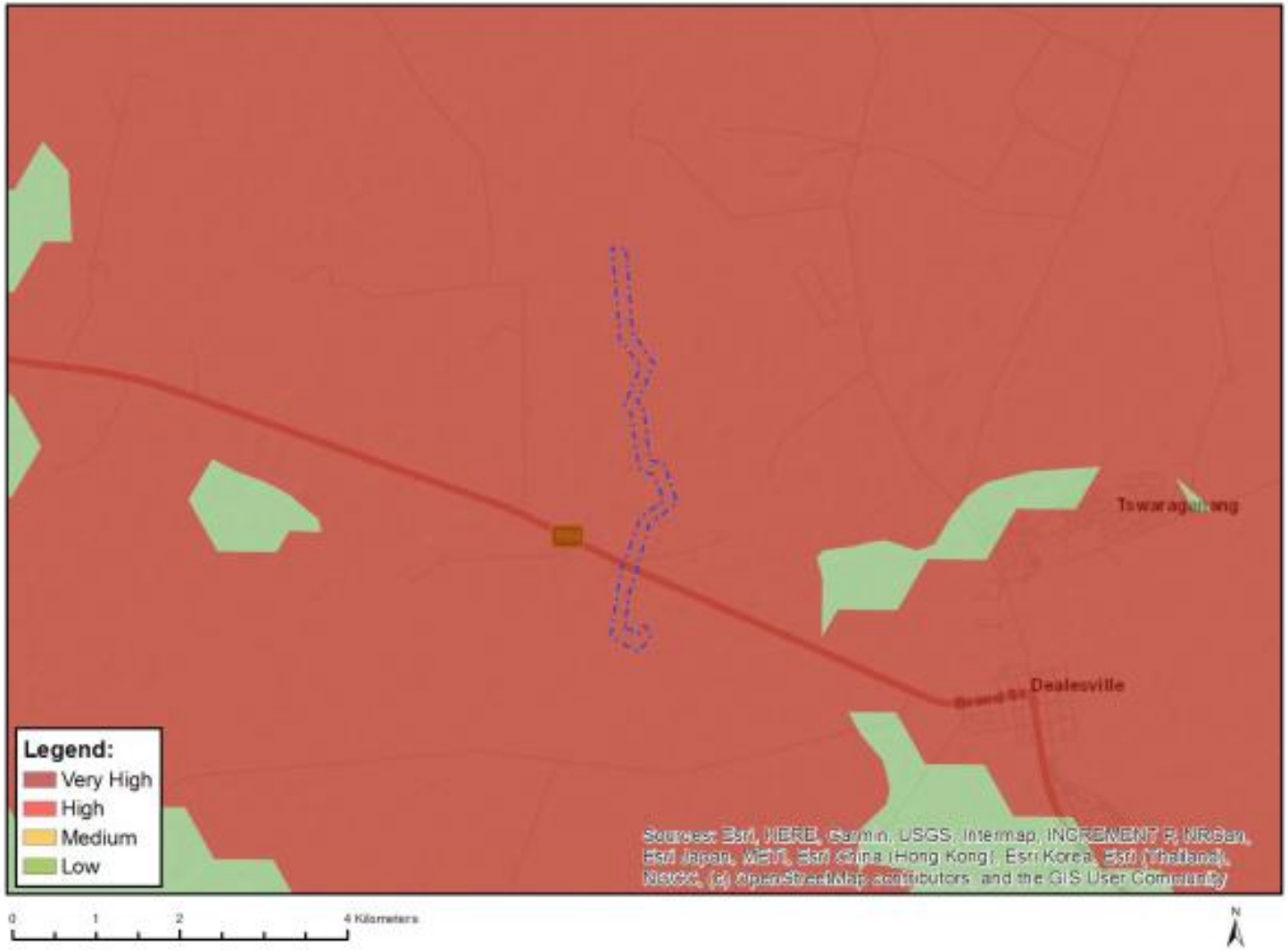


Figure 10: Map of Relative Terrestrial Biodiversity Theme Sensitivity

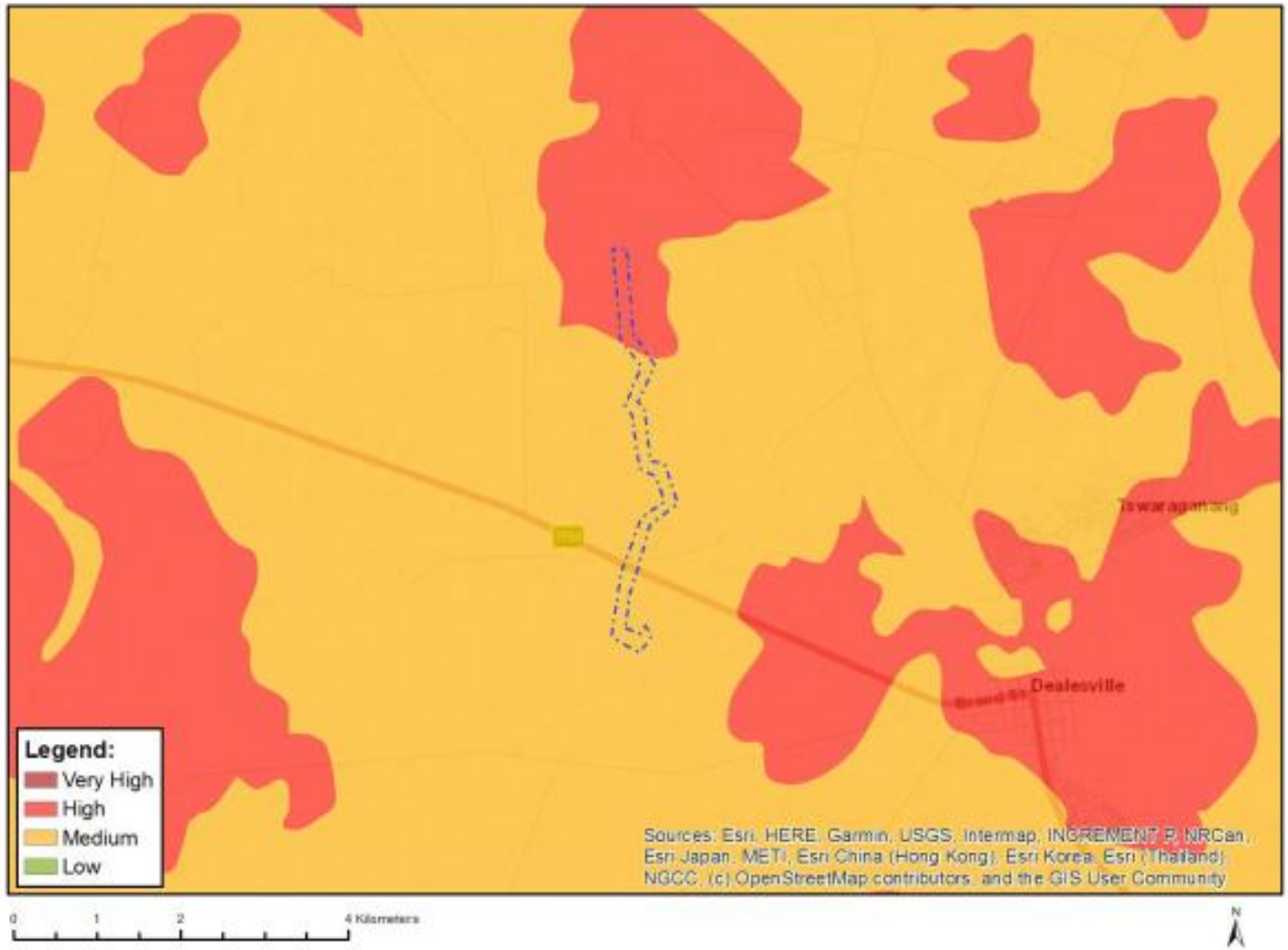


Figure 10: Map of Relative Palaeontology Theme Sensitivity

7.2 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 days prior to the date on which the activity will commence of 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.

7.3 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 impact management actions, not included in the pre-approved generic EMPr template, to manage impacts, those impact management outcomes and 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.

***Figure 8.1: Site Specific Mitigation*[3]**

Specialist	Impact Management Action	Implementation			Monitoring		
		Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
Aquatic	Reduce loss of aquatic species including any Species of Special Concern- Potential loss of protected or listed aquatic species	PM/ ECO / ESO	• All alien plant re-growth, which is currently low within the greater region must be monitored monthly and should it occur, these plants must be eradicated within the project footprints and especially in areas near the proposed crossings.	**Construction Decommissioning**	ECO / ESO	• Weekly for protected plants • Monthly for alien plants	• Records of monitoring and adherence to implementations methods and mitigation measures. • Alien Management Plan • Rehabilitation Plan • Ecological Management Plan
	Avoid /Limit damage or loss of riparian systems and disturbance of waterbodies in the construction / decommissioning phase	PM/ ECO / ESO	• The current layout must be selected, to ensure all the observed aquatic systems will be avoided, thus avoiding this impact • <u>Sensitive habitats in close proximity to the development footprint must be avoided or demarcated as No Go area (i.e., Wetlands).</u> • <u>No activities may take place, without the necessary authorisation from this Department, within a horizontal distance of 100 m from any watercourse or estuary or within a 500 m radius from a delineated boundary of any a wetland or pan</u> • <u>All the conditions of the National Water Act (Act 36 of 1998) (NWA) must be complied with</u>		ECO / ESO	• Monthly and as and when required	• Storm Water Management Plan • Records of monitoring and adherence to implementations methods and mitigation measures. • Rehabilitation Plan • Erosion Management Plan • <u>Necessary authorisation(s) from DWS in place and kept on record</u>

[3] <u>It should be noted that a number of mitigation measures / recommendations have been provided by Organs of State (OoS) / Key Stakeholders following the completion of the 30-day review and comment period for the Draft BAR, which have been incorporated into this EMPr (this table specifically). These mitigation measures / recommendations have been underlined in this table.</u>

Specialist	Impact Management Action	Implementation			Monitoring		
		Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
			• Registration of water uses under Section 21 of the NWA is compulsory[4]. • In terms of Section 4(1) of the NWA, a person may use water from a water resource for purposes such as reasonable domestic use, domestic gardening, animal watering, firefighting and recreational use, as set out in Schedule 1. • Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use. • Any erosion / sedimentation must be resolved through whatever additional interventions maybe necessary (i.e., extension, energy dissipaters, spreaders, etc). This will the avoid any secondary impacts that could affect downstream areas.				
	Avoid Water quality changes (increase in sediment, organic loads, chemicals or eutrophication	PM/ ECO / ESO	• All liquid chemicals including fuels and oil, must be stored in with secondary containment (bunds or containers or berms) that can contain a leak or spill. Such facilities must be inspected routinely and must have the suitable PPE and spill kits needed to contain likely worst-case scenario leak or spill in that facility, safely.		ECO / ESO	• Daily to ensure plant is in working order (minimise leaks), spills are prevented and if they do occur a quickly rectified.	• Storm Water Management Plan • Records of monitoring and adherence to implementations methods and mitigation measures. • Spill Management Plan • Erosion Management Plan

[4] In terms of Section 22 of the NWA a person may only use water without a license:

- If that water use is permissible under Schedule 1.
- If that water use is permissible as a continuation of an existing lawful use.
- If that water use is permissible in terms of a General Authorisation issued under Section 39 of the NWA.

Specialist	Impact Management Action	Implementation			Monitoring		
		Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
			• The storage of material, chemicals, fuels, etc. must not pose a risk to the surrounding environment and this includes surface and groundwater resources. Temporary bunds must also be constructed around chemical or fuel storage areas to contain possible spillages. Such storage areas must be located outside the 1: 100-year floodline of a river and must be fenced to prevent unauthorised access into the area. The maintenance of vehicles and equipment used for any purpose during the prospecting activity will take place only in the maintenance yard area. • Washing and cleaning of equipment must be done in designated wash bays, where rinse water is contained in evaporation/sedimentation ponds (to capture oils, grease cement and sediment). • Mechanical plant and bowsers must not be refuelled or serviced within 100m of a river channel. • All construction camps, lay down areas, wash bays, batching plants or areas and any stores should be more than 50 m from any demarcated water courses. • Littering and contamination associated with construction activity must be avoided through effective construction camp management. • Zero discharge of contaminated surface water is allowed				

Specialist	Impact Management Action	Implementation			Monitoring		
		Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
			• The Plant should be sited, designed and managed so that the quality of surface and groundwater in the vicinity are not degraded by runoff, leaching or seepage from the site or waste utilization areas • No stockpiling should take place within or near a water course • All stockpiles must be protected and located in flat areas where run-off will be minimised and sediment recoverable • Monitoring must take place on a continuous basis to ensure the relevant mitigation measures / recommendations are adhered to				
	Hydrological regime or Hydroperiod changes (Quantity changes such as abstraction or diversion)	PM/ ECO / ESO	• A stormwater management plan must be developed in the preconstruction phase, detailing the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems. • Effective stormwater management must include effective stabilisation (gabions and Reno mattresses) of exposed soil • The applicant must ensure the storm water run-off has to be directed away from the site to ensure the separation of clean and dirty water	**Operation**	ECO / ESO	• Annual Inspection of stormwater control systems to ensure these are functional	• Storm Water Management Plan • Records of monitoring and adherence to implementations methods and mitigation measures.

Specialist	Impact Management Action	Implementation			Monitoring		
		Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
Terrestrial Ecology and Plant Assessment	Loss of natural vegetation	PM/ ECO / ESO	• Restrict activities to footprint areas, use existing maintenance and access roads, rehabilitate disturbed areas after construction, control alien invasive plant species. • Sensitive habitats in close proximity to the development footprint must be avoided or demarcated as No Go areas. • Pre-construction walk through - The presence of any species of conservation concern within the development area as well as along the grid connection should be checked • A Pre-construction walk-through of the approved development footprint must be conducted to ensure that sensitive habitats and species are avoided where possible.	**Construction** **Decommissioning**	ECO / ESO	• Annual monitoring for 3 years after construction to evaluate vegetation cover, species composition.	• Records of monitoring and adherence to implementations methods and mitigation measures. • Records of walkthrough reports and compliance with various plans and reports as per ECO reports • Alien Management Plan • Rehabilitation Plan • Ecological Management Plan
	Invasion by alien invasive plant species	PM/ ECO / ESO	• Compile and implement an alien invasive control plan, monitor degree of invasion as well as outcome and effectiveness of control measures. • Erosion and Alien Invasive Plant Species Management Plan and Rehabilitation Plan must be developed to mitigate on habitat degradation due to erosion and alien plant invasion.	**Operation**	ECO / ESO	• Annual monitoring for 3 years after construction to evaluate vegetation cover, species composition.	• Records of monitoring and adherence to implementations methods and mitigation measures. • Alien Management Plan • Rehabilitation Plan • Ecological Management Plan
	Impacts on TOPs, Red data listed or provincially protected species	PM / ECO / ESO / Ecologist	• Permits from relevant authorities must be obtained for the removal or disturbance of any TOPs, Red data listed or provincially protected species	**Construction** **Operation** **Decommissioning**	ECO / ESO / Ecologist	• Ongoing for duration of construction, operation and decommission	• Records of monitoring and adherence to implementations methods and mitigation measures. • Proof of submission of permit applications. • Permits kept on file (if required)

Specialist	Impact Management Action	Implementation			Monitoring		
		Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
Avifauna	Habitat destruction during construction & maintenance	PM / ECO / ESO	• A pre-construction avifaunal walk down should be conducted to: • Confirm final layout and identify any sensitivities that may arise between the conclusion of the BA process and the construction phase. • Identify any sensitive species breeding on site that may arise between the conclusion of the BA process and the construction phase. • All construction activities should be strictly managed according to generally accepted environmental best practice standards, so as to avoid any unnecessary impact on the receiving environment. • All temporary disturbed areas should be rehabilitated according to the site's rehabilitation plan, following construction. • A pre-construction avifaunal walk down should be conducted to provide final confirmation of the sections of power line requiring bird collision mitigation.	**Construction**	ECO / ESO	• Monthly The new power line should be patrolled during operation by ESKOM annually to measure any impacts on birds (through detecting collision fatalities) and to monitor the durability of the line marking devices Where multiple devices on a span have failed they should be replaced immediately. Data should be submitted to the Eskom –EWT Strategic Partnership where it will be curated and publicly accessible.	• Records of walkthrough reports and compliance with various plans and reports as per ECO reports • Rehabilitation Plan
	Collision of birds with overhead cables	PM/ ECO / ESO	• It is recommended as a precautionary measure that the standard Eskom Bird Perch be fitted to all pole tops to further provide safe perching space well above dangerous hardware. • It is also essential that if any of the pylon structures are changed, we are given opportunity to assess the	**Operation**	ECO / ESO	• As required	• Records of walkthrough reports and compliance with various plans and reports as per ECO reports

Specialist	Impact Management Action	Implementation			Monitoring		
		Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
			electrocution risk of the new structures and design mitigation. • An approved antibird collision line marking device must be fitted to overhead cables on high-risk sections of the alignments to make cables more visible to birds in flight and reduce the likelihood or collision				
	Electrocution of birds perched on power lines	• PM/ ECO / ESO	• It is recommended as a precautionary measure that the standard Eskom Bird Perch be fitted to all pole tops to further provide safe perching space well above dangerous hardware. • It is also essential that if any of the pylon structures are changed we are given opportunity to assess the electrocution risk of the new structures and design mitigation.	**Operation**	ECO / ESO	• As required	• Records of walkthrough reports and compliance with various plans and reports as per ECO reports
Heritage / Archaeology / Palaeontology	Destruction of archaeological resources	• PM/ ECO / ESO	• Recording and sampling of artefacts from the site (waypoints 286 to 289). • Appoint archaeologist to conduct mitigation well before construction	**Planning and Design**	ECO / ESO	Once off prior to constrcution	• Records of walkthrough reports and compliance with various plans and reports as per ECO reports • SARAH permit in place
	Impacts to the cultural landscape	PM/ ECO / ESO	• Minimise disturbance footprint. • Rehabilitate all areas not required during operation. • Minimise size of access track.	**Construction Operation Decommissioning**	ECO / ESO	On-going	• Records of monitoring and adherence to implementations methods and mitigation measures. • Alien Management Plan • Rehabilitation Plan • Ecological Management Plan
	Impacts to archaeological sites or remains, fossils or other categories of	PM/ ECO / ESO	• If any evidence of archaeological sites or remains (e.g., remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other	**Construction Operation Decommissioning**	ECO / ESO	On-going	• Records of monitoring and adherence to implementations methods and mitigation measures. • Proof of correspondence with SAHRA APM Unit,

Specialist	Impact Management Action	Implementation			Monitoring		
		Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
	heritage resources		categories of heritage resources are found during the proposed development, SAHRA APM Unit (Sityhilelo Ngcatsha/Phillip Hine 021 462 5402) must be alerted as per section 35(3) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule. • If heritage resources are uncovered during the course of the development, a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the heritage resource. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA.				• Proof of Phase 2 rescue operation (subject to permits issued by SAHRA), if required / applicable.
	Impacts to unmarked human burials	PM/ ECO / ESO	• If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Thingahangwi Tshivhase/Mimi Seetelo 012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule.	**Construction Operation Decommissioning**	ECO / ESO	On-going	• Records of monitoring and adherence to implementations methods and mitigation measures. • Proof of correspondence with the SAHRA Burial Grounds and Graves (BGG) Unit.

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.

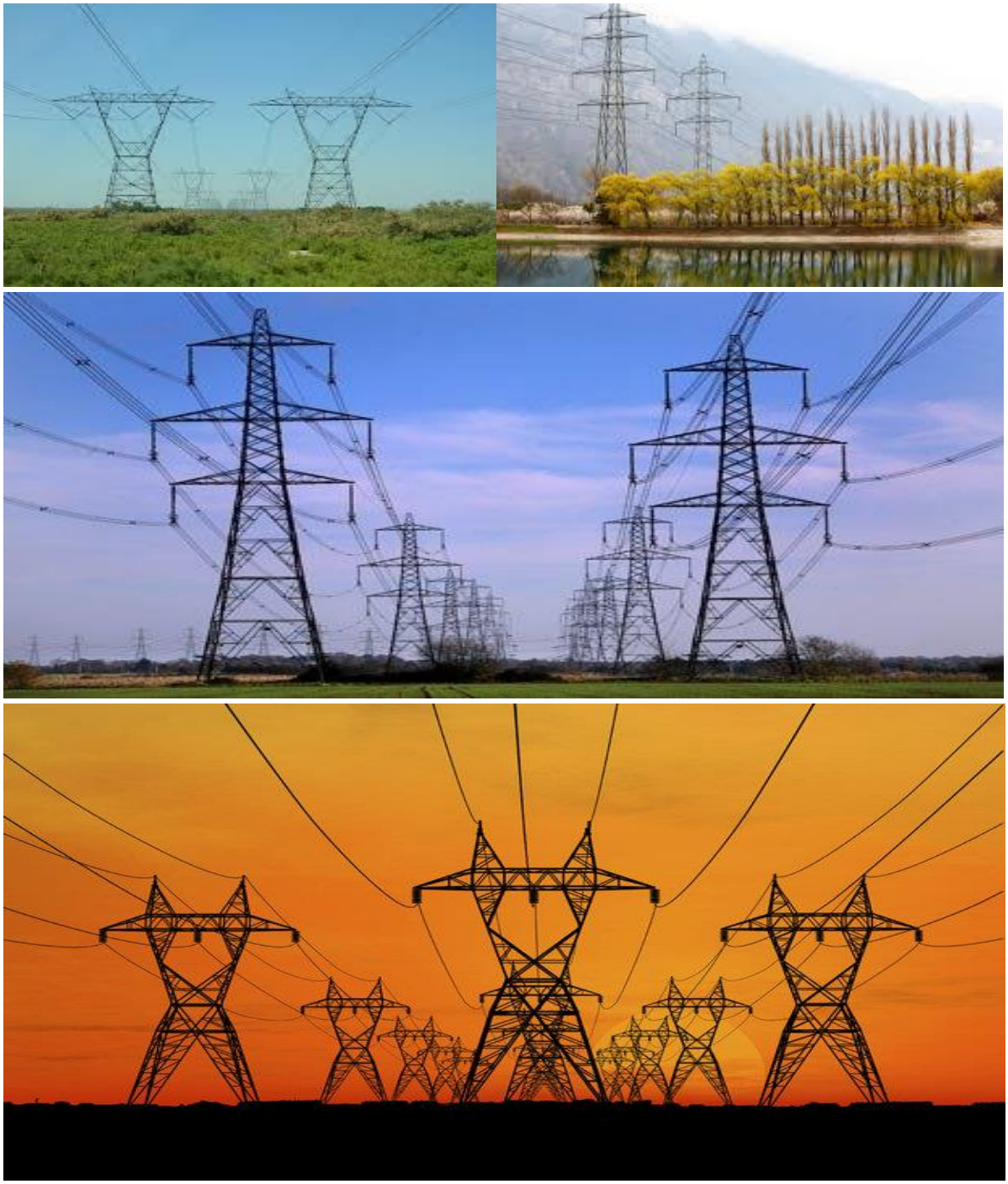
APPENDIX 2: CURRICULA VITAE

APPENDIX 7.2

Generic 400kV Powerline EMPr

APPENDIX 1

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



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 overhead electricity transmission and distribution infrastructure, 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 overhead electricity transmission and distribution infrastructure. 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 overhead electricity transmission and distribution infrastructure requiring EA in terms of NEMA, i.e. with a capacity of 33 kilovolts or more. 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 realisation 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	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 overhead electricity transmission and distribution infrastructure, which are presented in the form of a template that has been pre-approved. 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. Where an impact management outcome is not relevant, the words "not applicable" can be inserted in the template under the "responsible persons" column. 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. 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.
	2	Site specific information	Contains preliminary infrastructure layout and a declaration that the applicant/holder of the EA

Part	Section	Heading	Content
			will comply with the pre-approved generic EMPr template contained in Part B: Section 1, 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 actions have been either pre-approved or approved in terms of Part C. 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 Part B: section 2 not be submitted. Once approved, this Section forms part of the EMPr for the development and is legally binding.
C		Site specific sensitivities/ attributes	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 (Part B: section 1) This section will not be required should the site contain no specific environmental sensitivities or attributes. However, if Part C 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

Part	Section	Heading	Content
			approved, Part C forms part of the EMPr for the site and is legally binding. 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 Part B: section 1.
Appendix 1			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.

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 corridor in which the proposed overhead electricity transmission and distribution 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. raptor nest, threatened plant species, archaeological site, etc. Sensitivity maps must identify features both within the planned working area and any known sensitive features in the surrounding landscape within 50m from the development footprint. The overhead transmission and distribution profile must be illustrated at an appropriate resolution to enable fine scale interrogation. It is recommended that <20 km of overhead transmission and distribution length is illustrated per page in A3 landscape format. Where considered appropriate, photographs of sensitive features in the context of tower positions must be used.

Sub-section 3 is the declaration that the applicant/proponent 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 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 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; and

"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	Environment 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&APs	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)	Role 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. Responsibilities - 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)	Role 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. Responsibilities - 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)	Role 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. 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&APs), 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

Responsible Person (s)	Role and Responsibilities
	variation, not allowed for in the 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. <u>Responsibilities</u> The responsibilities of the ECO will include the following: - 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;

Responsible Person (s)	Role and Responsibilities
	- Checking the cEO's public complaints register in which all complaints are recorded, as well as action taken; - 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.
developer Environmental Officer (dEO)	<u>Role</u> 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. <u>Responsibilities</u> - 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:

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

Responsible Person (s)	Role and Responsibilities
	- ensure that contractors' staff repair, at their own cost, any environmental damage as a result of a contravention of the specifications contained in EMPr, to the satisfaction of the ECO.
contractor Environmental Officer (cEO)	Role Each Contractor affected by the EMPr should appoint a cEO, who is responsible for the on-site implementation of the EMPr (or relevant sections of the EMPr). The Contractor's representative can be the site agent; site engineer; a dedicated environmental officer; or an independent consultant. The Contractor must ensure that the Contractor's Representative is suitably qualified to perform the necessary tasks and is appointed at a level such that she/he can interact effectively with other site Contractors, labourers, the Environmental Control Officer and the public. As a minimum the cEO shall meet the following criteria: Responsibilities - Be on site throughout the duration of the project and be dedicated to the project; - Ensure all their staff are aware of the environmental requirements, conditions and constraints with respect to all of their activities on site; - Implementing the environmental conditions, guidelines and requirements as stipulated within the EA, EMPr and Method Statements; - Attend the Environmental Site Meeting; - Undertaking corrective actions where non-compliances are registered within the stipulated timeframes; - Report back formally on the completion of corrective actions; - Assist the ECO in maintaining all the site documentation; - Prepare the site inspection reports and corrective action reports for submission to the ECO; - Assist the ECO with the preparing of the monthly report; and - Where more than one Contractor is undertaking work on site, each company appointed as a Contractor will appoint a cEO representing that company.

4. 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 overhead electricity transmission and distribution 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. At 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 Substances;
- 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 , 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. Where0 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 must be included in the EMPr file and be submitted to the CA at intervals as indicated in the EA.

An Environmental Audit Report must be prepared monthly. 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 overhead electricity transmission and distribution infrastructure. There is a list of aspects identified for the development or expansion of overhead electricity transmission and distribution infrastructure, 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 overhead electricity transmission and distribution infrastructure.

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 contactor 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 understand 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;						
– The Contractor must allow for sufficient sessions to train all personnel with no more than 20 personnel attending each course;						
– Refresher environmental awareness training is available as and when required;						
– 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;						
– The Contractor must erect and maintain information posters at key locations on site, and the posters must include the following information as a minimum: a) Safety notifications; and b) No littering.						
– Environmental awareness training must include as a minimum the following: 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;						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
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.						
– A record of all environmental awareness training courses undertaken as part of the EMPr must be available;						
– Educate workers on the dangers of open and/or unattended fires;						
– A staff attendance register of all staff to have received environmental awareness training must be available.						
– Course material must be available and presented in appropriate languages that all staff can understand.						

5.2 Site Establishment Development

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

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
– 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;						
– Location of construction 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;						
– Sites must be located where possible on previously disturbed areas;						
– The camp must be fenced in accordance with ***Section 5.5: Fencing and gate installation***; and						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
– The use of existing accommodation for contractor staff, where possible, is encouraged.						

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;						
– 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						
– Unauthorised access and development related activity inside access restricted areas is prohibited.						

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**
– Access to the servitude and tower positions must be negotiated with the relevant landowner and must fall within the assessed and authorised area;						
– An access agreement must be formalised and signed by the DPM, Contractor and landowner before commencing with the activities;						
– The access roads to tower positions must be signposted after access has been negotiated and before the commencement of the activities;						
– 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						
– All contractors must be made aware of all the access routes.						
– Any access route deviation from that in the written agreement must be closed and re-vegetated immediately, at the contractor's expense.						
– Maximum use of both existing servitudes and existing roads must be made to minimise further disturbance through the development of new roads;						
– 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;						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
– Access roads in flattish areas must follow fence lines and tree belts to avoid fragmentation of vegetated areas or croplands.						
– Access roads must only be developed on pre-planned and approved 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.						
– Existing and new gates to be recorded and documented in accordance with section 4.9: photographic record.						
– All gates must be fitted with locks and be kept locked at all times during the development phase, unless otherwise agreed with the landowner.						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
– At points where the line crosses an existing 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.						
– Care must be taken that the gates must be so erected that there is a gap of no more than 100mm between the bottom of the gate and the ground.						
– Where gates are installed in jackal proof fencing, a suitable reinforced concrete sill must be provided beneath the gate.						
– Original tension must be maintained in the fence wires.						
– All gates installed in electrified fencing must be re-electrified.						
– All demarcation fencing and barriers must be maintained in good working order for the duration of overhead transmission and distribution electricity infrastructure development activities.						
– Fencing must be erected around the camp, batching plants, hazardous storage areas, and all designated access restricted areas, where appropriate and would not cause harm to the sensitive flora.						
– Any temporary fencing to restrict the movement of livestock must only be erected with the permission of the landowner.						
– All fencing must be developed of high-quality material bearing the SABS mark.	Contractor	Make use of high-quality materials	During the construction phase	cEO		

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
		approved by SABS				
– The use of razor wire as fencing must be avoided as far as possible.						
– 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.						
– On completion of the development phase all temporary fences are to be removed.						
– The contractor must ensure that all fence uprights are appropriately removed, ensuring that no uprights are cut at ground level but rather removed completely.						

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**
– 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.						
– The Contractor must ensure the following: 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 riverbed 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.						
– Ensure water conservation is being practiced by: 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.						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
d. The use of grey water is encouraged.						

5.7 Storm and wastewater management

Impact management outcome: Impacts to the environment caused by stormwater 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**
– 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.						
– 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.						
– Natural stormwater 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.						
– 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.						

5.8 Solid and hazardous waste management

Impact management outcome: Waste is 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.						
– Sufficient, covered waste collection bins (scavenger and weatherproof) must be provided.						
– A suitably positioned and clearly demarcated waste collection site must be identified and provided.						
– The waste collection site must be maintained in a clean and orderly manner.						
– Waste must be segregated into separate bins and clearly marked for each waste type for recycling and safe disposal.						
– Staff must be trained in waste segregation.						
– Bins must be emptied regularly.						
– General waste produced onsite must be disposed of at registered waste disposal sites/ recycling company.						
– Hazardous waste must be disposed of at a registered waste disposal site.						
– Certificates of safe disposal for general, hazardous and recycled waste must be maintained.						

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.						
– In the event of a spill, prompt action must be taken to clear the polluted or affected areas.						
– Where possible, no development equipment must traverse any seasonal or permanent wetland.						
– No return flow into the estuaries must be allowed and no disturbance of the Estuarine Functional Zone should occur.						
– Development of permanent watercourse or estuary crossing must only be undertaken where no alternative access to tower position is available.						
– There must not be any impact on the long-term morphological dynamics of watercourses or estuaries.						
– Existing crossing points must be favoured over the creation of new crossings (including temporary access).						
– When working in or near any watercourse or estuary, the following environmental controls and consideration must be taken: a) Water levels during the period of construction; No altering of the bed, banks, course or characteristics of a watercourse b) During the execution of the works, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
e.g. including ensuring that construction equipment is well maintained; 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 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.						

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.						
– Protected or endangered species may occur on or near the development site. Special care should be taken not to damage such species.						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
– 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.						
– Permits for removal must be obtained from the Department of Agriculture, Forestry and Fisheries (DAFF) and the Northern Cape Department of Environment and Nature Conservation (DENC) prior to the cutting or clearing of the affected species, and they must be filed.						
– 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.						
– Trees felled due to construction must be documented and form part of the Environmental Audit Report.						
– Rivers and watercourses must be kept clear of felled trees, vegetation cuttings and debris.						
– 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 that is appropriately trained.						
– A daily register must be kept of all relevant details of herbicide usage.						
– No herbicides must be used in estuaries.						
– All protected species and sensitive vegetation not removed must be clearly marked and such areas						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
fenced off in accordance to **Section 5.3: Access restricted areas**.						
Servitude:						
– Vegetation that does not grow high enough to cause interference with overhead transmission and distribution infrastructures, or cause a fire hazard to any plantation, must not be cut or trimmed unless it is growing in the road access area, and then only at the discretion of the Project Manager.						
– Where clearing for access purposes is essential, the maximum width to be cleared within the servitude must be in accordance to distance as agreed between the landowner and the EA holder.						
– Alien invasive vegetation must be removed according to a plan (in line with relevant municipal and provincial procedures, guidelines and recommendations) and disposed of at a recognised waste disposal facility.						
– Vegetation must be trimmed where it is likely to intrude on the minimum vegetation clearance distance (MVCD) or will intrude on this distance before the next scheduled clearance. MVCD is determined from SANS 10280.						
– Debris resulting from clearing and pruning must be disposed of at a recognised waste disposal facility, unless the landowners wish to retain the cut vegetation.						
– In the case of the development of new overhead transmission and distribution infrastructures, a one metre "trace-line" must be cut through the vegetation						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
for stringing purposes only and no vehicle access must be cleared along the "trace-line". Alternative methods of stringing that limit impact to the environment must always be considered.						

5.11 Protection of fauna

Impact management outcome: Minimise disturbance to fauna and avifauna.

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.						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– The breeding sites of raptors and other wild bird species must be taken into consideration during the planning of the development programme.						
– 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.						
– Nesting sites on existing parallel lines must documented.						
– Special recommendations of the avian specialist must be adhered to at all times to prevent unnecessary disturbance of birds.						
– Bird guards and diverters must be installed on the new line as per the recommendations of the specialist.						
– 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.						
– No deliberate or intentional killing of fauna is allowed.						
– In areas where snakes are abundant, snake deterrents are to be deployed on the pylons to prevent snakes climbing up, being electrocuted and causing power outages; and						
– 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.						

5.12 Protection of heritage resources

Impact management outcome: Minimise impact to heritage resources.

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;						
– Carry out general monitoring of excavations for potential fossils, artefacts and material of heritage importance;						

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

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
– 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.;						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All unattended open excavations must be adequately fenced or demarcated;						
– Adequate protective measures must be implemented to prevent unauthorised access to and climbing of partly constructed towers and protective scaffolding;						
– Ensure structures vulnerable to high winds are secured; and						
– Maintain an incidents and complaints register in which all incidents or complaints involving the public are logged.						

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;						
– 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;						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Where mobile chemical toilets are required, the following must be ensured: a) Toilets are located no closer than 100m 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; and f) Toilets are serviced regularly and the ECO must inspect toilets to ensure compliance to health standards.						
– A copy of the waste disposal certificates must be maintained.						

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;						
– Ensure that the workforce is sensitised to the effects of sexually transmitted diseases, especially HIV/ AIDS;						
– The Contractor must ensure that information posters on HIV/ AIDS are displayed in the Contractor Camp area;						
– Information and education relating to sexually transmitted diseases to be made available to both construction workers and local community, where applicable;						
– Free condoms must be made available to all staff on site at central points;						
– Medical support must be made available; and						
– Provide access to Voluntary HIV Testing and Counselling Services.						

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;						
– The Emergency Plan must deal with accidents, potential spillages and fires in line with relevant legislation;						
– All staff must be made aware of emergency procedures as part of environmental awareness training;						
– The relevant local authority must be made aware of a fire as soon as it starts; and						
– In the event of emergency, necessary mitigation measures to contain the spill or leak must be implemented (see **Hazardous Substances section 5.17**).						

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;						
– All hazardous substances must be stored in suitable containers as defined in the Method Statement;						
– Containers must be clearly marked to indicate contents, quantities and safety requirements;						
– All storage areas must be bunded. The bunded area must be of sufficient capacity to contain a spill / leak from the stored containers;						
– Bunded areas to be suitably lined with a SABS approved liner;						
– An Alphabetical Hazardous Chemical Substance (HCS) control sheet must be drawn up and kept up to date on a continuous basis;						
– All hazardous chemicals that will be used on site must have Material Safety Data Sheets (MSDS);						
– All employees working with HCS must be trained in the safe use of the substance and according to the safety data sheet;						
– Employees handling hazardous substances / materials must be aware of the potential impacts and follow						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
appropriate safety measures. Appropriate personal protective equipment must be made available;						
– The Contractor must ensure that diesel and other liquid fuel, oil and hydraulic fluid is stored in appropriate storage tanks or in bowsers;						
– 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);						
– The floor of the bund must be sloped, draining to an oil separator;						
– Provision must be made for refuelling 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;						
– All empty externally dirty drums must be stored on a drip tray or within a bunded area;						
– No unauthorised access into the hazardous substances storage areas must be permitted;						
– No smoking must be allowed within the vicinity of the hazardous storage areas;						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
– Adequate fire-fighting equipment must be made available at all hazardous storage areas;						
– Where refuelling away from the dedicated refuelling station is required, a mobile refuelling unit must be used. Appropriate ground protection such as drip trays must be used;						
– 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;						
– The responsible operator must have the required training to make use of the spill kit in emergency situations;						
– An appropriate number of spill kits must be available and must be located in all areas where activities are being undertaken; and						
– 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 wastewater management and 5.8 for solid and hazardous waste management.						

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;						
– 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.						
– Leaking equipment must be repaired immediately or be removed from site to facilitate repair;						
– Workshop areas must be monitored for oil and fuel spills;						
– Appropriately sized spill kit kept onsite relevant to the scale of the activity taking place must be available;						
– 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;						
– Water drainage from the workshop must be contained and managed in accordance with Section 5.7: storm and wastewater management.						

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;						
– Batching plants areas must be fitted with a containment facility for the collection of cement laden water.						
– Dirty water from the batching plant must be contained to prevent soil and groundwater contamination						
– Bagged cement must be stored in an appropriate facility and at least 10m away from any water courses, gullies and drains;						
– A washout facility must be provided for washing of concrete associated equipment. Water used for washing must be restricted;						
– Hardened concrete from the washout facility or concrete mixer can either be reused or disposed of at an appropriate licensed disposal facility;						
– Empty cement bags must be secured with adequate binding material if these will be temporarily stored on site;						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
– Sand and aggregates containing cement must be kept damp to prevent the generation of dust (Refer to Section 5.20: Dust emissions)						
– 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; and						
– Temporary fencing must be erected around batching plants in accordance with Section 5.5: Fencing and gate installation.						

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;						
– 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;						
– Excavation, handling and transport of erodible materials must be avoided under high wind conditions or when a visible dust plume is present;						
– 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;						
– Where possible, soil stockpiles must be located in sheltered areas where they are not exposed to the erosive effects of the wind;						
– Where erosion of stockpiles becomes a problem, erosion control measures must be implemented at the discretion of the ECO;						
– Vehicle speeds must not exceed 40km/h along dust roads or 20km/h when traversing unconsolidated and non-vegetated areas;						
– Straw stabilisation must be applied at a rate of one bale/10m² and harrowed into the top 100mm of top material, for all completed earthworks;						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
– For significant areas of excavation or exposed ground, dust suppression measures must be used to minimise the spread of dust.						

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						
– Notification of surrounding landowners, emergency services site personnel of blasting activity 24 hours prior to such activity taking place on Site.						

5.22 Noise

Impact Management outcome: Unnecessary noise is prevented by ensuring that noise from construction activities 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;						
– All vehicles and machinery must be fitted with appropriate silencing technology and must be properly maintained;						
– 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;						
– 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.						

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;						
– Firefighting equipment must be available on all vehicles located on site;						
– The local Fire Protection Agency (FPA) must be informed of construction activities;						
– Contact numbers for the FPA and emergency services must be communicated in environmental awareness training and displayed at a central location on site;						
– Two-way swop of contact details between ECO and FPA.						

5.24 Stockpiling and stockpile areas

Impact management outcome: Erosion and sedimentation as a result of stockpiling are reduced.

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 and water bodies;						
– All stockpiled material must be maintained and kept clear of weeds and alien vegetation growth by undertaking regular weeding and control methods;						
– Topsoil stockpiles must 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.);						
– Where possible, sandbags (or similar) must be placed at the bases of the stockpiled material in order to prevent erosion of the material.						

5.25 Finalising tower positions

Impact management outcome: No environmental degradation occurs as a result of the survey and pegging operations.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
– No vegetation clearing must occur during survey and pegging operations;						
– No new access roads must be developed to facilitate access for survey and pegging purposes;						
– Project manager, botanical specialist and contractor to agree on final tower positions based on survey within assessed and approved areas;						
– The surveyor is to demarcate (peg) access roads/tracks in consultation with ECO. No deviations will be allowed without the prior written consent from the ECO.						

5.26 Excavation and Installation of foundations

Impact management outcome: No environmental degradation occurs as a result of excavation or installation of foundations.

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 recognised disposal site, if not used for backfilling purposes;						
– Spoil can however be used for landscaping purposes and must be covered with a layer of 150 mm topsoil for rehabilitation purposes;						
– Management of equipment for excavation purposes must be undertaken in accordance with Section 5.18: Workshop equipment maintenance and storage; and						
– Hazardous substances spills from equipment must be managed in accordance with Section 5.17: Hazardous substances.						
– Batching of cement to be undertaken in accordance with Section 5.19: Batching plants;						
– Residual cement must be disposed of in accordance with Section 5.8: Solid and hazardous waste management.						

5.27 Assembly and erecting towers

Impact management outcome: No environmental degradation occurs as a result of assembly and erecting of towers.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
– Prior to erection, assembled towers and tower sections must be stored on elevated surfaces (suggest wooden blocks) to minimise damage to the underlying vegetation;						
– In sensitive areas, tower assembly must take place off-site or away from sensitive positions;						
– The crane used for tower assembly must be operated in a manner which minimises impact to the environment;						
– The number of crane trips to each site must be minimised;						
– Wheeled cranes must be utilised in preference to tracked cranes;						
– Consideration must be given to erecting towers by helicopter or by hand where it is warranted to limit the extent of environmental impact;						
– Access to tower positions to be undertaken in accordance with access requirements specified in **Section 5.4: Access Roads**;						
– Vegetation clearance to be undertaken in accordance with general vegetation clearance requirements specified in **Section 5.10: Vegetation clearing**;						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
– No levelling at tower sites must be permitted unless approved by the Development Project Manager or Developer Site Supervisor;						
– Topsoil must be removed separately from subsoil material and stored for later use during rehabilitation of such tower sites;						
– Topsoil must be stored in heaps not higher than 2m to prevent destruction of the seed bank within the topsoil;						
– Excavated slopes must be no greater that 1:3, but where this is unavoidable, appropriate measures must be undertaken to stabilise the slopes;						
– Fly rock from blasting activity must be minimised and any pieces greater than 150 mm falling beyond the Working Area, must be collected and removed;						
– Only existing disturbed areas are utilised as spoil areas;						
– Drainage is provided to control groundwater exit gradient with the spill areas such that migration of fires is kept to a minimum;						
– Surface water runoff is appropriately channelled through or around spoil areas;						
– During backfilling operations, care must be taken not to dump the topsoil at the bottom of the foundation and then put spoil on top of that;						
– The surface of the spoil is appropriately rehabilitated in accordance with the requirements specified in Section 5.29: Landscaping and rehabilitation;						
– The retained topsoil must be spread evenly over areas to be rehabilitated and suitably compacted to effect re-vegetation of such areas to prevent erosion as soon						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
as construction activities on the site is complete. Spreading of topsoil must not be undertaken at the beginning of the dry season.						

5.28 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**
– Where possible, previously disturbed areas must be used for the siting of winch and tensioner stations. In all other instances, the siting of the winch and tensioner must avoid Access restricted areas and other sensitive areas;						
– The winch and tensioner station must be equipped with drip trays in order to contain any fuel, hydraulic fuel or oil spills and leaks;						
– Refuelling of the winch and tensioner stations must be undertaken in accordance with **Section 5.17: Hazardous substances;**						
– In the case of the development of overhead transmission and distribution infrastructure, a one metre "trace-line" may be cut through the vegetation for stringing purposes only and no vehicle access must be cleared along "trace-lines". Vegetation clearing must be undertaken by hand, using chainsaws and handheld implements, with vegetation being cut off at ground level. No tracked or wheeled mechanised equipment must be used;						
– Alternative methods of stringing which limit impact to the environment must always be considered e.g. by hand or by using a helicopter;						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
– Where the stringing operation crosses a public or private road or railway line, the necessary scaffolding/ protection measures must be installed to facilitate access. If, for any reason, such access has to be closed for any period(s) during development, the persons affected must be given reasonable notice, in writing;						
– No services (electrical distribution lines, telephone lines, roads, railways lines, pipelines fences etc.) must be damaged because of stringing operations. Where disruption to services is unavoidable, persons affected must be given reasonable notice, in writing;						
– Where stringing operations cross cultivated land, damage to crops is restricted to the minimum required to conduct stringing operations, and reasonable notice (10 workdays minimum), in writing, must be provided to the landowner;						
– Necessary scaffolding protection measures must be installed to prevent damage to the structures supporting certain high value agricultural areas such as vineyards, orchards, nurseries.						

5.29 Socio-economic

Impact management outcome: Socio-economic development is enhanced.

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;						
– Develop and implement a collaborative and constructive approach to conflict resolution as part of the external stakeholder engagement process;						
– Sustain continuous communication and liaison with neighbouring owners and residents						
– Create work and training opportunities for local stakeholders; and						
– 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.						

5.30 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:**						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
management of hazardous substances and **5.18 workshop, equipment maintenance and storage**;						
– Hazardous storage areas must be well ventilated;						
– Fire extinguishers must be serviced and accessible. Service records to be filed and audited at last service;						
– Emergency and contact details must be displayed;						
– Security personnel must be briefed and have the facilities to contact or be contacted by relevant management and emergency personnel;						
– Night hazards such as reflectors, lighting, traffic signage etc. must have been checked;						
– Fire hazards identified and the local authority must have been notified of any potential threats e.g. large brush stockpiles, fuels etc.;						
– Structures vulnerable to high winds must be secured;						
– Wind and dust mitigation must be implemented;						
– Cement and materials stores must have been secured;						
– Toilets must have been emptied and secured;						
– Refuse bins must have been emptied and secured;						
– Drip trays must have been emptied and secured.						

5.31 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 to a registered waste site and certificates of disposal provided;						
– 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						
– 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;						
– 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;						
– 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;						
– Rehabilitation of tower sites and access roads outside of farmland;						
– Indigenous species must be used for with species and/grasses to where it compliments or approximates the original condition;						

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Stockpiled topsoil must be used for rehabilitation (refer to **Section 5.24: Stockpiling and stockpiled areas**);						
– Stockpiled topsoil must be evenly spread so as to facilitate seeding and minimise loss of soil due to erosion;						
– Before placing topsoil, all visible weeds from the placement area and from the topsoil must be removed;						
– Subsoil must be ripped before topsoil is placed;						
– The rehabilitation must be timed so that rehabilitation can take place at the optimal time for vegetation establishment;						
– Where impacted through construction related activity, all sloped areas must be stabilised to ensure proper rehabilitation is effected and erosion is controlled;						
– 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;						
– Spoil can be used for backfilling or landscaping as long as it is covered by a minimum of 150mm of topsoil.						
– 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:						

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						

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 Contact details and description of the project

7.1.1. Details of the Applicant:

Applicant Name	**South Africa Mainstream Renewable Power Developments (Pty) Ltd**
Contact Person	Eugene Marais
Physical Address	4th Floor Mariendahl House, Newlands on Main, Corner Main and Campground Road, Claremont, Cape Town, 7708
Postal Address	PO Box 45063, Claremont, 7735
Telephone	021 657 4045
Fax	N/A
Cell	(073) 871 5781
Email Address	Eugene.Marais@mainstreamrp.com

7.1.2. Details and Expertise of Environmental Assessment Practitioner (EAP)

EAP Name	**Stuart Heather-Clark- SLR Consulting South Africa (Pty) Ltd**
EAP Qualifications	(Curriculum Vitae included):
Professional Affiliation/Registration	(Curriculum Vitae included):
Telephone	+27 21 461 1118
Fax	n/a
Email Address	shclark@slrconsulting.com

Refer to **Appendix A** of the EMPr for the detailed experience of the EAP and the Project Team.

7.1.3. Project Details

Project Name:

BASIC ASSESSMENT FOR THE PROPOSED CONSTRUCTION AND OPERATION OF A RADIO MAST, 132KV POWERLINE AND 400KV LOOP IN LOOP OUT (LILO) POWERLINES LOCATED NEAR DEALESVILLE IN THE TOKOLOGO LOCAL MUNICIPALITY, LEJWELEPUTSWA DISTRICT IN THE FREE STATE PROVINCE (DFFE: xxx)

7.1.4. Project Description

South Africa Mainstream Renewable Power Developments (Pty) Ltd ('Mainstream') is proposing the development of one (1) Radio Mast, two (2) x 400kV powerlines and one (1) x 132kV powerline that will connect to the authorised 132kV/400kV Main Transmission Substation (MTS) (14/12/16/3/3/1/2460/AM1) as well as to the approved 100MW Kentani Solar Photovoltaic (PV) Energy Facility (14/12/16/3/3/2/724/AM3) respectively. The Kentani Solar PV Energy Facility is one (1) of eleven (11) solar PV projects collectively known as the Kentani Cluster located near the town of Dealesville, within the Tokologo Local Municipality (Lejweleputswa District) in the Free State Province.

The Kentani Cluster consists of eleven (11) solar PV projects and associated electrical infrastructure (including a powerline), each of which received their own Environmental Authorisation (EA) in 2016 from the Department of Environmental Affairs (DEA) [now referred to as the Department of Forestry, Fisheries and the Environment (DFFE)].

It should be noted that on 28 October 2021, the Minister of Mineral Resources and Energy, namely Gwede Mantashe, announced the Preferred Bidders of the Round 5 Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) and six (6) of the aforementioned Solar Energy Facilities, collectively referred to as the "Kentani Cluster", received Preferred Bidder status i.e.:

- Kentani Solar PV (14/12/16/3/3/2/724/AM3)
- Sonoblomo Solar PV (14/12/16/3/3/2/723/AM2)
- Klipfontein Solar PV (14/12/16/3/3/2/722/AM2)
- Klipfontein 2 Solar PV (14/12/16/3/3/2/726/1/AM1)
- Leliehoek Solar PV (14/12/16/3/3/2/728/AM2)
- Braklaagte Solar PV (14/12/16/3/3/2/727/1)

These Solar Energy Facilities have now become Strategic Infrastructure Projects i.e. SIPs 8 and 10. SIPs 8 and 10 target the development of green energy in support of the South African economy and the provision of electricity transmission and distribution respectively.

- SIP 8 supports sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP2010) and support bio-fuel production facilities.
- SIP 10 Expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development. Align the 10-year transmission plan, the services backlog, the national broadband roll-out and the freight rail line development to leverage off regulatory approvals, supply chain and project development capacity.

The approved MTS and associated infrastructure will service eleven (11) of Mainstream's solar PV projects authorised as part of the Kentani Cluster.

The powerlines and the Radio Mast are located within the Kimberly Renewable Energy Development Zone (REDZ) (namely REDZ 4) and Central Strategic Transmission Corridor, as defined and in terms of the procedures laid out in Government Notices No. 113 and No. 145 which were formally gazetted on 16 February 2018 and 26 February 2021 respectively. The respective powerlines which are being proposed as part of this application and BA process are as follows:

1. Two (2) 400kV overhead powerlines (approx. 700m in length) are being proposed and will connect the approved MTS (14/12/16/3/3/1/2460/AM1) to the existing Eskom 400kV powerline, located west of the approved MTS site, via a Loop-In-Loop Out (LILO) connection; and
2. One (1) 132kV powerline (approx. 5km in length) is being proposed and will connect the approved MTS to the authorised Kentani on-site substation (14/12/16/3/3/2/724/AM3), located approx. 4.85km north-west of the approved MTS site.
3. One (1) Radio Mast (approx. 90m in height) is being proposed and will be situated within the approved MTS site.

A road in the servitude under the proposed powerlines as well as an access road (approx. 4-8m wide) to the R64 provincial route will also be required.

As part of the BA process, powerline corridors with widths of 300m (150m on either side of centre line) are being proposed and assessed for the 400kV and 132kV powerlines. This is to allow flexibility when routing the powerlines within the authorised corridor (should the EA be granted).

It must be noted that the majority of the proposed powerlines being proposed are located within existing approved powerline corridors and that only small sections will traverse outside of the approved corridors:

- The portion of the 132kV powerline outside of an existing approved corridors and Eskom servitudes is approximately 700m
- The portion of the each of the 400kV powerlines outside of an existing approved corridors and Eskom servitudes is approximately 150m and 250m respectively.

Considering the above, it is important to note that the location of the corridors for the powerlines being proposed as part of this application have previously been assessed as part of the development footprint for the approved Artemis MTS and powerline corridors (14/12/16/3/3/1/2460/AM1) as well as the Kentani Cluster of solar PV developments, each of which received their own EA in 2016[1].

[1] It should be noted that the validity period of the EA issued for the Klipfontein Solar PV Energy Facility in 2016 was extended by the Holder of the EA in April 2021 (14/12/16/3/3/2/722/AM1). The EA issued in 2016 is now valid until 06 June 2026 (i.e., EA lapses on 06 June 2026).

This Generic EMPr is applicable to the proposed 132kV powerline and 400kV LILO powerlines and associated infrastructure located near Dealesville in the Tokologo Local Municipality, Lejweleputswa District in the Free State Province.

7.1.5. Project Location

Location details of the proposed 132Kv powerline and 400kV powerlines development:

Province	Free State
District Municipality	Lejweleputswa District Municipality
Local Municipality	Tokologo Local Municipality
Ward number(s)	Ward 1
Nearest town(s)	Dealesville
Affected Properties: Farm name(s), number(s) and portion numbers	» Remaining Extent of the Farm Klipfontein No. 305 ; » The Farm Leliehoek No. 748 ; » The Farm Overschot No. 31; » Remainder of the Farm Oxford No. 1030; and
SG 21 Digit Code (s)	» Remaining Extent of the Farm Klipfontein No. 305 (F00400000000030500000); » The Farm Leliehoek No. 748 (F00400000000074800000); » The Farm Overschot No. 31 (F00400000000003100000); » Remainder of the Farm Oxford No. 1030 (F00400000000103000000
Current zoning and land use	Agriculture

132kV powerlines and 400kV powerlines and associated infrastructure development

Infrastructure	**Footprint, dimensions and technical details**
Radio Mast[2]	• One (1) new Radio Mast • Total height 90m The radio mast will be with the Authorised MTS footprint (14/12/16/3/3/1/2460/AM2).
Grid Connection (Powerlines)	• Two (2) new 400kV overhead powerlines connecting the approved MTS to existing Eskom 400kV powerline (approx. 700m each) via LILO connection. • One (1) new 132kV overhead powerline (approx. 5km) connection from the approved MTS to the authorised Kentani on-site substation (14/12/16/3/3/2/724) (approx. 4km north-west of MTS site); • Length of 400kV powerlines = approx. 700m each • Length of 132kV powerline = approx. 5km • Area occupied by powerlines unknown at this stage • Powerline corridors with widths of 300m (150m on either side of centre line) being proposed and assessed for 400kV and 132kV powerlines to allow flexibility when routing powerlines within authorised corridor (should EA be granted)

[2] It should be noted the proposed radio mast will be placed with the Authorised MTS footprint (14/12/16/3/3/1/2460/AM2).

Infrastructure	Footprint, dimensions and technical details
	• Powerline servitude of 400kV powerlines= approx. 55m per 1 x 400kV powerline • Powerline servitude of 132kV powerline = approx. 32m Eight (8) 132kV powerlines within grid connection corridor authorised as part of Kentani Cluster will also be re-routed and provision has been made for this routing in the approved MTS
Roads	• New road in servitude under proposed powerlines Widths of up to approx. 4-8m

It should be noted that Eskom's requirements for work in or near Eskom servitudes should be adhered to.

7.1 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. raptor nest, threatened plant species, archaeological site, etc. Sensitivity maps shall identify features both within the planned working area and any known sensitive features in the surrounding landscape. The overhead transmission and distribution profile shall be illustrated at an appropriate resolution to enable fine scale interrogation. It is recommended that <20 km of overhead transmission and distribution length is illustrated per page in A3 landscape format. Where considered appropriate, photographs of sensitive features in the context of tower positions shall be used.

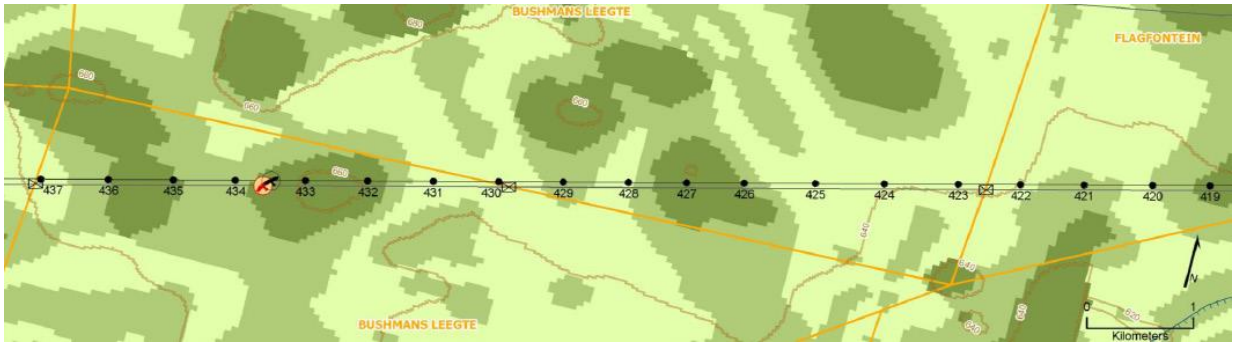

Figure 1: Example of an environmental sensitivity map in the context of a final overhead transmission and distribution profile

The national web-based environmental screening tool was utilised for this project and the grid connection corridor sensitivity maps can be seen in Figures 3 to 7. The site-specific environmental sensitivity map included in the BA Report is included as Figure 2.

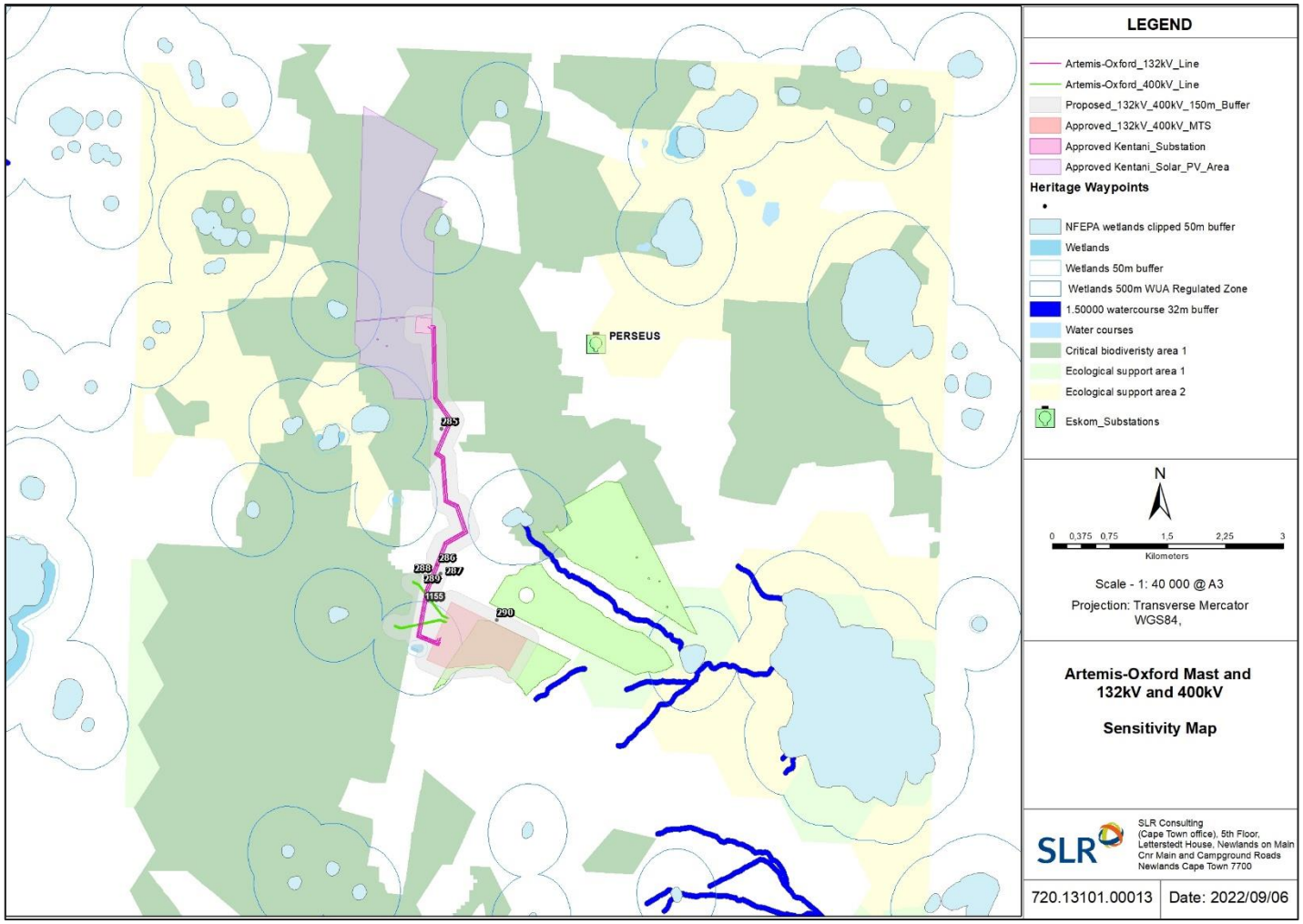

Figure 2: Environmental sensitivity map based on Specialist Findings.

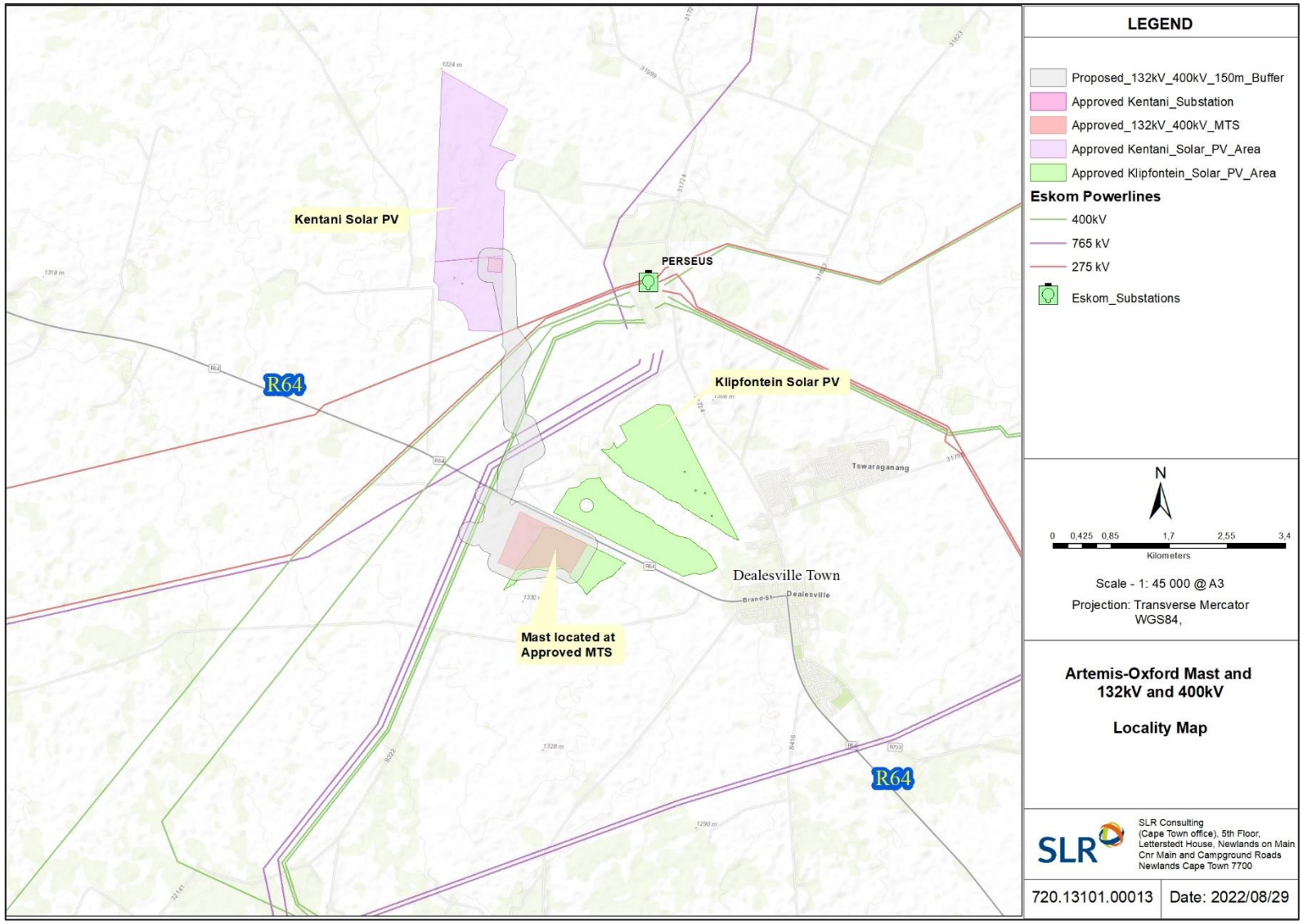

Figure 3: Proposed Site Layout

Figure 4: Map of Relative Agriculture Theme Sensitivity

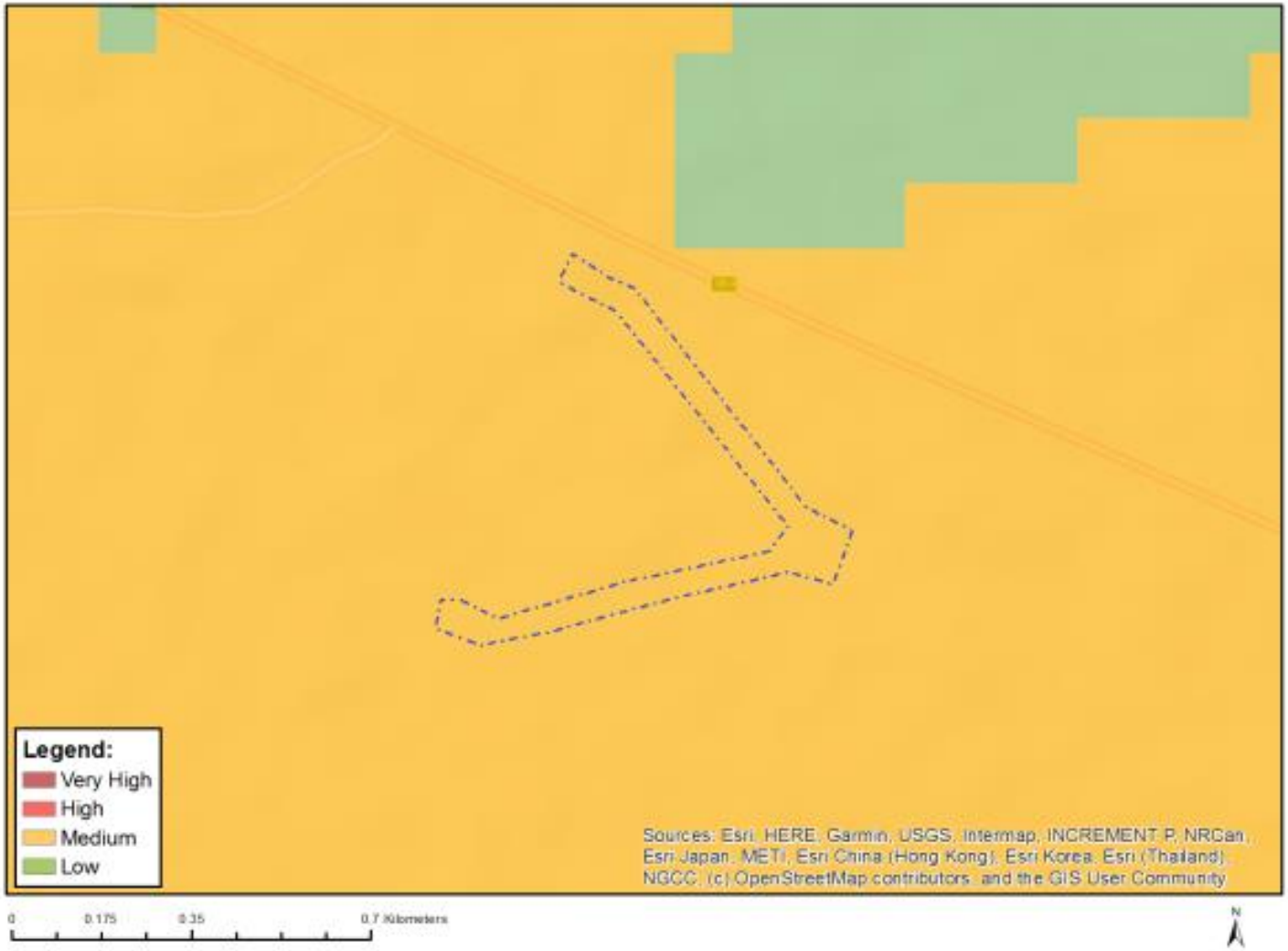

Figure 5: Map of Animal Species Theme Sensitivity

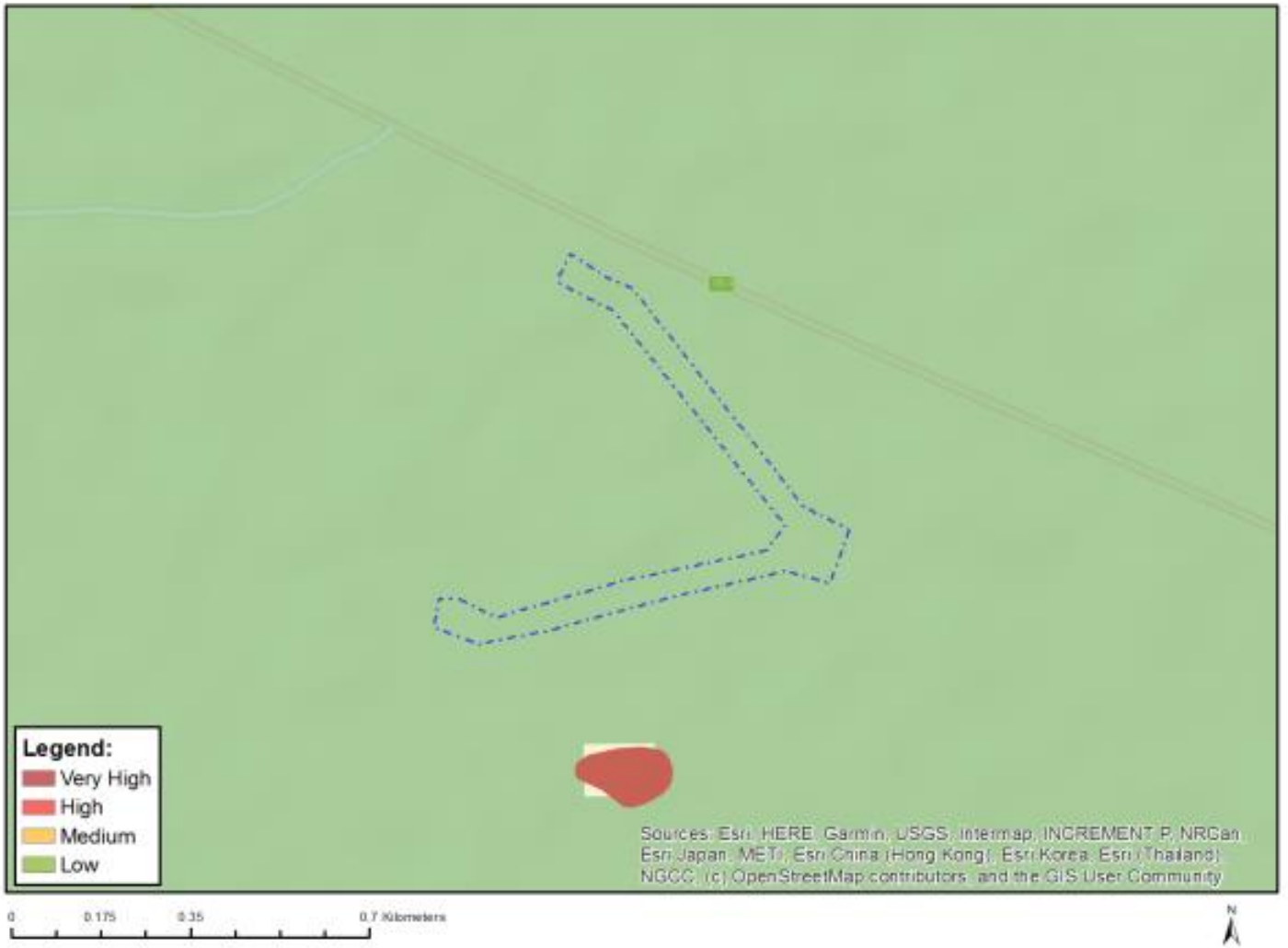

Figure 6: Map of Aquatic Biodiversity Theme Sensitivity

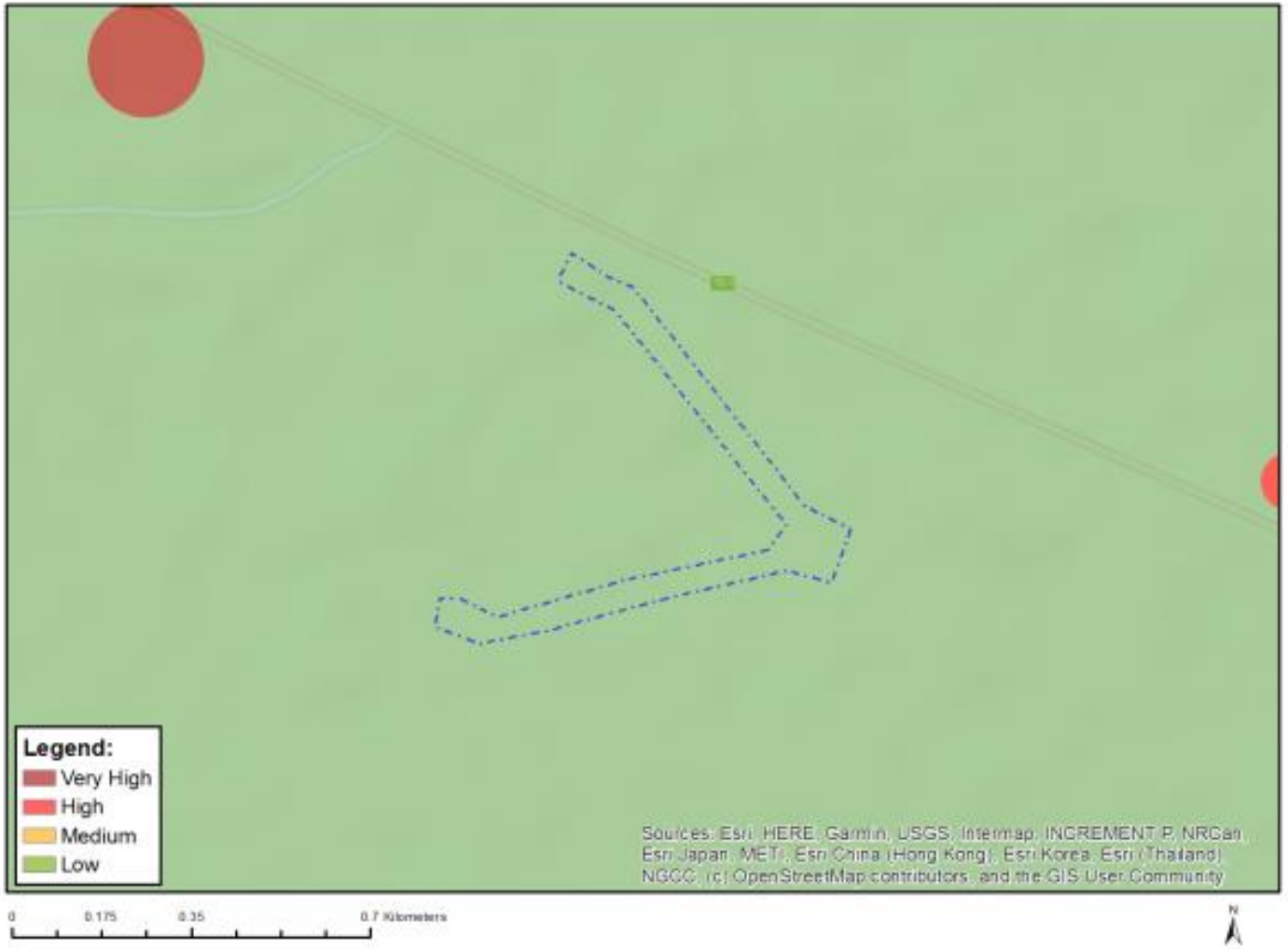

Figure 7: Map of Archaeological and Cultural Heritage Species Theme Sensitivity

Figure 9: Map of Relative Plant Species Theme Sensitivity

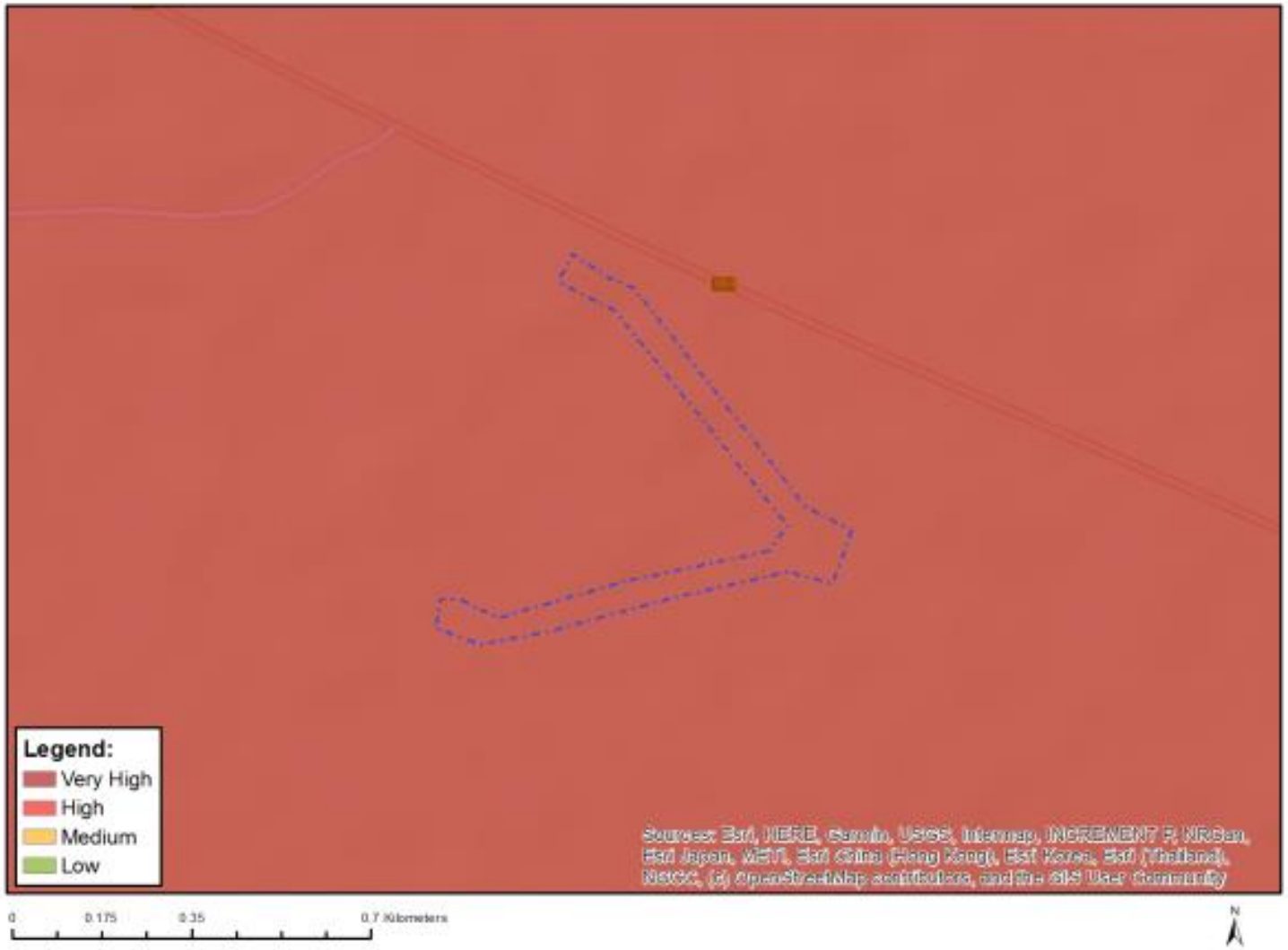

Figure 10: Map of Relative Terrestrial Biodiversity Theme Sensitivity

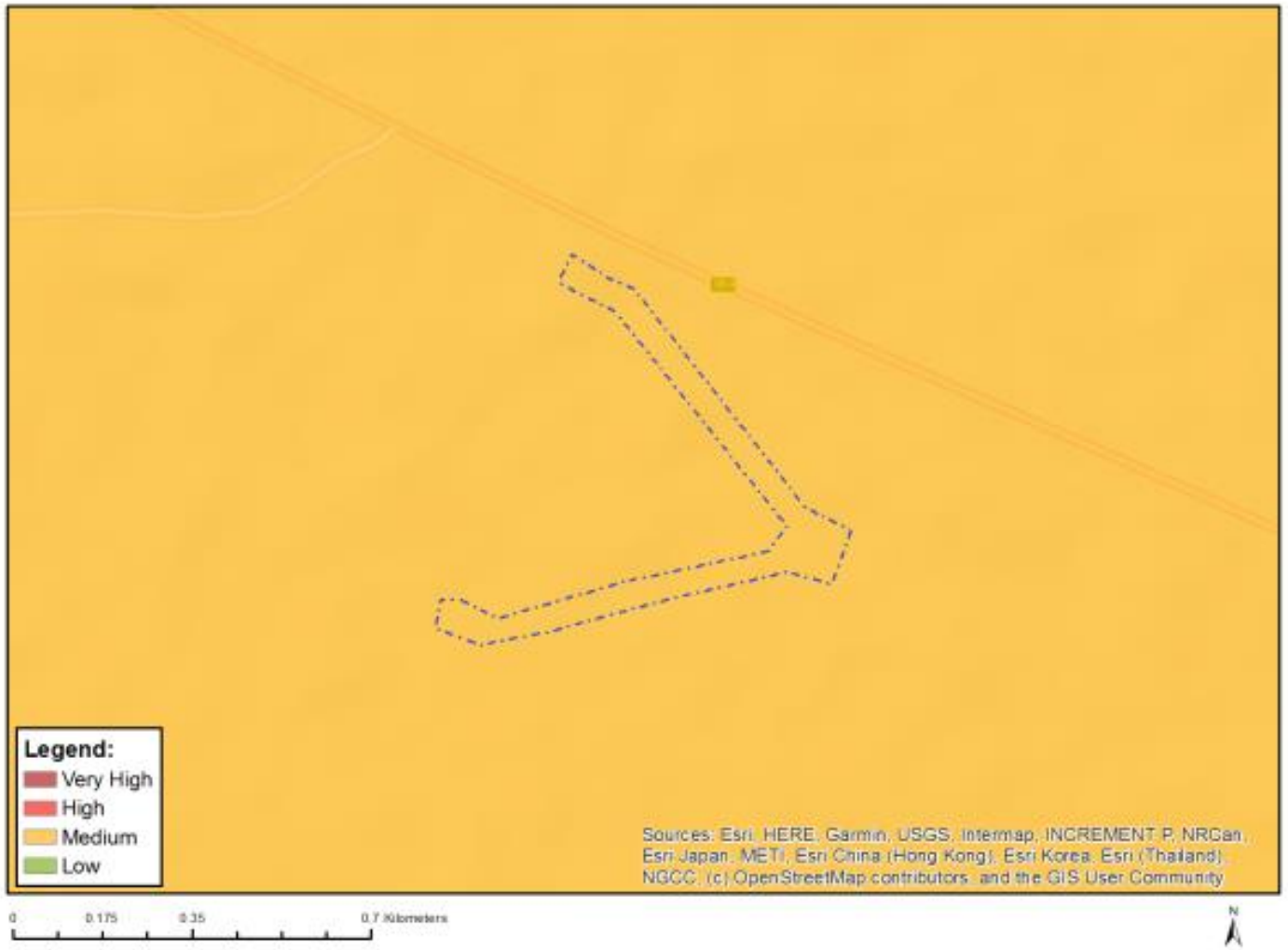

Figure 10: Map of Relative Palaeontology Theme Sensitivity

7.2 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 days prior to the date on which the activity will commence of 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.

7.3 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 impact management actions, not included in the pre-approved generic EMPr template, to manage impacts, those impact management outcomes and 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.

***Figure 8.1: Site Specific Mitigation*[3]**

Specialist	Impact Management Action	Implementation			Monitoring		
		Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
Aquatic	Reduce loss of aquatic species including any Species of Special Concern- Potential loss of protected or listed aquatic species	PM/ ECO / ESO	• All alien plant re-growth, which is currently low within the greater region must be monitored monthly and should it occur, these plants must be eradicated within the project footprints and especially in areas near the proposed crossings.	**Construction Decommissioning**	ECO / ESO	• Weekly for protected plants • Monthly for alien plants	• Records of monitoring and adherence to implementations methods and mitigation measures. • Alien Management Plan • Rehabilitation Plan • Ecological Management Plan
	Avoid /Limit damage or loss of riparian systems and disturbance of waterbodies in the construction / decommissioning phase	PM/ ECO / ESO	• The current layout must be selected, to ensure all the observed aquatic systems will be avoided, thus avoiding this impact • <u>Sensitive habitats in close proximity to the development footprint must be avoided or demarcated as No Go area (i.e., Wetlands).</u> • <u>No activities may take place, without the necessary authorisation from this Department, within a horizontal distance of 100 m from any watercourse or estuary or within a 500 m radius from a delineated boundary of any a wetland or pan</u> • <u>All the conditions of the National Water Act (Act 36 of 1998) (NWA) must be complied with</u>		ECO / ESO	• Monthly and as and when required	• Storm Water Management Plan • Records of monitoring and adherence to implementations methods and mitigation measures. • Rehabilitation Plan • Erosion Management Plan • <u>Necessary authorisation(s) from DWS in place and kept on record</u>

[3] <u>It should be noted that a number of mitigation measures / recommendations have been provided by Organs of State (OoS) / Key Stakeholders following the completion of the 30-day review and comment period for the Draft BAR, which have been incorporated into this EMPr (this table specifically). These mitigation measures / recommendations have been underlined in this table.</u>

Specialist	Impact Management Action	Implementation			Monitoring		
		Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
			• Registration of water uses under Section 21 of the NWA is compulsory[4]. • In terms of Section 4(1) of the NWA, a person may use water from a water resource for purposes such as reasonable domestic use, domestic gardening, animal watering, firefighting and recreational use, as set out in Schedule 1. • Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use. • Any erosion / sedimentation must be resolved through whatever additional interventions maybe necessary (i.e., extension, energy dissipaters, spreaders, etc). This will the avoid any secondary impacts that could affect downstream areas.				
	Avoid Water quality changes (increase in sediment, organic loads, chemicals or eutrophication	PM/ ECO / ESO	• All liquid chemicals including fuels and oil, must be stored in with secondary containment (bunds or containers or berms) that can contain a leak or spill. Such facilities must be inspected routinely and must have the suitable PPE and spill kits needed to contain likely worst-case scenario leak or spill in that facility, safely.		ECO / ESO	• Daily to ensure plant is in working order (minimise leaks), spills are prevented and if they do occur a quickly rectified.	• Storm Water Management Plan • Records of monitoring and adherence to implementations methods and mitigation measures. • Spill Management Plan • Erosion Management Plan

[4] In terms of Section 22 of the NWA a person may only use water without a license:

- If that water use is permissible under Schedule 1.
- If that water use is permissible as a continuation of an existing lawful use.
- If that water use is permissible in terms of a General Authorisation issued under Section 39 of the NWA.

Specialist	Impact Management Action	Implementation			Monitoring		
		Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
			• The storage of material, chemicals, fuels, etc. must not pose a risk to the surrounding environment and this includes surface and groundwater resources. Temporary bunds must also be constructed around chemical or fuel storage areas to contain possible spillages. Such storage areas must be located outside the 1: 100-year floodline of a river and must be fenced to prevent unauthorised access into the area. The maintenance of vehicles and equipment used for any purpose during the prospecting activity will take place only in the maintenance yard area. • Washing and cleaning of equipment must be done in designated wash bays, where rinse water is contained in evaporation/sedimentation ponds (to capture oils, grease cement and sediment). • Mechanical plant and bowsers must not be refuelled or serviced within 100m of a river channel. • All construction camps, lay down areas, wash bays, batching plants or areas and any stores should be more than 50 m from any demarcated water courses. • Littering and contamination associated with construction activity must be avoided through effective construction camp management. • Zero discharge of contaminated surface water is allowed				

Specialist	Impact Management Action	Implementation			Monitoring		
		Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
			• The Plant should be sited, designed and managed so that the quality of surface and groundwater in the vicinity are not degraded by runoff, leaching or seepage from the site or waste utilization areas • No stockpiling should take place within or near a water course • All stockpiles must be protected and located in flat areas where run-off will be minimised and sediment recoverable • Monitoring must take place on a continuous basis to ensure the relevant mitigation measures / recommendations are adhered to				
	Hydrological regime or Hydroperiod changes (Quantity changes such as abstraction or diversion)	PM/ ECO / ESO	• A stormwater management plan must be developed in the preconstruction phase, detailing the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems. • Effective stormwater management must include effective stabilisation (gabions and Reno mattresses) of exposed soil • The applicant must ensure the storm water run-off has to be directed away from the site to ensure the separation of clean and dirty water	**Operation**	ECO / ESO	• Annual Inspection of stormwater control systems to ensure these are functional	• Storm Water Management Plan • Records of monitoring and adherence to implementations methods and mitigation measures.

Specialist	Impact Management Action	Implementation			Monitoring		
		Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
Terrestrial Ecology and Plant Assessment	Loss of natural vegetation	PM/ ECO / ESO	• Restrict activities to footprint areas, use existing maintenance and access roads, rehabilitate disturbed areas after construction, control alien invasive plant species. • Sensitive habitats in close proximity to the development footprint must be avoided or demarcated as No Go areas. • Pre-construction walk through - The presence of any species of conservation concern within the development area as well as along the grid connection should be checked • A Pre-construction walk-through of the approved development footprint must be conducted to ensure that sensitive habitats and species are avoided where possible.	**Construction Decommissioning**	ECO / ESO	• Annual monitoring for 3 years after construction to evaluate vegetation cover, species composition.	• Records of monitoring and adherence to implementations methods and mitigation measures. • Records of walkthrough reports and compliance with various plans and reports as per ECO reports • Alien Management Plan • Rehabilitation Plan • Ecological Management Plan
	Invasion by alien invasive plant species	PM/ ECO / ESO	• Compile and implement an alien invasive control plan, monitor degree of invasion as well as outcome and effectiveness of control measures. • Erosion and Alien Invasive Plant Species Management Plan and Rehabilitation Plan must be developed to mitigate on habitat degradation due to erosion and alien plant invasion.	**Operation**	ECO / ESO	• Annual monitoring for 3 years after construction to evaluate vegetation cover, species composition.	• Records of monitoring and adherence to implementations methods and mitigation measures. • Alien Management Plan • Rehabilitation Plan • Ecological Management Plan
	Impacts on TOPs, Red data listed or provincially protected species	PM / ECO / ESO / Ecologist	• Permits from relevant authorities must be obtained for the removal or disturbance of any TOPs, Red data listed or provincially protected species	**Construction Operation Decommissioning**	ECO / ESO / Ecologist	• Ongoing for duration of construction, operation and decommission	• Records of monitoring and adherence to implementations methods and mitigation measures. • Proof of submission of permit applications. • Permits kept on file (if required)

Specialist	Impact Management Action	Implementation			Monitoring		
		Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
Avifauna	Habitat destruction during construction & maintenance	PM / ECO / ESO	• A pre-construction avifaunal walk down should be conducted to: • Confirm final layout and identify any sensitivities that may arise between the conclusion of the BA process and the construction phase. • Identify any sensitive species breeding on site that may arise between the conclusion of the BA process and the construction phase. • All construction activities should be strictly managed according to generally accepted environmental best practice standards, so as to avoid any unnecessary impact on the receiving environment. • All temporary disturbed areas should be rehabilitated according to the site's rehabilitation plan, following construction. • A pre-construction avifaunal walk down should be conducted to provide final confirmation of the sections of power line requiring bird collision mitigation.	**Construction**	ECO / ESO	• Monthly The new power line should be patrolled during operation by ESKOM annually to measure any impacts on birds (through detecting collision fatalities) and to monitor the durability of the line marking devices Where multiple devices on a span have failed they should be replaced immediately. Data should be submitted to the Eskom –EWT Strategic Partnership where it will be curated and publicly accessible.	• Records of walkthrough reports and compliance with various plans and reports as per ECO reports • Rehabilitation Plan
	Collision of birds with overhead cables	PM/ ECO / ESO	• It is recommended as a precautionary measure that the standard Eskom Bird Perch be fitted to all pole tops to further provide safe perching space well above dangerous hardware. • It is also essential that if any of the pylon structures are changed, we are given opportunity to assess the	**Operation**	ECO / ESO	• As required	• Records of walkthrough reports and compliance with various plans and reports as per ECO reports

Specialist	Impact Management Action	Implementation			Monitoring		
		Responsible person	**Method of implementation**	**Timeframe for implementation**	**Responsible person**	**Frequency**	**Evidence of compliance**
			electrocution risk of the new structures and design mitigation. • An approved antibird collision line marking device must be fitted to overhead cables on high-risk sections of the alignments to make cables more visible to birds in flight and reduce the likelihood or collision				
	Electrocution of birds perched on power lines	• PM/ ECO / ESO	• It is recommended as a precautionary measure that the standard Eskom Bird Perch be fitted to all pole tops to further provide safe perching space well above dangerous hardware. • It is also essential that if any of the pylon structures are changed we are given opportunity to assess the electrocution risk of the new structures and design mitigation.	**Operation**	ECO / ESO	• As required	• Records of walkthrough reports and compliance with various plans and reports as per ECO reports
Heritage / Archaeology / Palaeontology	Destruction of archaeological resources	• PM/ ECO / ESO	• Recording and sampling of artefacts from the site (waypoints 286 to 289). • Appoint archaeologist to conduct mitigation well before construction	**Planning and Design**	ECO / ESO	Once off prior to constrcution	• Records of walkthrough reports and compliance with various plans and reports as per ECO reports • SARAH permit in place
	Impacts to the cultural landscape	PM/ ECO / ESO	• Minimise disturbance footprint. • Rehabilitate all areas not required during operation. • Minimise size of access track.	**Construction Operation Decommissioning**	ECO / ESO	On-going	• Records of monitoring and adherence to implementations methods and mitigation measures. • Alien Management Plan • Rehabilitation Plan • Ecological Management Plan
	Impacts to archaeological sites or remains, fossils or other categories of	PM/ ECO / ESO	• If any evidence of archaeological sites or remains (e.g., remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other	**Construction Operation Decommissioning**	ECO / ESO	On-going	• Records of monitoring and adherence to implementations methods and mitigation measures. • Proof of correspondence with SAHRA APM Unit,

Specialist	Impact Management Action	Implementation			Monitoring		
		Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
	heritage resources		categories of heritage resources are found during the proposed development, SAHRA APM Unit (Sityhilelo Ngcatsha/Phillip Hine 021 462 5402) must be alerted as per section 35(3) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule. • If heritage resources are uncovered during the course of the development, a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the heritage resource. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA.				• Proof of Phase 2 rescue operation (subject to permits issued by SAHRA), if required / applicable.
	Impacts to unmarked human burials	PM/ ECO / ESO	• If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Thingahangwi Tshivhase/Mimi Seetelo 012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule.	**Construction Operation Decommissioning**	ECO / ESO	On-going	• Records of monitoring and adherence to implementations methods and mitigation measures. • Proof of correspondence with the SAHRA Burial Grounds and Graves (BGG) Unit.

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: CURRICULA VITAE

APPENDIX 7.3

Artemis Mast EMPr

ARTEMIS MAST: ENVIRONMENTAL MANAGEMENT PROGRAMME

Prepared for: Klipfontein Solar Facility (Pty) Ltd

Authority References:

SLR Project No.: 720.13101.00013
Report No.: 1
Revision No.:
September 2022

DOCUMENT INFORMATION

Title	**Artemis Mast: Environmental Management Programme**
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Reviewer	Stuart Heather- Clark
Keywords	Mast
Status	Draft
Report No.	1
SLR Company	SLR Consulting (South Africa) (Pty) Ltd

DOCUMENT REVISION RECORD

Rev No.	Issue Date	Description	Issued By
A	September 2022	Mast EMPr	SHC

REPORT SIGN OFF AND APPROVALS

L Scott-Shaw

Liandra Scott-Shaw
(Project Manager)

Stuart Heather- Clark
(Reviewer)

BASIS OF REPORT

This document has been prepared by an SLR Group company with reasonable skill, care and diligence, and taking account of the manpower, timescales and resources devoted to it by agreement with **Klipfontein Solar Facility (Pty) Ltd** (the Client) as part or all of the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

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EXECUTIVE SUMMARY

Klipfontein Solar PV (Pty) Ltd is proposing the development of one (1) Radio Mast, two (2) x 400kV powerlines and one (1) x 132kV powerline that will connect to the authorised 132kV/400kV Main Transmission Substation (MTS) (14/12/16/3/3/1/2460/AM1) as well as to the approved 100MW Kentani Solar Photovoltaic (PV) Energy Facility (14/12/16/3/3/2/724/AM3) respectively. The Kentani Solar PV Energy Facility is one (1) of eleven (11) solar PV projects collectively known as the Kentani Cluster located near the town of Dealesville, within the Tokologo Local Municipality (Lejweleputswa District) in the Free State Province.

The Kentani Cluster consists of eleven (11) solar PV projects and associated electrical infrastructure (including a powerline), each of which received their own Environmental Authorisation (EA) in 2016 from the Department of Environmental Affairs (DEA) [now referred to as the Department of Forestry, Fisheries and the Environment (DFFE)].

This EMPr is applicable to the proposed 90m Radio Mast and associated infrastructure located near Dealesville in the Tokologo Local Municipality, Lejweleputswa District in the Free State Province.

CONTENTS

ACRONYMS AND ABBREVIATIONS

Acronym / Abbreviation	**Definition**
DFFE	Department of Forestry, Fisheries and the Environment
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EO	Environmental Officer
EAP	Environmental Assessment Practitioner
EMPr	Environmental Management Programme
GN	Government Notice
MS	Method Statement
MTS	Main Transmission Substation
MSDS	Material Safety Data Sheet
NEMA	National Environmental Management Act, 1998 (No. 107 of 1998)
SAHRA	South African Heritage Resources Agency
SIPs	Strategic Infrastructure Projects
REIPPP	Renewable Energy Independent Power Producer Procurement Programme
PV	Photovoltaic
SLR	SLR Consulting (South Africa) (Pty) Ltd

GLOSSARY

ALIEN INVASIVE PLANTS / VEGETATION: Plants that do not naturally occur in an area and is declared alien invasive pant species in terms of the National Environmental Management: Biodiversity Act, 2004. These plants may also be referred to as exotic plants, e.g. Lantana (*Lantana camara*).

CONTRACTOR: The natural or juristic person or partnership whose tender for the construction of the works has been accepted by or on behalf of the Proponent.

CONSTRUCTION ACTIVITY: A construction activity is any action taken by the Contractor, his / her subcontractors, suppliers or personnel during the construction phase of the project. **Construction** For the purpose of this document is defined as the erection of radio mast structures and the installation of electronic equipment.

CONSTRUCTION AREA(S): All areas used by the Contractor in order to carry out the required construction activities. This includes, all offices, batching areas, storage and stockpile areas, workshops, spoiling areas, borrow pits, access roads, etc.

CONSTRUCTION CAMP: Construction camp refers to all site offices, container sites, workshops and testing facilities.

ENVIRONMENT: Environment means the surroundings withing which humans exist and that are made up of – (i) the land, water and atmosphere of the earth; (ii) micro-organisms, plant and animal life; (iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and (iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

ENVIRONMENTAL MANAGEMENT PROGAMME: That part of the overall management process which includes organisational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy (DRAFT ISO 14 000, 1995). In essence, it contributes a detailed programme of action prepared to ensure recommendations for the enhancing potential positive impacts and avoiding or limiting potential negative environmental impacts are implemented during the life-cycle of a project.

ERADICATION PROGRAMME: The organised clearing and rehabilitation of land infested by invasive alien species of plants.

GROUNDWATER: The water that fills the natural openings present in the rock or unconsolidated sands.

HAZARD: This means a source of or exposure to danger.

HAZARDOUS: Contains an element of risk. Dangerous or toxic to life.

HAZARDOUS SUBSTANCES: This means any substance or mixture of substances, product or material declared to be a hazardous substance under section 2(1) of the Hazardous Substance Act, 1973.

HERBICIDE: See 'Pesticide'.

HERITAGE MATERIALS: Heritage materials include, but are not limited to, meteorites, archaeological and / or paleontological remains (including fossil Shells and trace fossils); coins; indigenous and / or colonial ceramics; any articles of value or antiquity; marine Shell heaps; stone artefacts and bone remains; structures and other built features with heritage significance; rock art and rock engravings; and graves or unmarked human burials including grave goods and / or associated burial material.

MAINTENANCE: The complete upkeep, support and protection of areas/regions/sites.

METHOD STATEMENTS: Written statements which contain details regarding construction procedures, materials (where applicable), timing, storage methods (where applicable) and sketches of proposed construction. Method Statements shall be submitted for work near environmental sensitive areas of the site. This includes environmentally sensitive aspects of the work such as cement, poisons and oil storage, treatment of wastewater, provision of ablution facilities, etc.

MITIGATION: The implementation of practical measures to reduce adverse impacts or enhance beneficial impacts of an action.

NO-GO AREA(S): Areas where construction activities are prohibited.

PESTICIDE: Pesticides are chemicals used by humans to kill organisms that threaten their health and well-being, pets and livestock or cause damage to crops. This includes insecticides, herbicides, fungicides, acaricides, nematicides and rodenticides.

POLLUTION: Pollution means any change in the environmental caused by – (i) substances; (ii) radioactive or other waves; or (iii) noise, odours, dust or heat, emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future.

REHABILITATION: To re-establish or restore to a healthy sustainable capacity or state.

SITE: The site refers to the total area where the contract will take place, as awarded to the Contractor and any other area reasonably required by the Contractor to undertake the construction activities in order to fulfil the contract.

Artemis Mast: Environmental Management Programme

1. INTRODUCTION

Klipfontein Solar PV (Pty) Ltd is proposing the development of one (1) Radio Mast, two (2) x 400kV powerlines and one (1) x 132kV powerline that will connect to the authorised 132kV/400kV Main Transmission Substation (MTS) (14/12/16/3/3/1/2460/AM1) as well as to the approved 100MW Kentani Solar Photovoltaic (PV) Energy Facility (14/12/16/3/3/2/724/AM3) respectively. The Kentani Solar PV Energy Facility is one (1) of eleven (11) solar PV projects collectively known as the Kentani Cluster located near the town of Dealesville, within the Tokologo Local Municipality (Lejweleputswa District) in the Free State Province (see figure 1-1).

The Kentani Cluster consists of eleven (11) solar PV projects and associated electrical infrastructure (including a powerline), each of which received their own Environmental Authorisation (EA) in 2016 from the Department of Environmental Affairs (DEA) [now referred to as the Department of Forestry, Fisheries and the Environment (DFFE)].

SLR Consulting (South Africa) (Pty) Ltd (SLR) has been appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the required Environmental Management Programme (EMPr) (in line with the National Environmental Management Act, 1998 (Act 107 of 1998)) for the proposed Artemis Mast project.

1.1 EXISTING AUTHORISATIONS AND AMENDMENTS

On 28 October 2021, the Minister of Mineral Resources and Energy, namely Gwede Mantashe, announced the Preferred Bidders of the Round 5 Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) and six (6) of the aforementioned Solar Energy Facilities, collectively referred to as the "Kentani Cluster", received Preferred Bidder status i.e.:

- Kentani Solar PV (14/12/16/3/3/2/724/AM3)
- Sonoblomo Solar PV (14/12/16/3/3/2/723/AM2)
- Klipfontein Solar PV (14/12/16/3/3/2/722/AM2)
- Klipfontein 2 Solar PV (14/12/16/3/3/2/726/1/AM1)
- Leliehoek Solar PV (14/12/16/3/3/2/728/AM2)
- Braklaagte Solar PV (14/12/16/3/3/2/727/1)

These Solar Energy Facilities have now become Strategic Infrastructure Projects (SIP) i.e. SIPs 8 and 10. SIPs 8 and 10 target the development of green energy in support of the South African economy and the provision of electricity transmission and distribution respectively.

- SIP 8 supports sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP2010) and support bio-fuel production facilities.
- SIP 10 Expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development. Align the 10-year transmission plan, the services backlog, the national broadband roll-out and the freight rail line development to leverage off regulatory approvals, supply chain and project development capacity.

The approved MTS and associated infrastructure will service eleven (11) of Mainstream's solar PV projects authorised as part of the Kentani Cluster.

It should be noted that the 132kV/400kV MTS development footprint and the 132kV and 400kV corridors (in which the respective powerlines which form part of this application / BA process would be situated)

were granted authorisation by the DFFE in April 2022 (DFFE Reference Number: 14/12/16/3/3/1/2460/AM1). However, due to technical consideration, the approved 132kV and 400kV corridors are not suited to connect the approved MTS to the National grid nor the authorised Kentani Solar PV (DFFE Reference Number: 14/12/16/3/3/2/724/AM3) to the MTS, and as such additional small portions of the corridors are required to be assessed to accommodate the technical changes.

The powerlines and the Radio Mast are located within the Kimberly Renewable Energy Development Zone (REDZ) (namely REDZ 4) and Central Strategic Transmission Corridor, as defined and in terms of the procedures laid out in Government Notices No. 113 and No. 145 which were formally gazetted on 16 February 2018 and 26 February 2021 respectively. The respective powerlines which are being proposed as part of this application and BA process are as follows:

1. Two (2) 400kV overhead powerlines (approx. 700m in length) are being proposed and will connect the approved MTS (14/12/16/3/3/1/2460/AM1) to the existing Eskom 400kV powerline, located west of the approved MTS site, via a Loop-In-Loop Out (LILO) connection; and
2. One (1) 132kV powerline (approx. 5km in length) is being proposed and will connect the approved MTS to the authorised Kentani on-site substation (14/12/16/3/3/2/724/AM3), located approx. 4.85km north-west of the approved MTS site.
3. One (1) Radio Mast (approx. 90m in height) is being proposed and will be situated within the approved MTS site.

A road in the servitude under the proposed powerlines as well as an access road (approx. 4-8m wide) to the R64 provincial route will also be required.

As part of the BA process, powerline corridors with widths of 300m (150m on either side of centre line) are being proposed and assessed for the 400kV and 132kV powerlines. This is to allow flexibility when routing the powerlines within the authorised corridor (should the EA be granted).

It must be noted that the majority of the proposed powerlines being proposed are located within existing approved powerline corridors and that only small sections will traverse outside of the approved corridors:

- The portion of the 132kV powerline outside of an existing approved corridors and Eskom servitudes is approximately 700m
- The portion of the each of the 400kV powerlines outside of an existing approved corridors and Eskom servitudes is approximately 150mand 250m respectively.

Considering the above, it is important to note that the location of the corridors for the powerlines being proposed as part of this application have previously been assessed as part of the development footprint for the approved Artemis MTS and powerline corridors (14/12/16/3/3/1/2460/AM1) as well as the Kentani Cluster of solar PV developments, each of which received their own EA in 2016[1].

[1] It should be noted that the validity period of the EA issued for the Klipfontein Solar PV Energy Facility in 2016 was extended by the Holder of the EA in April 2021 (14/12/16/3/3/2/722/AM1). The EA issued in 2016 is now valid until 06 June 2026 (i.e., EA lapses on 06 June 2026).

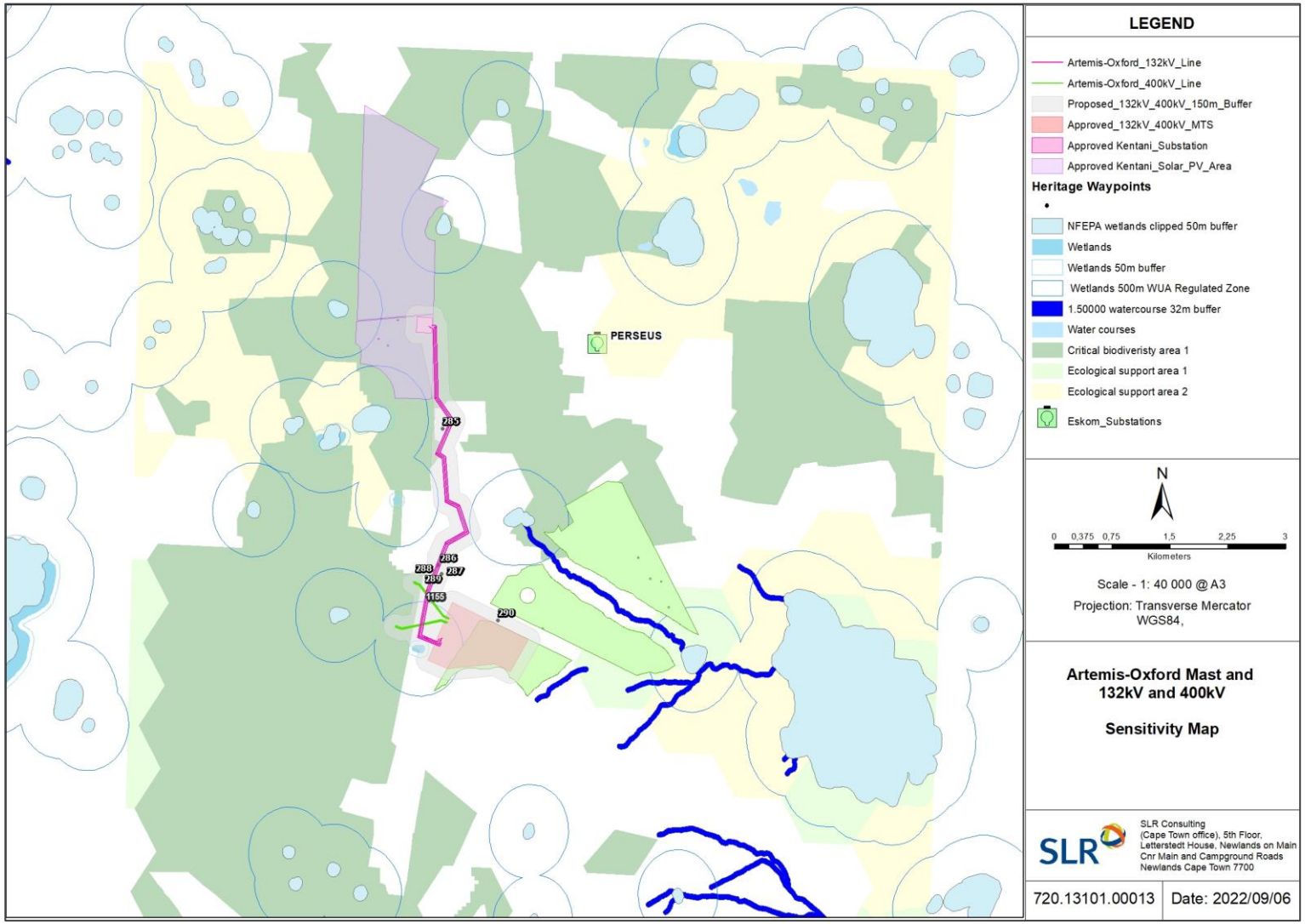

Figure 1-1: Environmental sensitivity map based on Specialist Findings.

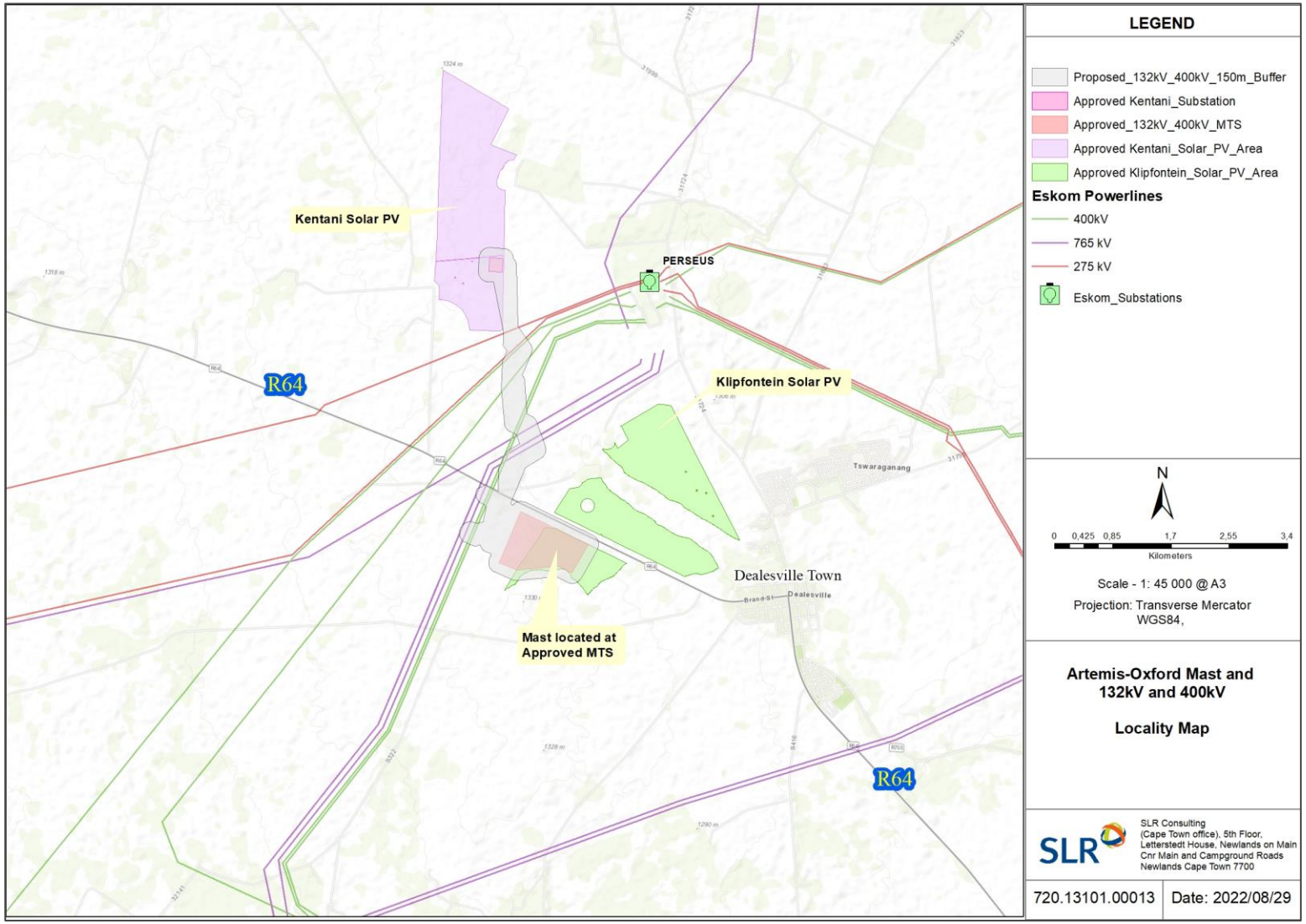

Figure 1-2: Proposed Site Layout

1.1 LEGAL REQUIREMENT OF THE EMPR

SLR was appointed by **Mainstream** as the independent EAP to undertake a Basic Assessment (BA) process that is required in terms of the National Environmental Management Act, (NEMA), 1998 (Act No. 107 of 1998). The compilation of this EMPr forms part of the requirements (Appendix 4) of the EIA Regulations 2014 (as amended). This EMPr will be submitted to the DFFE for approval as part of the BA process and the final version, if necessary, will be updated to comply with any conditions of authorisation.

1.2 CONTENTS OF THE EMPR

The Construction and Operation Environmental Management Programme (EMPr) is comprised of the following sections:

- **Chapter 1: Introduction:** This section includes the project background and describes the contents and purpose of this EMPr, as well as the aims of this EMPr.
- **Chapter 2: Expertise of the Environmental Assessment Practitioner (EAP):** This section provides information on the EAP(s) responsible for the compilation of the EMPr. This expertise of the EAP, including qualifications, experience, and professional registrations.
- **Chapter 3: Legislative Overview:** This section provides information on the relevant environmental legislation pertinent to environmental processes in South Africa.
- **Chapter 4: Administration and regulation of environmental obligations:** This section identifies the management structure, as well as the roles and responsibilities of the various stakeholders. The procedures for environmental management and monitoring of the construction and operation phases are also presented.
- **Chapter 5: Environmental specifications:** This section includes environmental specifications relating to the construction and operation phases and associated infrastructure. It contains the specific actions and / or measures that must be taken in order to minimise and control the impact of construction and operation activities on the affected biophysical and socio-economic environment.

1.3 PURPOSE OF THE EMPR

The purpose of the EMPr is to ensure that potential impacts on the environment associated with the construction and operation phases are prevented and, where they cannot be prevented, are kept to a minimum and rehabilitated. Moreover, it is to ensure that any positive impacts associated with the project during the construction and operation phases are enhanced. The EMPr sets environmental targets for the Contractor (defined as the lead Contractor and any nominated or selected Sub-contractors) and Operator and reasonable standards against which the Contractor's and Operator's performance can be measured during the construction and operation phases, respectively.

This document will form the basis for the environmental specifications that the Contractor, in terms of the construction contract, will be obliged to adhere to during construction, as well as the Operator, in terms sale of land and binding agreements associated. This document will be included in the contract documentation for the construction phase and will thus form a binding agreement between the Contractor and the Proponent. It will also be included in in the terms of sale and will form a binding agreement between the Operator and the

Proponent. This EMPr has been prepared in compliance with Appendix 4 of the EIA Regulations, 2014 (as amended), the contents of which are outlined in **Table 1-1** below.

Table 1-1: Requirements of an EMPr in terms of the EIA Regulations, 2014 (as amended).

ITEM	CONTENT OF EMPR	COMPLETED (Y) OR NOT APPLICABLE (N/A)	LOCATION IN EMPR
1 a)	*i) Details of the EAP who prepared the EMPr;*	Y	Section **Error! Reference source not found.**.
	ii) Details of the expertise of that EAP to prepare an EMPr, including a curriculum vitae;	Y	Section **Error! Reference source not found.** and Appendix A.
b)	*A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;*	Y	Section **Error! Reference source not found.**.
c)	*A map at an appropriate scale which superimposes the proposed activity, its associated infrastructure, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;*	Y	Appendix B.
d)	*A description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including -*	Y	Tables 5-1.
	i) planning and design;		
	ii) pre-construction activities;		
	iii) construction activities;		
	iv) rehabilitation of the environmental after construction and where applicable post closure; and	Y	
	v) where relevant, operation activities;		Table 5-1.
e)	*[Deleted by amendments to the EIA Regulations, 2014]*		
f)	*A description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraphs (d) will be achieved, and must, where applicable, include actions -*	Y	Table 5-1

ITEM	CONTENT OF EMPR	COMPLETED (Y) OR NOT APPLICABLE (N/A)	LOCATION IN EMPR
	i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;		
	ii) comply with any prescribed environmental management standards or practices;		
	iii) comply with any applicable provisions of the Act regarding closure, where applicable; and		
	iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;		
g)	*The method of monitoring the implementation of the impact management actions contemplated in paragraph (f);*	Y	Table 5-1.
h)	*The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);*	Y	Table 5-1
i)	*An indication of the persons who will be responsible for the implementation of the impact management actions;*	Y	Table 5-1
j)	*The time periods within which the impact management actions contemplated in paragraph (f) must be implemented;*	Y	Table 5-1
k)	*The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);*	Y	Table 5-1
l)	*A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;*	Y	Table 5-1.
m)	*An environmental awareness plan describing the manner in which -*	Y	Section 4.5.
	i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and		
	ii) risk must be dealt with in order to avoid pollution or the degradation of the environment;	Y	Section 4.5
n)	*Any specific information that may be required by the competent authority;*	N/A	
2)	*Where a government notice gazetted by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.*	N/A	

2. EXPERTISE OF THE EAP

The details and role of the EAPs that were involved in the preparation of this EMPr are provided in **Table 2-1** below. Curriculum Vitae are attached as Appendix A.

SLR has no interest in the proposed project other than fair payment for consulting services rendered as part of the environmental assessment process.

Table 2-1: Expertise of the EAP

Stuart Heather Clark	
Responsibility	Reviewer
Qualification	BSc (Hons) Civil Engineering Masters Environmental Science
Professional Registration	• Registered EAP (2019-613) • CEAPSA -Certified as an Environmental Practitioner with the Interim Certification Board for Environmental Assessment Practitioners of South Africa (2006) • IAIAsa- Member of the International Association for Impact Assessment South Africa • IAIA International- Member of the International Association for Impact Assessment
Experience in years	24 Years
Experience	Stuart has 24 years of experience in local EIAs and international ESIAs. He has worked on over 100 development projects in 13 sub-Saharan African countries. His key strength is identifying and managing ESG risks for major capital projects from the concept phase through to the pre-feasibility, feasibility and implementation phases. Stuart has acted as an environmental advisor to various development agencies and financiers and he has an integral understanding of the Equator Principles and IFC Performance Standards and other international lender sustainability Frameworks.
Liandra Scott-Shaw	
Responsibility	Project Manager
Qualification	• B.Sc. Honours (Ecological Science) • B.Sc. (Biological Science)
Professional Registration	• South African Council for Natural Scientific Professions (SACNASP) Pri.Sci.Nat. No.: 11744 • Member of South African Wind Energy Association • IAIAsa Membership Number: 3624

Experience in years	8 years
Experience	Liandra holds a B.Sc. undergraduate degree in Biological Sciences as well as a B.Sc. Honours degree in Ecological Sciences from the University of KwaZulu-Natal. She worked for 5 years as a Vegetation Ecologist and Diatom specialist before committing to work as an Environmental Assessment Practitioner (EAP) with specific interest and experience in South African renewable energy projects and has led many EIAs and Basic Assessments for wind, solar, battery energy storage, and transmission line projects. She is also a member and Vice Chair of the South African Wind Energy Association (SAWEA) Environmental Working Group
Noluloyo Xorile	
Responsibility	Project Assistant
Qualification	• B.A. Hons (Environmental Management and Geographic Information Systems) • B.A (Geography)
Experience in years	5
Experience	Noluyolo Xorile has worked as an environmental consultant since 2017. Her key focus has mainly been feasibility studies, Scoping Assessments, Environmental Impact Assessments (EIA), Basic Assessments (BA), Environmental Management Programs (EMPRs), and environmental control monitoring, including stakeholder liaison within the power sector (Wind and Solar PV), mining, water treatment works, waste management, wetland rehabilitation, the built environment and environmentally sustainable design projects (Green Buildings) located in South Africa

3. LEGISLATIVE OVERVIEW

3.1 GENERAL

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

3.2 STATUTORY AND OTHER APPLICABLE LEGISLATION

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

3.2.1 The Constitution (No. 6 of 1996)

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

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

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

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

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

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

This act supports the Bill of Rights within the Constitution and highlights principles of sustainable development including preservation of ecosystems and biological diversity and avoidance, minimisation and remediation of pollution and environmental degradation. It also sets the stage for the control of listed activities and the procedural requirements for authorisation thereof through the Environmental Impact Assessment Regulations, 2014. Environmental authorisation must be obtained prior to the commencement of any activities listed in the EIA Regulation Listing Notices, 2014.

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

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

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

This act makes provisions to accomplish the objectives of the United Nations' Convention on Biological Diversity. COM may be required to apply for permits to conduct certain listed activities which, together with the listed threatened or protected species, may be identified by the Minister.

Section 73 (3) of this act empowers a competent authority to direct a person to take steps to remedy any harm to biodiversity resulting from the actions of that person or as a result of occurrence of listed invasive species occurring on land on which that person is the owner.

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

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

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

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

3.2.9 National Forests Act (No. 84 of 1998)

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

3.2.10 National Heritage Resources Act No. 25 of 1999)

This act provides for an integrated and interactive system for identification, assessment and management of South Africa's heritage resources, and empowers civil society to nurture and conserve their heritage resources. It provides for the control of specific activities that could impact heritage resources and for the procedural requirements for authorisation thereof from the heritage authority. Importantly, the South African Heritage Resources Agency (SAHRA)[2] must be notified immediately if any items of cultural heritage importance are noted during construction activities.

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

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

4. ADMINISTRATION AND REGULATION OF ENVIRONMENTAL OBLIGATIONS

Details of the management structure for this EMPr during the construction and operation phases are presented below. All official communication and reporting lines including instructions, directives and information shall be channelled according to the management structure presented below during the construction and operation phases.

4.1.1 Construction Phase

The construction phase activities included as part of the EMPr are in respect of any future construction, upgrades or expansions at the site. The implementation of this EMPr requires the involvement of several stakeholders, each fulfilling a different but vital role to ensure sound environmental management during the construction phase. The organisational structure during the construction phase is presented in **Figure 4-1**.

[2] SAHRA processes all development applications in terms of section 38 located in the Free State.

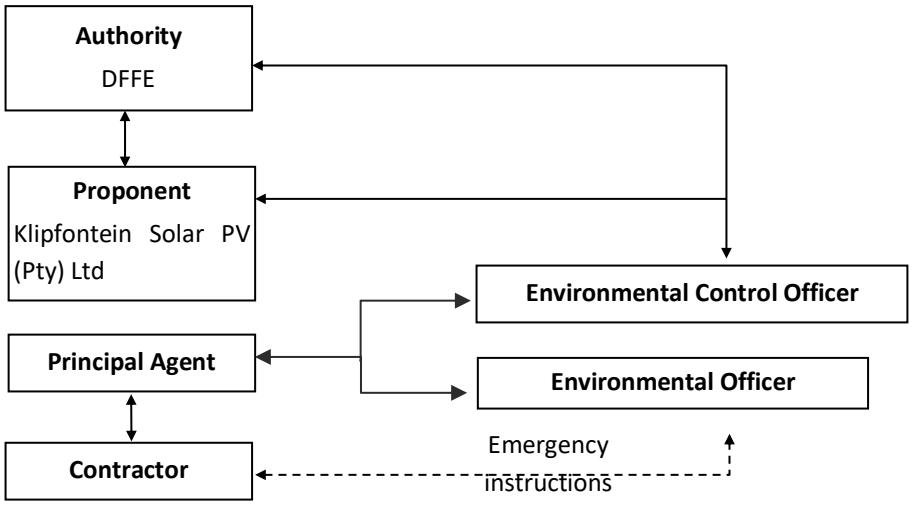

Figure 4-1: Organisational structure during the construction phase.

4.1.1.1 Authority: Department of Forestry, Fisheries and the Environment (DFFE)

DFFE is the designated authority responsible for authorising this EMPr. DFFE has overall responsibility for ensuring that The proponent complies with the conditions of its Environmental Authorisation (EA) as well as this EMPr. DFFE shall also be responsible for approving any amendments that may be required to the EMPr. In terms of Section 30 of NEMA, DFFE is to be notified immediately should there be an incident on site where the release of a hazardous substance was unexpected, sudden, and uncontrolled, including from a major emission, fire or explosion, that causes, has caused or may cause significant harm to the environment, human life or property.

4.1.1.2 Proponent: Klipfontein Solar PV (Pty) Ltd

The proponent is ultimately responsible for the implementation of the EMPr and the financial cost of all environmental control measures arising from the construction phase. The proponent must ensure that any person acting on its behalf complies with the conditions / specifications contained in this EMPr. Mainstream is also responsible for the appointment of a Principal Agent, Contractor and ECO. The Proponent shall address any site problems pertaining to the environment at the request of DFFE, the Contractor and / or ECO. The Proponent shall also ensure that all environmental authorisations and permits, if any, have been obtained from the authorities.

4.1.1.3 Principal Agent

For the purposes of this document the “Principal Agent” refers to any person (such as the architect, engineer or project manager) authorised by Mainstream to oversee the planning, design and construction phases of the project. Any on-site decisions regarding environmental management are ultimately the responsibility of the Principal Agent.

The responsibilities of the Principal Agent are to:

- Ensure that the requirements as set out in this EMPr and by the relevant Authorities are adhered to and implemented.

- Assist the ECO in ensuring that the conditions of the EMPr are being adhered to and promptly issuing instructions requested by the ECO, to the Contractor. All site instructions pertaining to environmental matters issued by the Principal Agent are to be copied to the ECO.
- Ordering the removal of person(s) and/or equipment not complying with the specifications or issuing a stop works order (as required by the ECO or otherwise).
- Issuing of penalties for transgressions of environmental site specifications.
- Providing input into the ECO's ongoing internal review of the EMPr.

4.1.1.4 Contractor

The Contractor shall have the following responsibilities:

- To implement all provisions of the EMPr during the construction phase. If the Contractor encounters difficulties with specifications, he / she must discuss alternative approaches with the Principal Agent and / or the ECO prior to proceeding.
- To ensure that all staff are familiar with the EMPr.
- Monitoring and verifying that the environmental impacts are kept to a minimum.
- To make personnel aware of environmental issues and to ensure that they show adequate consideration of the environmental aspects of the project.
- To prepare the required Method Statements (MS) (see Section 4.4).
- To report any incidents of non-compliance with the EMPr to the Principal Agent and / or the ECO.
- To rehabilitate any sensitive environments damaged due to the Contractor's negligence. This shall be done in accordance with The proponent 's and ECO's specifications.

Failure to comply with the EMPr may result in fines (see Section 4.9) and reported non-compliance may result in the suspension of work or termination of the contract by the Principal Agent.

4.1.1.5 Environmental Officer (EO)

The Contractor shall appoint, at his / her own cost, an EO to ensure that the EMPr is implemented and ensure that all environmental specifications and EMPr requirements are met at all times. The EO shall be responsible for monitoring, reviewing and verifying the Contractor's compliance with the EMPr.
The EO's duties in this regard shall include the following:

- Monitoring and verifying that the EMPr and MS are always adhered to and taking action is specifications are not followed.
- Monitoring and verifying that environmental impacts are kept to a minimum.
- Assisting the Contractor and ECO in finding environmentally responsible solutions to problems.
- Inspecting the site on a regular basis with regard to compliance with the EMPr.
- Completing weekly checklists detailing the above-mentioned inspections.
- Keeping a photographic record of progress on site from an environmental perspective.
- Reporting any incidents of non-compliance with the EMPr to the Principal Agent and ECO.
- Keeping a register of complaints on site and recording community comments and issues and the actions taken in response to these complaints.

4.1.1.6 Environmental Control Officer (ECO)

The ECO's duties shall include the following:

- Confirming that the necessary environmental authorisations and permits, if any, have been obtained from the relevant authority(ies).
- Advising the Contractor and / or Proponent on environmental issues within defined construction areas.
- Reviewing MS (see Section 3.5).
- Undertaking regular site visits to ensure compliance with the EMPr and verifying that negative environmental impacts are kept to a minimum and positive impacts are enhanced throughout the contract.
- Completing environmental checklists during site visits.
- Keeping a photographic record of progress on site from an environmental perspective.
- Assisting the Contractor and / or the Proponent in finding environmentally acceptable solutions to construction problems.
- Recommending additional environmental protection measures should this be necessary.
- Review the register of complaints and records and dealings with any community issues or comments.
- Giving a report back on any environmental issues at site meetings.
- Prepare an environmental audit report at the conclusion of the construction phase.

The ECO shall communicate directly with the Principal Agent. If the Principal Agent does not respond the ECO shall take the matter up with Proponent.

4.1.2 Operation Phase

The implementation of this EMPr requires the involvement of several stakeholders, each fulfilling a different but vital role to ensure sound environmental management during the operation phase. The organisational structure during the operation phase is presented in Figure 3-2.

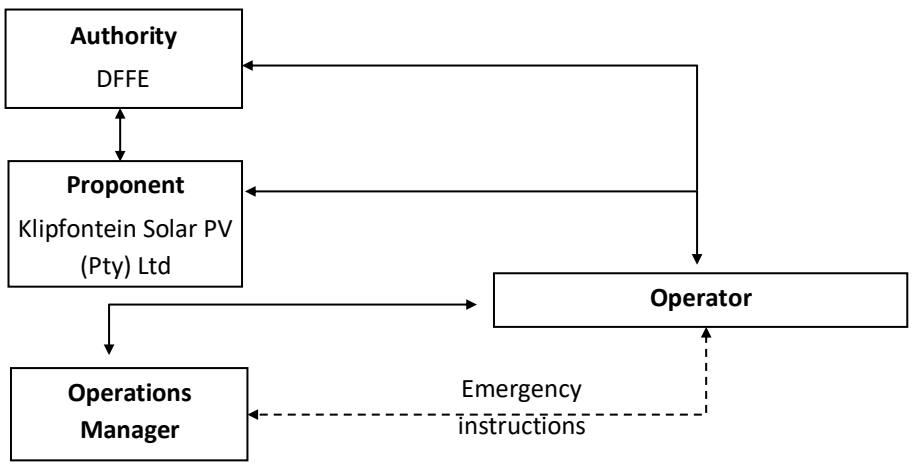

Figure 4-2: Organisational structure during the operation phase.

4.1.2.1 Authority: Department of Forestry, Fisheries and the Environment (DFFE)

DFFE is the designated authority responsible for authorising this EMPr. DFFE has overall responsibility for ensuring that the proponent complies with the conditions of its EA as well as this EMPr. DFFE shall also be responsible for approving any amendments that may be required to the EMPr.

4.1.2.2 Proponent: Klipfontein Solar PV (Pty) Ltd

The Proponent is ultimately responsible for the ensuring the implementation of the EMPr. The proponent must ensure that any person acting on its behalf complies with the conditions / specifications contained in this EMPr. The proponent shall address any site problems pertaining to the environment at the request of the Operator and Operations Manager.

The proponent shall address any site problems pertaining to the environment at the request of DFFE, the Contractor and / or ECO. The Proponent shall also ensure that all environmental authorisations and permits, if any, have been obtained from the authorities.

4.1.2.3 Operator

The Operator shall ensure that its responsibilities are executed in compliance with the EMPr. Any on-site decision regarding environmental management is ultimately the responsibility of the Operator. The Operator shall appoint an Operations Manager for all day-to-day environmental management activities.
Additionally, the Operator shall have the following responsibilities:

- To ensure implementation of all provisions of the EMPr during the operation phase. If the Operator encounters difficulties with specifications, he / she must discuss alternative approaches with the Proponent and / or DFFE prior to proceeding.
- To ensure that all staff are familiar with the EMPr.
- Confirming that the environmental impacts are kept to a minimum.
- To ensure personnel are aware of environmental issues and to ensure they show adequate consideration of the environmental aspects of the project.
- To ensure the rehabilitation of any sensitive environments damaged due to the Operator's negligence.
- To address any issues at the request of DFFE and / or the public.
- To oversee the implementation of internal operations and activities.
- Appointment of various contractors e.g. landscaping, maintenance, cleaning, etc.

Failure to comply with the EMPr may result in suspension of the EA.

4.1.2.4 Operations Manager

An Operations Manager shall be responsible for the following:

- To implement all provisions of the EMPr during the operation phase. If the Operations Manager encounters difficulties with specifications, he / she must discuss alternative approaches with the Operator prior to proceeding.
- To familiarise all staff with the EMPr.
- To keep negative environmental impacts to a minimum and to enhance positive impacts.

- To make personnel aware of environmental issues and to ensure they show adequate consideration of the environmental aspects of the project.
- To rehabilitate any sensitive environments damaged due to the Operator's negligence.
- To address any issues at the request of DFFE and / or the public.
- To implement internal operations and activities.
- Management of various contractors e.g. landscaping, maintenance, cleaning, etc.
- Monitoring and undertaking all day-to-day maintenance / management activities.
- Implementing the provisions of operation-related measures in accordance with the EMPr.
- Undertaking continual internal review of the property and operations.
- Reporting any incidents of non-compliance with the EMPr to the Principal Agent and / or DFFE.

Keeping a register of complaints on site and recording community comments and issues and the actions taken in response to these complaints.

4.2 EMPR ADMINISTRATION

Copies of this EMPr shall be kept at the site office/s during the operation phase. All senior personnel shall be required to familiarise themselves with the contents of this document. Any revisions to the EMPr document must be approved by DFFE before the revised EMPr is implemented. The Operations Manager shall be responsible for the implementation and distribution of any "approved" revisions to the EMPr during the operation phase.

4.3 INFORMATION BOARDS

The Contractor shall be responsible for erecting a general information board during the construction phase. The general information board shall, as a minimum, provide the name and contact number of the EO, to ensure that the public has access to the EO to request information and / or to lodge any complaints.

4.4 METHOD STATEMENTS (MS)

The Contractor shall submit written MS to the Principal Agent and ECO for all environmentally sensitive aspects of the work during the construction phase. An MS Control Sheet, signed by the Contractor, must accompany each MS (a pro forma Control Sheet is provided in Appendix C). An MS shall cover applicable details with regard to:

- Construction procedures.
- Materials and equipment to be used.
- Getting 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 Specifications.
- Any other information deemed necessary by the Proponent / ECO.

An MS shall be submitted to the Principal Agent and ECO **at least five (5) days prior** to the commencement of the construction activities for which the MS is required. It should be noted that an MS must contain sufficient information and detail to enable the Principal Agent and ECO to apply their minds to the potential impacts of the works on the environment. The Contractor will also need to thoroughly understand what is required of them in order to undertake the works.

Work shall not commence until the MS have been approved by the Principal Agent. Failure to submit an MS may cause the Principal Agent to order the Contractor to suspend part or all of the works concerned until an MS has been submitted and approved. Failure to submit an MS at least five days prior to commencing the relevant activity may result in a fine (see Section 3.10). Any damage caused to the surrounding environment by work done without prior approval shall be rehabilitated at the Contractor's cost.

As a minimum the following MSs are required:

- MS for indicating the location, preparation and layout of the construction camps and laydown areas.
- MS for the containment, handling, storage and disposal of hazardous substances.
- MS for handling accidental leaks and spills.
- MS for management of hazardous waste.
- MS for management of general waste.
- MS for management of wastewater.
- MS for dust control.
- MS for management of cement and concrete batching.
- MS for erosion and sedimentation control.
- MS for traffic accommodation and diversions.
- MS for fire prevention and control.
- MS for site rehabilitation.

The Principal Agent and / or the ECO shall specify any additional MS that may be required. Where relevant the MSs indicated above can be combined on agreement with the Principal Agent / ECO.

4.5 ENVIRONMENTAL AWARENESS TRAINING

Environmental awareness is defined as 'the growth and development of awareness, understanding and consciousness toward the biophysical environment and its problems, including human interactions and effect'. It is further stated that it is 'the educational process that deals with the human interrelationships with the environment and that utilizes an interdisciplinary problem-solving approach with value clarification'.

As part of continual improvement in environmental management performance, environmental as well as health and safety awareness training should be provided to all employees in order to promote the effective implementation of the EMPr actions[3].

[3] DEA&DP Guideline for Environmental Management Programmes, June 2005

Prior to the commencement of any work on site, the Contractor's site management staff shall attend an environmental awareness training course presented by the ECO. The Contractor shall liaise with the ECO prior to the commencement of construction to fix a date and venue for the course. The Contractor shall provide a suitable venue with facilities and ensure that the specified employees attend the course.

The information presented at the course shall be communicated by the Contractor to the rest of his employees on the site, to any new employees coming onto site after the initial training course and to his / her suppliers as appropriate. The presentation shall be conducted, as far as is possible, in the employees' language of choice.
As a minimum, training shall include:

- Explanation of the importance of complying with the EMPr.
- Discussion of the potential environmental impacts of construction activities.
- Employees' roles and responsibilities, including emergency preparedness.
- Explanation of the mitigation measures that must be implemented when carrying out their activities.
- Explanation of the specifics of this EMPr and its specification (no-go areas, etc.).
- Discussion of waste awareness and provision of training to ensure proper waste management is implemented when carrying out their activities.
- Explanation of the management structure of individuals responsible for matters pertaining to the EMPr.

The Contractor shall keep records of all environmental training sessions, including names of attendees, dates of their attendance and the information presented to them. A list of general environmental do's and don'ts are provided in Appendix D.

4.6 MEETINGS

The ECO shall meet with the Principal Agent on a monthly basis, or more frequently as required during the initial stages of the project. The ECO shall attend scheduled construction site meetings on a monthly basis throughout the contract period.

4.7 INSPECTION PROCEDURES

The day-to-day monitoring and verification that the EMPr is being adhered to shall be undertaken by the EO. The ECO shall visit and inspect the site at least on a monthly basis to ensure that correct procedures are being implemented and that the Contractor is complying with the environmental specifications in the EMPr. Additional site inspections by the ECO may be needed during the initial stages of the project. The ECO shall address any queries to the Proponent. If the queries cannot be resolved at this level, they shall be referred to the Principal Agent and, if necessary, to DFFE.

4.8 RECORD OF ACTIVITIES

The EO shall keep a record of activities on site, including but not limited to meetings attended, MSs received and approved, issues arising on site, cases of non-compliance with the EMPr, penalties / fines issued and corrective action taken to solve problems that arise and any complaints received and how they were addressed.

The EO shall undertake photographic monitoring for the duration of the construction phase. This shall include a photographic record of all areas that will be impacted by the construction activities prior to construction activities commencing. The EO shall monitor all sensitive work environments, which may also include photographic monitoring.

4.9 FINES

A system of fines shall be implemented to ensure compliance with the EMPr (see Appendix E). Where the Contractor inflicts non-repairable damage upon the environment or fails to comply with any of the environmental specifications of the EMPr this would constitute a breach of contract for which the Contractor may be liable to pay a fine. The Contractor is deemed not to have complied with the EMPr if, amongst others:

- There is evidence of contravention of the EMPr specifications, including any non-compliance with an approved MS.
- Construction activities take place outside the defined boundaries of the site.
- Environmental damage ensues due to negligence.
- The Contractor fails to comply with corrective or other instructions issued by the Principal Agent within a specific time period.
- The Contractor fails to respond adequately to complaints from the public.

If excessive infringement with regard to any of the above is registered, then the Principal Agent reserves the right to fine the Contractor, or in the extreme event terminate the Contractor's contract. The system of fines shall be implemented in the following way:

- Fines shall be issued per incident at the discretion of the Principal Agent.
- Fines shall be issued in addition to any remedial costs incurred as a result of non-compliance with the environmental specifications.
- The Principal Agent shall inform the Contractor of the contravention and the amount of the fine and will deduct the amount from the Contractor's monthly Payment Certificates.
- Fines, including but not limited to those activities presented in Appendix E, shall be imposed by the Principal Agent on the Contractor, his staff and / or the Sub-contractors' staff for contravention of the environmental specifications. Where there are ranges, the amount shall depend on the severity and extent of the damage done to the environment.

Should a fine be issued, the Principal Agent shall, in conjunction with the ECO, identify an appropriate environmental-focussed non-profit organisation in the area to which to donate the money.

Failure by any employee of the Contractor or their sub-contractors to show adequate consideration to the environmental aspects of the contract shall be considered sufficient cause for the Principal Agent to have that employee removed from the site. The ECO may, through the Principal Agent, also order the removal of equipment that is causing continual environmental damage.

4.10 INTERNAL REVIEW AND AUDITING

The Contractor shall establish an internal review procedure to monitor the progress and implementation of the EMPr during the construction phase.

Where necessary, and upon the recommendation of the Principal Agent and / or the ECO, procedures that require modification will be changed to improve the efficiency of the EMPr. All modifications to the EMPr shall be approved by DFFE before, if possible, any changes or adjustments to the EMPr are implemented. Any changes or adjustments to the EMPr shall be registered in the daily records of the Principal Agent. Adjustment and update of the original EMPr document is not required when these ad hoc changes are made.

At the conclusion of the construction phase an environmental audit report shall be compiled and submitted to DFFE. This report shall be compiled by the ECO, in collaboration with the Principal Agent and the EO. It shall, as a minimum, outline the implementation of the EMPr during the construction phase, and highlight any problems and issues that arose during the construction period to report, on a formal basis, the lessons learned from this project.

4.11 EXTERNAL REVIEW AND AUDITING

The Proponent must, for the period during which the EA and EMPr remain valid, ensure compliance with the conditions of the EA and EMPr is audited. The environmental audit report must be prepared by an independent person, with the relevant environmental auditing expertise and be submitted to DFFE upon completion or within six months of completion of the construction phase. The environmental audit report must contain all the information required as presented in Appendix 7 of the EIA Regulations, 2014 (as amended).

The Proponent, within seven days of the submission of the environmental audit report to DFFE, must notify all interested and affected parties of the submission and make the report available to anyone on request and on a publicly accessible website (if applicable).

Access to the site must be granted and the environmental audit reports, ECO reports and other relevant documentation must be produced to any authorised official representing the Competent Authority who requests to see it for the purposes of assessing and / or monitoring compliance with the conditions contained therein.

5. ENVIRONMENTAL SPECIFICATIONS

5.1 ENVIRONMENTAL ACTIONS AND OUTCOMES APPLICABLE TO THE PLANNING, CONSTRUCTION AND OPERATIONAL PHASE

The planning, construction and operational phase activities included as part of the EMPr are in respect of any future construction, upgrades or expansions at the site. Table 4-1 is only deemed applicable to any future construction upgrades or expansions at the site

5.1.1 Planning Phase

Table 4-1: Environmental actions and outcomes applicable to the Planning, Construction and Operational Phase.

Ref #	Project activity/aspect	Environmental Outcome	Management Action	Responsibility	Timing	Records/Indicators	Monitoring Requirements
5.1.1	**Site environmental personnel**	Effective management and monitoring of the EMPr and EA requirements	• An EO shall be appointed.	Contractor	Prior to construction	Letters of appointment.	N/A
			• An independent ECO shall be appointed.	Proponent			N/A
5.1.2	**Compliance documentation**	Compliance with legislative requirements	• EA shall be obtained prior to any construction. • The EMPr shall be approved by competent authority • Any additional environmental-related documentation / permits etc. shall be obtained. • All project-related documentation including, EA, EMPr, MS, Material Safety Data Sheets (MSDS), Complaints Registers, waste disposal slips, ablution facility service slips, etc. must be kept at the construction camp.	Proponent	Prior to construction	Copies of EA, DFFE approval of EMPr and copy of the approved EMPr.	Site Inspections and Audits

Ref #	Project activity/aspect	Environmental Outcome	Management Action	Responsibility	Timing	Records/Indicators	Monitoring Requirements
			• All the requirements of the National Water Act, 1998 (Act 36 of 1998) in terms of water use and pollution control management must be adhered to at all times. • The Contractor must erect and maintain information posters at key locations on site, and the posters must include the following information as a minimum: a) Safety notifications; and b) No littering			Copies of project-related documentation and additional environmental-related permits etc. kept on file at the construction camp.	
5.1.3	**Environmental awareness training**	All onsite staff are aware and understand the individual responsibilities in terms of this EMPr.	• All staff must receive environmental awareness training prior to commencement of the activities • The Contractor must allow for sufficient sessions to train all personnel • Refresher environmental awareness training is available as and when required; • 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 • Environmental awareness training must include as a minimum the following: a) Description of significant environmental impacts, actual or potential, related to their work activities.	ECO and Proponent ECO	Prior to construction Ad hoc	Environmental awareness training workshops Environmental awareness Training material	Attendance register Environmental awareness Training material requirements checklist

Ref #	Project activity/aspect	Environmental Outcome	Management Action	Responsibility	Timing	Records/Indicators	Monitoring Requirements
			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. • A record of all environmental awareness training courses undertaken as part of the EMPr must be available; • Course material must be available and presented in appropriate languages that all staff can understand • A staff attendance register of all staff to have received environmental awareness training must be available	ECO	Prior and during construction	Filing system including all proof of training	File with proof of training
5.1.4	**Storm and wastewater management**	Impacts to the environment caused by stormwater and wastewater discharges during construction are avoided	• 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;	ECO	During construction	Implement measures for the control and management of runoff	No mismanagement of runoff or contaminated water due to the temporary concrete batching plant

Ref #	Project activity/aspect	Environmental Outcome	Management Action	Responsibility	Timing	Records/Indicators	Monitoring Requirements
			• 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; • Natural stormwater 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 • 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.				Availability of approved absorbent material at the construction site and proof of disposal of oil at licensed disposal facilities
5.1.3	**Design Considerations**	Compliance with Requirements and recommendations specified in the Environmental Authorization	• The site must be positioned and designed in accordance with the specific conditions as set out in the Environmental Authorization. • The contractor shall observe all requirements and recommendations specified in the Environmental Authorization with specific reference to the type, height and colour of the mast and equipment.	The proponent and contractor responsible for construction	During planning/ pre-construction phase	Design specifications.	Site Development Plan

Ref #	Project activity/aspect	Environmental Outcome	Management Action	Responsibility	Timing	Records/Indicators	Monitoring Requirements
5.1.4	**Construction Camps / Laydown Areas**	Damage to the environment is avoided or minimised	• The construction camp shall be demarcated by a fence. • Suitable signs shall be erected to clearly demarcate construction camp areas. • Areas outside of the construction camp (that are not part of the property boundary are considered No-Go areas and shall be demarcated as such.	Contractor	Prior to construction	Approved MS indicating the location, preparation and layout of the construction camps and laydown areas	Site Inspections and Audits.
		Clean and well-maintained ablution facilities provided in suitable locations	• Suitable sanitary arrangements (e.g. chemical toilets) at each construction site as per building guidelines (SABS 0400) shall be provided. • One toilet shall be provided for every 15 workers on site. • Toilet/s shall be located where there will be a concentration of labour. • The siting of toilets shall be done in consultation with the Principal Agent or ECO to ensure that they are easily accessible for employees. • Toilets shall not be more than 50 m away from where construction activities are being undertaken. • Toilets shall be secured to the ground, in order to prevent them from blowing over. • Toilets shall be serviced regularly and kept in a neat and tidy state. • Toilets shall be provided with locks and toilet paper shall be provided.	Proponent	Prior to construction	Ablution service records. Incident Reports	Site Inspections and Audits.

Ref #	Project activity/aspect	Environmental Outcome	Management Action	Responsibility	Timing	Records/Indicators	Monitoring Requirements
			• Performing ablutions outside of the toilet facility is strictly prohibited.				
		Effective housekeeping	• Eating areas shall be established in agreement with the Principal Agent. • The Contractor shall provide adequate facilities for his / her staff. • Eating areas shall provide adequate shade. • Refuse bins with lids shall be provided at eating areas. • The eating area shall be cleaned up on a daily basis. • Any cooking on site shall be done using gas cookers. •	Contractor	Prior to and during construction	Principal Agent approval. Clean eating areas.	Site Inspections and Audits.
		Safe supply of drinking water	• Access to clean drinking water shall be provided to employees and visitors. • If water is stored on site, drinking water and multi-purpose water storage facilities shall be clearly distinguished and demarcated.	Contractor	Prior to construction	Clearly marked drinking water storage and supply points	Site Inspections and Audits.
5.1.5	**Materials handling and storage:** Handling	Safe passage of goods between destinations	• The Contractor shall ensure that all sub-contractors, suppliers and their delivery drivers are aware of procedures and restrictions in terms of this EMPr. • The Contractor (and suppliers) shall ensure that all materials are appropriately secured to ensure safe passage between destinations.	Contractor	Daily	Contractor instructions to sub-contractors and suppliers.	Site Inspections and Audits.

Ref #	Project activity/aspect	Environmental Outcome	Management Action	Responsibility	Timing	Records/Indicators	Monitoring Requirements
			• Loads including, but not limited to sand, stone chip, refuse, paper and cement, shall have appropriate cover to prevent them spilling from the vehicle during transit. Where this is not practical, the Contractor shall ensure that construction vehicles are not overfilled. • The Contractor shall be responsible for any clean-up resulting from the failure by his employees or suppliers to properly secure transported materials. • Haul vehicles shall be limited to specific haul routes. • All vehicles shall comply with speed limits. • The dangers associated with the movement of large haulage should be sign-posted in both directions leading up to the construction areas. • The Contractor shall ensure that delivery drivers are supervised during offloading.			Well-secured and covered loads (or no overfilled hauling trucks). Photographs.	
5.1.6	**Materials handling and storage: Storage of hazardous substances**	Effective containment, handling, storage and disposal of hazardous substances	• The Contractor shall prepare an MS for the containment, handling, storage and disposal of hazardous substances. • All hazardous substances (i.e., degreasers, paint cleaners, poisons, etc.) shall be confined to demarcated, adequately bunded areas within the construction camp and stored in suitable containers / storage facilities.	Contractor	Daily	Approved MS for the containment, handling, storage and disposal of hazardous substances. Suitable hazardous substance storage areas.	Site Inspections and Audits.

Ref #	Project activity/aspect	Environmental Outcome	Management Action	Responsibility	Timing	Records/Indicators	Monitoring Requirements
			• Suitable warning signs indicating the nature of the stored materials shall be displayed at the storage facilities or containment structure. • Suitable fire-fighting equipment, to the approval of the Principal Agent, shall be supplied and installed by the Contractor at the hazardous substance storage areas. • The Contractor shall ensure that contaminated rainwater or spillages collecting in hazardous substance storage areas do not enter the environment. This must be collected and suitable disposed of. • The Contractor shall have a copy of the MSDS readily available and ensure that their employees who are required to use such substances are fully conversant with the safe handling precautions, protective equipment to be used and storage precautions to be taken. • All spilled / redundant hazardous substances shall be disposed of at a suitably approved waste management facility. • All hazardous substances containers shall be either disposed of at a suitably approved waste management facility or returned to the supplier			Adequate warning sign and fire-fighting equipment. Emergency response plan (with evidence of municipality consultations) MSDS for all hazardous substances on site. Proof of safe disposal of hazardous substances. Incident Reports. Photographs.	

Ref #	Project activity/aspect	Environmental Outcome	Management Action	Responsibility	Timing	Records/Indicators	Monitoring Requirements
5.1.7	**Materials handling and storage:** Storage / use of equipment	Prevention of the spillage of hazardous substances from equipment	• Drip trays or similar forms of secondary containment shall be provided for stationary plant (such as compressors, pumps, generators, etc.) and for "parked" plant (e.g. hauling trucks, etc.). • All plant, construction equipment, vehicles or other items shall be stored within the construction camp, unless prior arrangements have been made with the Principal Agent or ECO.	Contractor	Daily	Drip trays or similar forms of secondary containment (especially for leaking equipment). Photographs.	Site Inspections and Audits.
5.1.8	**Waste Management:** General waste	Avoidance of the contamination of the environment as a result of waste management	General waste includes inert construction waste (e.g. rubble, packaging, timber, scrap metal, wire, nails, etc.) and office waste (e.g. paper, cardboard, stationary, etc.) and domestic waste (food, packaging, cans, bottles, etc.). • The Contractor shall ensure a Principal Agent-approved MS is in place for management of general waste. The MS shall include a list of general waste streams and the storage, handling and disposal management measures related to each waste stream. • General waste that cannot be recycled shall be disposed of at a suitably licensed waste management facility. • Keep site free of litter.	Contractor	Daily	Approved MS for management of general waste. Proof of suitably licensed waste disposal and recycling facilities used. No litter around site. Presence of suitably designed waste bins.	Site Inspections and Audits. Monthly general waste reconciliation

Ref #	Project activity/aspect	Environmental Outcome	Management Action	Responsibility	Timing	Records/Indicators	Monitoring Requirements
			• At all places of work the Contractor shall provide bins (with lids) of sufficient number and capacity to store general waste produced on a daily basis. The lids shall be kept firmly on the bins at all times. The bins must be clearly marked accordingly to prevent confusion to staff onsite as well as encourage the separation of waste on site for recycling. • All used PPE such as face masks and latex gloves must be correctly stored in a manner that minimises the risk and the spread of Covid-19 to all staff, contractors and visitors to the site. Healthcare risk waste should also be treated or disposed of in the appropriate manner. • Erect signage on-site encouraging workers not to litter, or dump waste and to promote the separation of waste for recycling. • Where practical, food waste should be collected for beneficiation in an appropriate manner. • Bins shall be emptied on a weekly basis or more frequently as required. • Solid waste may be temporarily stored at the construction camp site in a designated area approved by the Principal Agent and ECO prior to collection and disposal. The general waste storage facilities must be designed to prevent windblown waste and ingress of rainwater.			Suitably designed waste storage areas. No signs of on-site waste disposal / burning. Records of general waste types, volumes and disposal sites used. Photographs.	

Ref #	Project activity/aspect	Environmental Outcome	Management Action	Responsibility	Timing	Records/Indicators	Monitoring Requirements
			• An integrated waste management approach shall be used, based on the principles of waste minimisation, reduction, re-use and recycling of materials. Containers for recycling of at least glass, paper, metals and plastics shall be provided at the construction camp. Waste storage containers shall be covered, tip-proof, weatherproof and scavenger proof. • No waste material or litter shall be burnt or buried on site. • All solid waste shall be disposed of off-site at an approved landfill site. The Contractor shall supply the Principal Agent with receipts of disposal. In addition, disposal receipts shall be kept at the site office for inspection by the ECO and any relevant authority.				
5.1.9	**Traffic accommodation**	Safe traffic management	• Vehicle movement shall be limited to the defined access route. • All vehicles shall comply with speed limits. • Erect sufficient signage near the entry point to the site. • Ensure the site has adequate traffic control measures in place at the entrance to the site. • Schedule delivery of construction materials outside of peak morning (6 am to 9 am) and evening (3 pm to 6 pm) traffic times. • The Contractor shall also ensure that adequate vehicular and pedestrian traffic accommodation, signage and safety measures (as appropriate) are put in place on site.	Contractor	Daily	Appropriate safety signage. Photographs.	Site Inspections and Audits.

Ref #	Project activity/aspect	Environmental Outcome	Management Action	Responsibility	Timing	Records/Indicators	Monitoring Requirements
5.1.10	**Cement and concrete batching**	Prevention of the contamination of the environment as a result of batching	• Cement and concrete mixing directly on the ground shall not be allowed and shall take place on impermeable surfaces to the satisfaction of the Principal Agent and ECO. • Unused (full) cement bags shall be stored undercover and away from surface runoff. • Used (empty) cement bags shall be collected and stored in weatherproof containers to prevent wind-blown cement dust and water contamination. • Used cement bags shall not be used for any other purpose and shall be disposed of on a regular basis as general waste (as described above). • All excess concrete shall be removed from site on completion of concrete works and disposed of at a suitably licenced waste facility. • Washing of the excess cement / concrete into the ground shall not be allowed. • All excess aggregate shall also be removed and disposed of as general waste (as described above).	Contractor	Daily	No cement bags lying around. No cement / concrete / aggregate patches after construction. Photographs.	Site Inspections and Audits.
5.1.11	**Fire control**	Effective fire prevention and control	• The Contractor shall ensure a Principal Agent-approved MS is in place for fire prevention and control. • No open fires shall be allowed on site. • The Contractor shall take all reasonable steps to prevent the accidental occurrence or spread of fire.	Contractor	Daily	Approved MS is in place for fire prevention and control. No signs of open fires.	Site Inspections and Audits.

Ref #	Project activity/aspect	Environmental Outcome	Management Action	Responsibility	Timing	Records/Indicators	Monitoring Requirements
			• The Contractor shall appoint fire officers who shall be responsible for ensuring immediate and appropriate action in the event of a fire. • The appointed fire officers shall notify the local Fire and Emergency Service in the event of a veldfire and shall not delay doing so until such time as the fire is beyond his / her control. • The Contractor shall establish a fire-fighting team who shall be suitable trained in controlling fires. • The Contractor shall ensure that all site personnel are aware of the procedure to be followed in the event of a fire. • The Contractor shall ensure that there is adequate fire-fighting equipment on site at all times (which shall include, but not limited to, fire extinguishers, protective clothing and beaters). • Any work that requires the use of fire may only take place at that designated and shielded “hot work” area and as approved by the Principal Agent. Fire-fighting equipment shall be available in these areas. • The Contractor shall ensure that the telephone numbers of the local Fire and Emergency Service are displayed at the site offices, construction camps and laydown areas.			Fire-fighting team appointment and training records. Displayed telephone numbers of the local Fire and Emergency Service. Clearly marked designated smoking points. No cigarette butts discarded on the ground. Photographs.	

Ref #	Project activity/aspect	Environmental Outcome	Management Action	Responsibility	Timing	Records/Indicators	Monitoring Requirements
			• The Contractor shall establish a procedure for communicating with surrounding landowners in the event of a fire. This should include the names and contact details of the relevant landowners, as a as a map showing their properties. • Smoking is not allowed on site, other than at designated smoking points which are clearly marked as such. Cigarette butts shall not be discarded on the ground. • The Contractor shall pay the costs incurred by organisations called to put out fires started by their, or any of their sub-contractor's activities. The Contractor shall also pay the costs incurred to reinstate burnt areas as deemed necessary.				
5.1.12	**Noise control and working hours**	Minimisation of noise disturbance to neighbouring properties	• The Contractor shall be familiar with and adhere to, any local by-laws and regulations regarding the generation of noise and hours of operation. In addition, the provisions of SANS 10103 regarding the generation of noise shall apply to all areas within audible distance of residents whether in urban, peri-urban or rural areas. • The Contractor shall endeavour to keep noise-generating activities to a minimum, particularly during night-time work.	Contractor	Ad hoc	Procedure for recording and managing external grievance / complaints, and complaints register. Agreements with the Principal Agent and local authority (as required).	Site Inspections and Audits. Noise monitoring in accordance with SANS 10103 (when noise-related complaints have been received).

Ref #	Project activity/aspect	Environmental Outcome	Management Action	Responsibility	Timing	Records/Indicators	Monitoring Requirements
			• Implement a procedure for recording and managing external grievance / complaints. Noise monitoring shall be conducted when a noise-related complaint has been received, after consultation and agreement with the Principal Agent and ECO. Actions shall be identified as required. • No high noise-generating activity outside of normal hours, regardless of its proximity to residences, can take place without application to the Principal Agent for approval. The application must include proposed noise containment measures. High noise-generating activities include for example pile driving, grinding, road material loading / unloading, hammering, excavating, etc. • The Contractor shall restrict all operations that result in high noise disturbance to the local community to daylight working hours on weekdays or as otherwise agreed with the Principal Agent and local authority. • Ensure vehicles and equipment are maintained and in good working order. • Should a generator be deployed such generator shall comply with the maximum noise levels as stipulated in the Noise Control Regulations published under the Environment Conservation Act,1989 (Act No 73 of 1989)				
5.1.13	**Dust control**	Minimisation of dust.	• Minimise dust generation by implementing a dust control programme (e.g. wetting of areas being disturbed).	Contractor	Daily	No excessive dust generation.	Site Inspections and Audits.

Ref #	Project activity/aspect	Environmental Outcome	Management Action	Responsibility	Timing	Records/Indicators	Monitoring Requirements
			• The dust control programme shall include the following measures: ○ Limit stockpile heights to 2 m and protect exposed soils and materials against wind. ○ Ensure that a water truck is readily available, and that exposed areas and material stockpiles are adequately protected against the wind (e.g. wetting exposed soil / gravel areas during windy conditions, covering of material stockpiles with hessian, etc.). ○ The location of stockpiles shall take into consideration the prevailing wind directions and locations of sensitive receptors (e.g. crops, businesses and houses). ○ Implement a procedure for recording and managing external grievance / complaints. Dust monitoring shall be conducted when dust-related complaints have been received, after consultation and agreement with the Principal Agent and ECO. Actions shall be identified as required. ○ Ensure compliance with the National Dust Control Regulations, 2013 and the dust-fall rates specified therein. ○ Construction vehicles shall comply with speed limits and haul distances shall be minimised. ○ Material loads shall be suitably covered during transportation. Where this is not			Adequately protected exposed areas and material stockpiles. Procedure for recording and managing external grievance / complaints, and register. Photographs.	Dust monitoring in accordance with the National Dust Control Regulations, 2013 (when dust-related complaints have been received).

Ref #	Project activity/aspect	Environmental Outcome	Management Action	Responsibility	Timing	Records/Indicators	Monitoring Requirements
			practical (e.g. hauling material from cut to fill), the Contractor shall ensure that construction vehicles are not overfilled. ○ Appropriate dust suppression measures, to the satisfaction of the Principal Agent, shall be used when dust generation is unavoidable, particularly during prolonged periods of dry, windy weather. Such measures may include the use of temporary stabilising measures (e.g. chemical soil binders, straw, brush packs, chipping etc.).				
5.1.14	**Cultural heritage**	Minimisation / prevention of impacts on cultural heritage resources	• The Contractor shall be on the alert for the uncovering of human remains, fossil bone, archaeological implements and fossil plant / peaty material. ○ Monitoring for fossil material by the ECO is required during construction. The frequency and duration of such monitoring by the ECO will be in accordance with those set out in Section 4.1.1 above. Details of this monitoring must be included in the relevant ECO close-out report which must be submitted to SAHRA ○ Should any possible fossils and / or archaeological finds be uncovered, work must cease in the area and the Principal Agent and ECO shall be notified immediately, as well as, the SAHRA.	Contractor	Ongoing	Photographs.	Site Inspections and Audits.

Ref #	Project activity/aspect	Environmental Outcome	Management Action	Responsibility	Timing	Records/Indicators	Monitoring Requirements
5.1.15	**Herbicides and Insecticides**	Use of herbicides and insecticides to protect the installations	Should it be necessary to make use of herbicides and insecticides to protect the installations, the application of such chemicals shall be restricted to the base station site. The application of the herbicides and insecticides shall be done in accordance with the stipulations of The Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act No 36 of 1947. The contractor applying any herbicides and insecticides shall be in possession of a Pest Control Operator (PCO) license. The application of the chemicals shall not exceed the prescribed dosage for the specific product used. In all instances the application of the herbicides and insecticides should be of such nature that it will not cause any environmental harm.	Contractor	Ad hoc	Herbicides and Insecticides records register to be kept on site.	Site Inspections and Audits.
5.1.16	**Construction camp**: Lights	Minimisation / avoidance of disturbance to road traffic and surrounding community.	• Installed lighting for site activities shall not interfere with road traffic or cause a reasonably avoidable disturbance to the surrounding community. • Implement a procedure for recording and managing external grievance / complaints	Contractor.	Ongoing	External grievance/ complaints procedure and register.	Site Inspections and Audits.

Ref #	Project activity/aspect	Environmental Outcome	Management Action	Responsibility	Timing	Records/Indicators	Monitoring Requirements
5.1.17	**Site demarcation and No-Go areas**	Prevention of access to No-Go area.	• No-Go areas shall be clearly demarcated prior to the commencement of construction activities. • A photographic record of all construction areas before, during and after construction shall be kept. • All property outside of designated construction areas is to be considered as No-Go areas. • The Contractor shall ensure that his / her staff do not enter properties adjacent to the construction areas under any circumstances except for official business. • The Contractor shall maintain in good order all demarcation fencing and barriers for the duration of construction activities, or as otherwise instructed. The method of site demarcation must be practical and effective. • Entry into No-Go areas without the Principal Agent ’s permission will result in a penalty • The Contractor shall be responsible for any clean-up and / or rehabilitation of all areas impacted outside designated construction areas. • The Contractor shall be responsible for any clean-up and / or rehabilitation of all areas impacted outside designated construction areas.	Contractor	Ongoing	Clear demarcations of construction areas and No-Go areas. Photographs.	Site Inspections and Audits.

Ref #	Project activity/aspect	Environmental Outcome	Management Action	Responsibility	Timing	Records/Indicators	Monitoring Requirements
5.1.18	**Priming and Painting**		• Care shall be taken by the contractor to avoid the spillage of painting and solvent material on site. • Adequate containers for cleaning of equipment and for the storage of waste products must be provided • and all waste products resulting from the painting operation must be entirely removed from the site by the contractor	Contractor	Construction phase/ Operational phase	Priming and Painting register to be kept on site	Site Inspections and Audits.
5.1.19	**Waste from Electrical Connections**	Avoidance of the contamination of the environment as a result of waste from electrical connections	• All waste products resulting from electrical connections must be removed from the site by the contractor.	Contractor	Construction phase	Approved MS for management of general waste. Proof of suitably licensed waste disposal and recycling facilities used. No litter around site. Presence of suitably designed waste bins. Suitably designed waste storage areas.	Site Inspections and Audits. Monthly electrical waste reconciliation

Ref #	Project activity/aspect	Environmental Outcome	Management Action	Responsibility	Timing	Records/Indicators	Monitoring Requirements
5.1.20	**Visual**	Limit visual impact of the radio mast	• Naked light sources must not be visible outside of the development footprint. • Light sources must be shielded to prevent "light spillage". • Shielded down-lights to be used in open public areas. • The contractor shall comply with the visual requirements of the Environmental Authorisation. • The contractor shall ensure that the visual impact of the construction activities is minimised. • Due to the fact that the infrastructure in question will be a 30m high mast. • The mast will be a lattice mast and one can look "through" it. This will assist to lessen the visual impact. The proponent will implement elements of good visual design. The mast will remain galvanised.	Contractor	Construction phase	Complaints register	Site Inspections and Audits.

6. APPENDICES

APPENDIX A: CURRICULUM VITAE OF THE PROJECT TEAM

CURRICULUM VITAE

STUART HEATHER-CLARK

TECHNICAL DIRECTOR
AFRICA POWER SECTOR LEAD

Environmental Management Planning & Approvals, Africa

QUALIFICATIONS

Masters	1996	Environmental Science
BSc (Hons)	1992	Civil Engineering

EXPERTISE

- Environmental and Social Impact Assessment
- Environmental Management Plans/Programmes
- Public Participation & Facilitation
- Environmental & Social Due Diligence
- Environmental & Social Screening & Site Selection
- Training and Capacity Building
- Strategic Environmental Assessment

Stuart has over 24 years of environmental and social consulting experience in Africa. Having worked on over 100 development projects in Africa, his key strength is identifying and managing ESG risks for major capital projects from the concept phase through to the pre-feasibility, feasibility and implementation phases.

Through leading Environmental & Social Screening Studies, Environmental & Social Impact Assessments and Environmental & Social Due Diligences for major capital project in over 13 African countries; Stuart has developed a deep appreciation of key sustainability challenges facing development in Africa. He has excellent project management skills with the ability to manage projects from the concept phase through to project completion.

Stuart has worked for and with a number of IFI's, DFI's and PE firms to identify and managing ESG risks of their investments in Africa. He has an integral knowledge of the Equator Principles and IFC Performance Standards and understands the expectations of lenders and financial institutions when it comes to managing ESG risks.

Stuart has worked across various sectors including O&G, mining, infrastructure and power. Over the past eight years he has focussed on the power sector leading projects for wind farms, solar PV plants, hydropower plants and gas to power plants. He has an integral understanding of the Independent Power Producers (IPP) process in South Africa and several other African counties.

PROJECTS

	All projects
Environmental and Social Impact Assessment for a 20MW solar PV plant and transmission line, Gigawatt Global, Liberia, (2020)	Project Director for the ESIA a 20MW solar PV plant and associated transmission line. The ESIA includes biodiversity, social and heritage baseline studies, stakeholder engagement and compilation of an ESIA Report and ESMP. The ESIA will be aligned with the IFC Performance Standards.
ESIA for an 80-200 MW wind farm development, Mphepo Power, Zambia (2019-20)	Project Director for the ESIA for the development of a wind farm in Zambia. The ESIA included terrestrial and aquatic, social, heritage, noise and visual baseline studies, stakeholder engagement and compilation of an ESIA Report and ESMP. The ESIA was aligned with the IFC Performance Standards.

Environmental and Social Impact Assessment for a Road Upgrade, QGMI, Ghana, (2019-20)	Project Director for the Scoping Phase of the Environmental and Social Impact Assessment process for the proposed Winneba Obetsebi-Lamptey Flyover (Phase 2) project in Accra, Ghana in collaboration with local consultants. The project included additional visual impact assessment, air quality modelling and noise modelling. All work undertaken to IFC Performance Standards.
Environmental and Social Impact Assessment (ESIA) for the Gamsberg Mine Zinc Smelter, Black Mountain Mine (Vedanta), South Africa (2019-20)	Project Director for the ESIA for a new zinc smelter and associated infrastructure to beneficiate the 250 000 to 300 000 tpa of zinc concentrate produced at the Gamsberg Zinc Mine Phase-1 concentrator plant. The ESIA included extensive baseline studies including biodiversity, social, air quality, noise, visual, hydrology, geohydrology, and climate change. The process included extensive stakeholder engagement during the scoping and impact assessment phase.
ESIA Scoping Phase for the desalination plant and water carrier system, NamWater, Windhoek Namibia (2019-20)	Team member for the ESIA Scoping Phase for the proposed desalination plant and water carriage system to secure water supply to the central coast, Windhoek and en-route users. The Scoping Process included extensive stakeholder engagement and the Scoping Report was aligned with the KfW Sustainability Guidelines and World Bank Environmental and Social Standards.
Environmental & Social Due Diligence for 5MW solar PV plant, Confidential Client, Namibia (2019)	Project Director for an Environmental and Social (E&S) Due Diligence (Red Flags only) of a 5 MW solar PV facility located near Outapi, Namibia.
Environmental & Social Screening Study for 20MW solar PV plant, CIGenCo, Eswatini (2019)	Project Director for an Environmental and Social (E&S) Screening Study of two potential sites for development of solar PV projects as part of CIGenCo's bid as part of the Eswatini Independent Power Producers Policy (ESIPPP).
Permitting Strategy and Planning for the Rovuma LNG Project in Mozambique, ExxonMobil, Mozambique (2018-2019)	Team member supporting Exxon with the permitting strategy and plans for the Rovuma LNG Project in northern Mozambique.
Environmental and Social Impact Assessment (ESIA) Gap Analysis for a 50MW solar PV Plant, Volt Renewable, Zimbabwe (2018)	Environmental lead for the review of the locally approved EIA against the IFC Performance Standards. Gaps were identified and an Environmental and Social Action Plan (ESAP) developed to close the gaps.
Environmental and Social Impact Assessment (ESIA) Gap Analysis for a 5-star hotel development, Motal-Engil, Zimbabwe (2018)	Environmental lead for the review of the locally approved EIA against the IFC Performance Standards. Gaps were identified and an Environmental and Social Action Plan (ESAP) developed to close the gaps.

Environmental and Social Screening Study for a 100MW hybrid HFO and Solar PV Power Plant for a mine in Mali, Confidential client (2018)	Environmental lead for the screening of environmental and social risks for the development of a solar PV plant on a mine in Mali.
Environmental and Social Screening Study for 3 x 40MW solar PV plants, Confidential Client, GETFiT Zambia (2018)	Project Manager for an environmental and social screening study for 3 x solar PV sites in Zambia. The Screening Study included the review of desk top information and site visits to assess environmental and social risks. A comparative analysis was undertaken to select the site with the least environmental and social risks. This was combined with the technical analysis to select the preferred site to be taken into more detailed studies.
Environmental and Social Impact Assessment for a 40MW solar PV farm, Enel Green Power, South Africa (2017)	Project Director for an Environmental and Social Impact Assessment for a 40MW solar PV plant in South Africa. The study included scoping and stakeholder engagement, various specialist studies and the compilation of an ESIA Report and ESMP.
Environmental and Social Impact Assessment for 2 run-of-river Hydropower Plants and associated transmission lines in Northern Zambia, Globeleq, Zambia (2017)	Project Director for an Environmental and Social Impact Assessment for 2 run-of-river hydropower plants and associated transmission lines on the Kalungwishi River in Northern Zambia. The study included scoping and stakeholder engagement, various specialist studies including environmental flow, heritage, social, biodiversity, visual, noise and other studies. All work was undertaken to IFC Performance Standards. The project was put on hold after the baseline and Scoping Phase.
Environmental and Social Screening Study for an 212MW HFO Power Plant, Confidential Client, Angola (2017)	Project Director for an Environmental and Social Screening Study for a 212MW HFO Power Plant in Angola. The study included noise and air quality baseline sampling, soil and groundwater baseline sampling, community health screening, and the compilation of a detail legal register and compliance road map.
Environmental and Social Screening Study for a Hydropower Plant in Gabon, Confidential Client, Gabon (2017)	Environmental and Social Screening Study for a Hydropower Plant in Gabon, Confidential Client, Gabon, 2017
Environmental and Social Due Diligence (ESDD) for two Solar PV and two Wind Farm Projects South Africa, Confidential Client, South Africa (2017)	Project Director for the ESDD for two Solar PV and two Wind Farm Projects in South Africa.
Environmental, Health and Safety Risk assessment of four Solar PV sites in South Africa, Enel Green Power, South Africa (2017)	Project Director for the EHS Risk Assessments.
Environmental and Social Impact Assessment for a 100MW to 250MW solar PV Plant, Globeleq, Zambia (2016-17)	Project Director for an Environmental and Social Impact Assessment for a 100MW to 250MW solar PV plant in Zambia. The study included the analysis of key environmental and social impacts, compilation of an ESIA and ESMP reports and stakeholder engagement.

Environmental and Social Screening Study for a solar PV Plant, Confidential client, Zambia (2016)	Project Director for an Environmental and Social Screening Study for the establishment of solar PV power plant in Zambia. The study included the analysis of key environmental and social risks including regulatory, biodiversity and social risks.
Environmental and Social Due Diligence, Six Solar PV Farms, Confidential Client, South Africa (2016)	Project Director for an ESDD for six solar pv farms is South Africa. The ESDD was undertaken against SA Legislation and Regulations and IFC Performance Standards.
Environmental and Social Impact Assessment for a CCGT Power Plant, ArcelorMittal, South Africa (2016)	Project Director for an Environmental and Social Impact Assessment study for the establishment of a CCGT power plant for ArcelorMittal in Saldanha Bay, South Africa. The ESIA includes detailed specialist studies including air emissions modelling, noise modelling, biodiversity and heritage assessment. Full stakeholder engagement is also part of the scope of work.
Environmental and Social Management Plans, Wind Farm Development, Confidential Client, Kenya (2016)	Project Director and involved in advising the client on various strategies including vantage point bird monitoring and management plan development.
Environmental and Social Screening Study of potential solar PV sites, Confidential Client, Ivory Coast (2016)	Environmental and Social Screening Study of potential solar PV sites, Confidential Client, Ivory Coast, 2016
Environmental and Social Impact Assessment for the Tete-Macuse Railway Line and Macuse Power Development, Italthai, Mozambique (2015-17)	Project Director for the Environmental and Social Impact Assessment (ESIA) for the proposed Tete-Macuse railway line and Macuse Port development for the export of coal from Tete Province in Mozambique. The project included the development of over 700km of railway line and a new port development.
Strategic Environmental Assessment for the supporting infrastructure for the Baynes Hydropower Project, Baynes PJTC, Namibia/Angola (2014-15)	Project Director for the Strategic Environmental Assessment of the associated infrastructure for the Baynes hydropower project. The SEA covered the assessment of access roads for construction, transmission lines routing in Angola and Namibia and locations of an airfield.
Cumulative Impact Assessment of the development of numerous hydropower plants on the Kwanza River, Odebrecht, Angola (2014-15)	Project Director for the Cumulative Impact Assessment of the development of a number of hydropower plants on the Cuanza River in Angola.
Environmental and Social Impact Assessment for the Batoka Gorge Hydropower Project, ZRA, Zambia/Zimbabwe (2014-15)	Advisor to the ESIA team undertaking the Environmental and Social Impact Assessment (ESIA) for the proposed Batoka Gorge Hydropower Plant on the Zambezi River below the Victoria Falls. The project includes the construction of a dam wall, hydropower plants, transmission lines and associated infrastructure. The ESIA is being conducted in alignment with the IFC Performance Standards and the World Bank Safeguard Policies.
Environmental and Social Impact Assessment for the Rehabilitation of the Kariba Dam Wall, ZRA, Zambia/Zimbabwe (2014-15)	Project Director for the Environmental and Social Impact Assessment (ESIA) for the proposed Kariba Dam Rehabilitation Project. The project includes the rehabilitation of the plunge pool and spillway of the dam wall. The project is being funded by the World Bank, African Development Bank and the EU.

Environmental and Social Due Diligence (ESDD) for a 98 MW wind farm in South Africa, Confidential Client, South Africa (2015)	Project Director for the ESDD.
Environmental and Social Due Diligence (ESDD) for a 2 x 75 MW solar pv farm in South Africa, Confidential Client, South Africa (2015)	Project Director for the ESDD.
Environmental and Social Due Diligence (ESDD) for a 74 MW wind farm in South Africa, Confidential Client (2015)	Project Director for the ESDD.
Environmental and Social Screening Study for a CCGT Power Plant, Confidential Client, South Africa (2015)	Project Director for an Environmental and Social Screening study for the establishment of a gas power plant in Saldanha Bay, South Africa. The screening study outputs included a permitting strategy, environmental opportunities and constraints maps, and input into the site selection process.
Environmental and Social Impact Assessment for Floating Power Plants in the Port of Richards Bay, Department of Energy IPP Office, South Africa (2015-16)	Project Director for the ESIA for the establishment of Floating Power Plants in the Ports of Richards Bay in South Africa. The ESIA includes detailed specialist studies including marine outfall modelling, air emissions modelling and marine ecology studies. Full stakeholder engagement is also part of the scope of work.
Environmental and Social Impact Assessment for Floating Power Plants in the Port of Richards Bay, Department of Energy IPP Office, South Africa, (2015-16)	Project Director for the ESIA for the establishment of Floating Power Plants in the Ports of Saldanha in South Africa. The ESIA includes detailed specialist studies including marine outfall modelling, air emissions modelling and marine ecology studies. Full stakeholder engagement is also part of the scope of work.
Environmental and Social Impact Assessment for LNG Import Terminal in the Port Richards Bay for the Gas to Power Programme, Department of Energy IPP Office, South Africa (2015-16)	Project Director for the ESIA for the establishment of LNG Import Terminals as part of the DoE's Gas to Power Programme in South Africa. The ESIA includes detailed specialist studies including marine outfall modelling, air emissions modelling and marine ecology studies. Full stakeholder engagement is also part of the scope of work.
Environmental and Social Impact Assessment for LNG Import Terminal in the Port Saldanha for the Gas to Power Programme, Department of Energy IPP Office, South Africa, (2015-16)	Project Director for the ESIA for the establishment of LNG Import Terminals as part of the DoE's Gas to Power Programme in South Africa. The ESIA includes detailed specialist studies including marine outfall modelling, air emissions modelling and marine ecology studies. Full stakeholder engagement is also part of the scope of work.
Environmental and Social Screening study for the establishment of an CCGT power plant in the Ports of Richards Bay, Confidential client, South Africa (2015)	Project Director for an Environmental and Social Screening Study for the establishment of a CCGT power plant in Richards Bay, South Africa. The study included the analysis of key environmental and social risks including air emissions, effluent emissions, biodiversity (terrestrial and marine) and social issues. The assessment applies to the power plant site, transmission line routing and pipeline routing and compares the opportunities and constraints associated with the two locations.

Environmental and Social Screening study for the establishment of an CCGT power plant in the Port of Saldanha, Confidential client, South Africa (2015)	Project Director for an Environmental and Social Screening Study for the establishment of a CCGT power plant in Saldanha Bay, South Africa. The study included the analysis of key environmental and social risks including air emissions, effluent emissions, biodiversity (terrestrial and marine) and social issues. The assessment applies to the power plant site, transmission line routing and pipeline routing and compares the opportunities and constraints associated with the two locations.
Environmental and Social Screening study for the establishment of an SCGT power plant in the Ports of Saldanha, Confidential client, South Africa (2015)	Project Director for an Environmental and Social Screening Study for the establishment of an SCGT power plant in the Port of Saldanha. The study included the analysis of key environmental and social risks including air emissions, effluent emissions, biodiversity (terrestrial and marine) and social issues. The assessment applies to the power plant site, transmission line routing and pipeline routing.
Environmental and Social Impact Assessment for the Burgan Oil Fuel Storage Deport in the Port of Cape Town, Burgan Oil, South Africa (2014-15)	Project Director for the ESIA for the Burgan Oil Fuel Storage Deport in the Port of Cape Town.
Millennium Challenge Account – Malawi: Infrastructure Development Project – Energy Sector (hydropower plants, transmission and distribution lines and substations), MCC, Malawi (2014-15)	Environmental Lead for the Independent Engineer to review all the Contracting Engineers environmental and social studies associated with the Infrastructure Development Project. The project includes the upgrade and development of new power infrastructure including hydropower plants, transmission lines, distribution lines and substations.
Strategic Environmental Assessment of the New Town Integrated Development Zone, TFM Mining, Katanga Province, DRC (2014)	Project Director for the Strategic Environmental Assessment of the New Town Integrated Development Zone undertaken for Tenke Fungurume Mining (TFM) in Katanga Province, DRC.
Environmental and Social Impact Assessment (ESIA) for the Gamsberg Zinc Mine, South Africa, Black Mountain Mine (Vedanta) (2012-13)	Project Director for the Environmental and Social Impact Assessment for a new Zinc Mine in the Northern Cape Province in South Africa. The ESIA includes the assessment of the mine and all associated infrastructure including waste rock dumps, tailing dams, processing plant, transmission lines, a new township development, upgrade of a water pipeline and associated water treatment facilities, and transport options to the Port of Saldanha via both road and rail. The ESIA is being undertaken as an integrative process to meet various environmental legal requirements including National Environmental Management Act (NEMA): EIA Regulations, NEM: Waste Act, NEM: Air Quality Act, NEM: Biodiversity Act, National Heritage Resource Act, National Water Act and the Minerals Petroleum Resources Development Act. The process includes various specialist studies, full stakeholder engagement as well as integration with a Biodiversity Off-sets process.
Environmental and Social Impact Assessment for the Expansion of Transnet's existing Manganese Ore Export Railway Line and Associated Infrastructure, South Africa (2012)	Project Director for the ESIA for the Expansion of Transnet's existing Manganese Ore Export Railway Line and Associated Infrastructure in the Northern and Eastern Cape, South Africa.

Ore Line Expansion Project for the Sishen-Saldanha Ore Line and Port of Saldanha, various Mining Companies and Transnet, South Africa (2011-2012)	Project Director for the Environmental and Social Screening Study for the Pre-feasibility Phase of the Ore Line Expansion Project. This included compiling a detail Environmental and Social Design Criteria Report together with initial Stakeholder Engagement. A detailed multi-criteria assessment for various port and stockpile options was undertaken. The project included upgrading over a 1000 km of railway line and upgrading the port facilities including stockpiles, stacker-reclaimers, conveyors and ship loading facilities. The stakeholder engagement process was specifically designed to obtain buy-in from stakeholder who were strongly opposed some components of the port and rail expansion.
Strategic Environmental Assessment for the Mozambican Regional Gateway Programme, MRGP, Mozambique, Malawi, Zambia, Zimbabwe (2012)	Project Director for the SEA of the MRGP. The MRGP aims to support the improvement of the Southern African transport (roads, rail and ports), regional infrastructure network, which uses Mozambique as a gateway for international trade. The MRGP geographic scope encompasses the Beira and Nacala Transport Corridors and the respective links to the Maputo and Limpopo Corridors. The SEA identified environmental and social issues that need to be considered in the long terms planning an implementation of the rail and port infrastructure that makes up the Beira and Nacala Transport Corridors.
Strategic Environmental Assessment (SEA) for the coastline of Mozambique, MICOA, Mozambique (2012)	Adviser on the SEA for the coast of Mozambique. The SEA aims to identify potential conflicts between various uses of the coastal zone and to recommend strategic interventions to facilitate sustainable development within the coastal zone. Various users of the coastal zone that are being considered include off-shore oil and gas operations, coastal mining, tourism, conservation and artisanal and industrial fishing.
Environmental and Social Screening Study for port options in Pemba Bay, Anadarko, Mozambique (2012)	Project Lead for an Environmental and Social Screening Study for various port options in Pemba Bay. The screening study includes a multi-criteria assessment of various port locations taking into account marine and terrestrial ecology, social issues, land ownership, legal aspects and physical marine conditions.
Environmental and Social Impact Assessment for a LPG import and distribution facility, Sunrise Energy, South Africa (2011-2012)	Project Director for the Scoping/EIA for a LPG importation, storage and distribution facility which includes a marine offloading facility in Saldanha Bay, a pipeline and a storage facility. The environmental permitting process required the liaison with local and provincial environmental authorities, co-ordination of specialist studies, public participation and impact assessment.
Environmental and Social Screening Study for a Mine development in Angola, Confidential Client, Angola (2011-2012)	Project Director for the Environmental and Social Screening Study for the Concept Phase for a new mine development in Angola. The study included identifying environmental and social risks to the project and costing a full ESIA according to IFC Performance Standards and Equator Principles.
Equator Principles and IFC Performance Standards Training, Vedanta Resources Plc, Zambia (2012)	Lead facilitator of a 5-day training course on the implementation of the Equator Principles and IFC Performance Standards for a number of Vedanta's mining operations across Southern Africa, Europe and Australia.
Environmental and Social Impact Assessment for the upgrade of the Principe Airport, HBD, Principe (2011-2012)	Project Director for the Environmental and Social Impact Assessment for the upgrade of the airport in Principe.
EIA for a 380MW renewable energy facility north of Touwsrivier in the Western Cape (2010-2011)	Project Director for the Scoping/EIA for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process required liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.

EIA for a 170MW renewable energy facility east of Touwsrivier in the Western Cape (2010-2011)	Project Director for the Scoping/EIA for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process required liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.
EIA for a 670MW renewable energy facility south of Sutherland in the Western and Northern Cape (2010-2011)	Project Director for the Scoping/EIA for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process requires the liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.
EIA for a 500MW renewable energy facility south of Beaufort West in the Western Cape (2010-2011)	Project Director for the Scoping/EIA for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process required liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.
EIA for a 120MW renewable energy facility south east of Victoria West in the Northern Cape (2010-2011)	Project Director for the Scoping/EIA for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process required liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.
EIA for a 225MW wind farm in the Richtersveld, Western Cape (2011)	Project Director for the Scoping/EIA for a proposed wind farm. The environmental permitting process required liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.
EIA for a 750MW wind farm in the Roggeveld, Western Cape and Northern Cape (2011) **Director**	Project Director for the Scoping/EIA for a proposed wind farm. The environmental permitting process required liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.
EIA for a 225MW renewable energy facility between Vredenburg and Velddrif in the in the Western Cape (2010-2011)	Project Director for the Scoping/EIA for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process required liaison with local, provincial and national environmental authorities, co-ordination of specialist studies, public participation and impact assessment.
Environmental and Social Impact Assessment for the Lesotho Highland 150 MW Wind Power Project, Breeze Power, Lesotho (2011)	Project Director for the Scoping Phase of the Environmental and Social Impact Assessment for a 150MW wind farm development in Lesotho. The Scoping Phase included the analysis of available information to identify key environmental and social risks associated with the siting of the wind farm.
Environmental Screening Study for a Wind Farm Development in the Southern Cape, South Africa (2011)	Project Director for the Environmental Screening Study for a wind farm development in the Southern Cape.
Environmental and Social Due Diligence for a Wind Farm Development in Coega, Electrawinds, South Africa (2011)	Project Director for the Environmental and Social Due Diligence for a wind farm development in the Coega.

Environmental and Social Impact Assessment for Venetia Diamond Mine, De Beers, South Africa (2011)	Project Director for the Scoping and ESIA for the proposed new underground mine and EMP consolidation for existing mining activities. The ESIA was undertaken as an integrative process to meet various environmental legal requirements including National Environmental Management Act (NEMA): EIA Regulations, NEM: Waste Act, NEM: Air Quality Act, NEM: Biodiversity Act, National Heritage Resource Act, National Water Act and the Minerals Petroleum Resources Development Act.
Environmental and Social Impact Assessment for a river barging project on the Zambezi River, Riversdale Mining, Mozambique (2010-2011)	Project Director for the project which includes the assessment of environmental and social impacts associated with dredging over 500km of the Zambezi River. The project includes full stakeholder engagement, coordination of various specialist studies with extensive field work and the integration of all information into an ESIA report and ESMP.
EIA for two solar PV plant development, South Africa (2010)	Project Director of the EIA for the development of two solar PV plants in the Northern Cape and Free State Provinces of South Africa. ERM undertook the required studies to obtain environmental approval for these developments, including specialist studies such as landscape and visual and cultural heritage assessments, and stakeholder engagement.
Basic Assessment for the installation of wind measuring masts on six sites in the Western Cape and two sites in the Northern Cape (2010)	Project Director for the Basic Assessments to install wind measuring masts at eight sites in South Africa. The scope of work included the submission of the application, public participation, preparation of an EMP and submission of the Basic Assessment report.
EIA for a 100MW renewable energy facility north of Velddrif in the in the Western Cape (2010)	Project Director for the Scoping process for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process required the liaison with local, provincial and national environmental authorities, co-ordination of specialist studies and public participation.
EIA for a 300MW renewable energy facility east of Lambert's Bay in the Western Cape (2010)	Project Director for the Scoping process for a proposed renewable energy facility incorporating wind and photovoltaic power generating technologies. The environmental permitting process required liaison with local, provincial and national environmental authorities, co-ordination of specialist studies and public participation.
External adviser and reviewer for an ESIA for a wind farm development in the Eastern Cape, Confidential Client, South Africa (2010)	Adviser and reviewer for an EIA for the development of a wind farm in the Eastern Cape.
Environmental Advisor Environmental and Social Impact Assessment for the Mphanda Nkuwa Hydropower Project in Mozambique (2010)	Advisor for the ESIA for the Mphanda Nkuwa Hydropower Project in Mozambique. The core service was to advise the project team on international standards such as the IFC Performance Standards and World Commission on Dams.
Environmental Sensitivity Study of the Durban Airport Site Expansion Project , South Africa, Transnet (2010)	Project Director for the Environmental Sensitivity Study for the proposed dig-out port currently being considered by Transnet at the Durban International Airport Site. The aim of this assessment was to determine the biophysical, natural and social opportunities and constraints to the development of the dig-out port, as well as provide a strategic overview of the environmental context of the site. In addition, the sensitivity study provided strategic guidance in terms of the environmental due process and licensing requirements with respect to the National Environmental Management Act, and associated legislation.

ESIA for a new high voltage overhead transmission power line in Cameroon, AES Sonel, Cameroon (2007- 2009)	Project Director for the Environmental and Social Impact Assessment and a full Resettlement Action Plan for a new electricity distribution project, comprising a 113km overhead power line, for AES Sonel. As Project Director, Mr Heather-Clark was responsible for client liaison, quality control and final review of all reports.
Advisor to the Environmental and Social Impact Assessment for the Baynes Hydropower Project in Namibia and Angola (2009)	Project Advisor for the Environmental and Social Impact Assessment for the proposed Baynes Hydropower Project on the Kunene River. The ESHIA process is being conducted in accordance to the Angolan EIA Regulations, the Namibian EIA Regulations, the World Bank Safeguard Policies and the IFC performance standards.
Environmental and Social Impact Assessment for the upgrade of a 1100 km railway line in South Africa, Transnet (2008- 2009)	Project Director for the Environmental and Social Impact Assessment for the upgrade of a commodities railway line across South Africa. The project included a number of specialist studies, managing subcontractors, interfacing with the railway engineering team, report writing, managing an extensive stakeholder consultation process, client liaison and management of project finances.
Environmental and Social Impact Assessment for the services corridor associated with the development of a greenfield CTL Plant, Sasol, South Africa (2009)	Project Director for an ESIA of a services corridor to support the development of a greenfield CTL plant development in South Africa. The ESHIA process was conducted in accordance to the South African EIA Regulations and the IFC performance standards.
Environmental and Social Impact Assessment for 2D seismic exploration project in the Rovuma Basin, Petronas, Mozambique (2009)	Project Director for the ESIA for the offshore seismic exploration activities in Blocks 3 & 6, situated in the Rovuma Basin off the coast of Mozambique. The exploration activities comprise 2D seismic surveys in deepwater.
Environmental and Social Screening Study for a river barging project on the Zambezi River, Riversdale Mining, Mozambique (2009)	Project Director for the project which included the assessment of environmental and social risks associated with dredging over 500km of the Zambezi River. The project included reviewing existing information, mapping key sensitivities and facilitating a specialist workshop in order to develop Terms of Reference for detailed baseline studies that will be required should the project proceed to a full ESIA.
Equator Principled and IFC Performance Standards Review and Training, African Housing Solutions, South Africa (2009)	Lead reviewer for the ESIA and Resettlement Policy Framework, for a housing development in Nigeria, against the Equator Principles and IFC Performance Standards. Mr Heather-Clark was responsible for reviewing the ESIA Report and for presenting a 2 ½ day training course on the Equator Principles and IFC Performance Standards.
Environmental Assessment for the dredging and disposal of dredge spoil at the Port of Saldanha, Transnet, South Africa (2008)	Project Director for this project and was responsible for guidance of technical studies which included dredging studies and marine sediment contamination characterization. The study included the assessment of dredge spoil dumping alternatives. Stakeholder engagement included an important component of the project.
Environmental and Social Screening Study, Port of Saldanha, Transnet, South Africa (2008)	Project Director for the screening study which included an assessment of alternative berth options for the export of iron ore at the iron ore terminal at the Port of Saldanha, South Africa. The work included ongoing interaction with the port engineering and design teams, together with stakeholder engagement.

ESIA for an Early Production System (EPS) and Power Plant for Kaiso-Tonya Area, Exploration Area 2, Tullow Uganda Operations Pty Ltd, Uganda (2007-08)	Project Director for the project which included a full ESIA for an Early Production System and associated Power Plant in the Kaiso-Tonya area on the banks of Lake Albert, Uganda. The intent of the project is to produce oil (and small amounts of gas) which will be converted into electrical power and distillate products (kerosene and diesel) for consumption within Uganda. The electrical power will be fed into the main grid supplementing the Ugandan electrical power grid while the distilled products (diesel and kerosene) will be used to displace the currently imported fuels. The ESIA included a detailed assessment of alternative sites for the proposed EPS and power plant, together with various environmental and social baseline studies and stakeholder engagement.
ESIA monitoring studies for Sasol's Off-shore gas exploration activities in Inhambane and Sofala Provinces, Mozambique, Sasol Petroleum Sofala & Empresa Nacional de Hidrocarbonetos (2007-08)	Project Director for an environmental monitoring survey programme for Sasol's offshore hydrocarbon exploration activities. Monitoring studies included seismic noise modelling and monitoring, dugong surveys, artisanal fish catch monitoring, coral reef surveys and monitoring, sea turtle monitoring and tourism monitoring.
Strategic Environmental and Social Overview and ESIAs for offshore exploration well drilling activities in Blocks 2 and 3A, Lake Albert, Uganda. Tullow Oil Plc and Heritage Oil and Gas Limited (2006- 2008)	Project Director for this project. The project involved undertaking a strategic overview study of Lake Albert that provided background information on the limnological (physical, chemical and biological) features of the lake as well as environmental and socio-economic resources (such as nature reserves, tourism nodes, prime fishing areas etc). It also presented areas of environmental risk and opportunity associated with oil explorations on, and immediately adjacent to, the lake. The strategic overview provided a framework within which ESIAs were undertaken for the offshore drilling project. A site selection study was undertaken for onshore support infrastructure. Baseline studies included shoreline sensitivity mapping, oil spill modelling, water and sediment quality surveys, fish and fisheries surveys, socio-economic surveys and terrestrial ecology surveys. An extensive public participation process was undertaken as part of the ESIAs.
Environmental and Social Baseline Assessment for a green fields coal mine and CTL plant development, Sasol, South Africa (2008)	Project Director the environmental and social baseline studies to support the evaluation of sites for potential development of a green field's coal mine and associated CTL Plant in South Africa. Mr. Heather-Clark has assisted with review and quality control of the various baseline studies.
Development of guideline document for the integration of environmental and social issues into the project lifecycle for mine development, De Beers, South Africa (2008)	Team member of the project team that assisted the client in developing a detailed guideline document for the integration of social and environmental issues into mine planning. This included all phases of the planning process from Concept through to Pre-feasibility, Feasibility and Implementation. Mr Heather-Clark, as lead facilitator, presented a 2 day training course on these guidelines, to mine planners and engineers.
EIA for a Metal Recovery Plant and Slag Crushing, Screening and Weathering facility at Arcelor Mittal Saldanha Works, MultiServ, South Africa (2007 – 2008)	Project Director for the EIA, including a public consultation process and the following specialist studies: air quality, groundwater, noise impact assessment, botanical and archaeology studies and a traffic impact assessment. Mr Heather-Clark was responsible for client liaison, quality control and final review of all reports.

Implementation of the Equator Principles for Standard Bank's Project Financing Processes, Standard Bank, South Africa (2008)	Lead facilitators for Equator Principles and IFC Performance Standards training to assist Standard Bank in adopting the Equator Principles. An assessment system (based on the IFC Performance Standards) to link with Standard Bank's project finance transaction life-cycle was developed. This involved the development of "tools" and guidance documents to form a system, together with training on the use of the system for all project finance staff.
Comparative review of EIAs undertaken by ERM globally for electricity utilities, Eskom, South Africa (2007)	Project Director for this project. The project included research to provide Eskom with an overview of different EIA governance systems and approaches to managing EIAs in other countries, as well as identifying trends in EIA practice.
Environmental and Social Screening and Qualitative Risk Assessment Western Ports and Rail Corridor, Transnet, South Africa (2007)	Project Director involved in identifying environmental and social risks associated with future port development in the Port of Saldanha, Port of Cape Town and Port of Mossel Bay. The scope of the study included the review of previous EIAs, SEAs and other planning documents to identify environmental and social drivers and assess their risk to future port planning, development and operations. As the environmental team, ERM interacted on a regular basis with the port engineering and design teams to develop a port development framework for a 30 year planning period.
Environmental and Social Screening and Qualitative Risk Assessment Central Ports and Rail Corridor, Transnet, South Africa (2007)	Project Director involved in identifying environmental and social risks associated with future port development in the Port of East London, Port of Port Elizabeth and Port of Ngqura. The scope of the study included the review of previous EIAs, SEAs and other planning documents to identify environmental and social drivers and assess their risk to future port planning, development and operations. As the environmental team, ERM interacted on a regular basis with the port engineering and design teams to develop a port development framework for a 30 year planning period.
Environmental and Social Screening and Qualitative Risk Assessment Eastern Ports and Rail Corridor, Transnet, South Africa (2007)	Project Director involved in identifying environmental and social risks associated with future port development in the Port of Durban and Port of Richards Bay. The scope of the study included the review of previous EIAs, SEAs and other planning documents to identify environmental and social drivers and assess their risk to future port planning, development and operations. As the environmental team, ERM interacted on a regular basis with the port engineering and design teams to develop a port development framework for a 30 year planning period.
EIA of the Moatize Coal Mine and associated railway line and deep water port infrastructure, CVRD, Tete Province, Mozambique (2006-2007)	Project Coordinator and Cost Controller on this project. ERM was commissioned by CVRD, a Brazilian Mining Company, to undertake environmental studies related to the green fields development of a coal mine in Tete Province, Mozambique. The project included the development of a power plant, railway line and port for the export of coal.
Corporate Social Responsibility Strategy development for a leading South African retailer, South Africa (2006)	Lead facilitator for this project. The project involved identifying and prioritising the company's sustainability issues and defining a strategy to address these issues. The process was driven by the need for the company to be listed on the Johannesburg Stock Exchanges SRI Index.
Research project on the effects of water scarcity on the fresh produce supply to a major South Africa retailer, South Africa (2006)	Project Leader coordinated a group of researchers to identify water scarce areas and to plot these against the location of fresh produce suppliers for a major retailer in South Africa. This researched form a core component of the companies Sustainability Strategy.
Independent Environmental Advisers to the Financing Parties of the Gautrain Rapid Rail Link project, Bowman Gilfillan (2006)	Independent Environmental Advisers to the Financing Parties, provided review and advisory services through Bowman Gilfillan on Environmental Management Plans for the Gautrian Rapid Link project.

ESIA for seismic surveys and exploration well drilling and testing in Blocks 16 and 19 off the coast of Mozambique, Sasol Petroleum Sofala & Empresa Nacional de Hidrocarbonetos (2005 – 2006)	Project Manager for the ESIA which involved undertaking an ESIA and compiling EMPs for offshore exploration activities in Blocks 16 & 19, situated to the east of the Bazaruto Archipelago National Park, off the coast of Mozambique. The exploration activities comprised 2D and 3D seismic surveys in deepwater and shallow water as well as exploration well drilling and testing activities.
EIA for the upgrade and expansion of the existing sinter plant at Vanderbijlpark, ArcelorMittal, South Africa (2006)	Project Director for the EIA and stakeholder engagement process to meet South African requirements. This included coordination of the technology review, air quality, health and waste management specialist studies and compilation of the integrated Scoping and EIA Report.
Review of Sustainability Report and Sustainability Management System, Confidential, South Africa (2004)	Lead reviewer of the Sustainability Report of a leading retailer in South Africa and providing adhoc advice on sustainability issues. This included compiling a monthly news letter to staff on relevant sustainability issues facing the retail industry in South Africa.
EIA of a proposed expansion of the Container Terminal Stacking area at the Port of Cape Town, National Ports Authority, South Africa (2003-2004)	Project Manager for this EIA. The project included the expansion of the Cape Town container terminal into the sea though dredging 1 million m3 of material for reclamation. The project included a detailed study on alternative sources for fill material and other studies which focused on marine archaeology, coastal erosion, marine hydrodynamics and water quality, visual, noise and traffic. The EIA included full stakeholder engagement throughout the EIA process.
Environmental Site Suitability Study for a manganese smelter, Asia Minerals Limited (2004)	Part of the project team that undertook a preliminary site selection process for a manganese smelter by identifying key environmental and social issues for potential sites within Southern Africa. Sites included the Belualane Industrial Park (Mozambique) and Richards Bay, the Coega Industrial Development Zone (IDZ) and Saldanha (South Africa).
DFID funded project to assess progress towards meeting the water relater targets of the Millennium Development Goals, DIFD, Zambia (2004)	Country Coordinator for Zambia on this project. The project included detailed stakeholder surveys secondary data analysis to establish the countries progress towards meeting the Millennium Development Goals, specifically related to water supply and sanitation.
Roll-out of ISO14001 and OHSAS18001 management systems to 2 industrial sites in South Africa, Confidential, South Africa (2004)	Project Manager responsible for undertaking ISO14001 training at two industrial sites. The project formed part of a global initiative to have several industrial sites throughout Africa and Europe ISO14001 certified.
Strategic Environmental Assessment (SEA) for the Port of Cape Town, National Ports Authority of South Africa, South Africa (2003)	Project Manager for this project and played a lead role in directing the course and outcome of the SEA. The SEA focussed on key environmental and social opportunities and constraint to the future long term development of the Port of Cape Town. A Sustainability Framework was developed to address key opportunities and constraints and to set up long terms monitoring programs. A key component of this study was to understand the Port-City linkages and developing mechanisms to ensure that port planning was supported by city planning and visa-versa.
Strategic Environmental Assessment (SEA) for the Port of Richards Bay, National Ports Authority of South Africa, South Africa (2003)	Project Adviser for this project and played a lead role in directing the course and outcome of the SEA. The SEA focussed on key environmental and social opportunities and constraint to the future long term development of the Port of Cape Town. A Sustainability Framework was developed to address key opportunities and constraints and to set up long terms monitoring programs. A key component of this study was to understand the Port-City linkages and developing mechanisms to ensure that port

	planning was supported by city planning and visa-versa.
E&S Due Diligence of the Phase 2 Maputo Port Revitalisation and Rehabilitation Project, Standard Corporate Merchant Bank, Mozambique (2003)	Environmental Adviser to the Standard Corporate Merchant Bank for the review of the EIA and Risk Assessment studies undertaken for the Phase 2 Maputo Port Revitalisation and Rehabilitation Project. The EIA was reviewed against the Mozambican and International Best Practice guidelines and detailed recommendation made on how to manage the environmental risks associated with the revitalisation project.
National Oil Spill Contingency Plan for Cameroon, funded by the World Bank, Cameroon Government, Cameroon (2003)	Part of the team that compiled a comprehensive Oil Spill Contingency Plan for Cameroon (OSCP). The OSCP form a core component of the Chad Cameroon Pipeline and included contingency plans for both on land and marine based spills. The OSCP was compiled according to the IPEACA guidelines and was reviewed by the World Bank.
EIA/SEA Capacity Building, Environmental Public Authority (EPA), State of Kuwait (2003)	Lead facilitator for a 2 day training course on SEA and EIA for the Environmental Public Authority (EPA) of the State of Kuwait.
Training Workshop on Strategic Environmental Assessment for South Eastern Africa and the Western Indian Ocean Island States, SEACAM, Mozambique (2003)	Lead course facilitator for the SEA training course funded by SEACAM. The training course included the principles of SEA, SEA process and case studies of SEA's in Southern Africa.
Improving the Effectiveness of EIA and the Potential of SEA in Southern Africa: Case Study on SEA of the National Commercial Ports Policy and SEA for the Port of Cape Town, World Bank/SAIEA, Namibia (2003)	Presenter of two case studies on SEA at a regional workshop funded by the World Bank and SAIEA.
Environmental Impact Assessment for the Eskom SABRE-GEN wind turbine test facility, Eskom, South Africa (2002)	Project Manager for the EIA. The EIA included stakeholder engagement throughout the process and included the following specialist studies: visual assessment, bird strike modelling and noise assessment.
Strategic Environmental Assessment: Scoping Phase Port of Richards Bay, National Ports Authority of South Africa, South Africa (2002)	Project Leader and integrative writer for the Scoping Phase of the SEA for the Port of Richards Bay. This phase included detailed stakeholder consultation to identify opportunities and constraints to long term port development at the Port of Richards Bay.
White Paper on National Commercial Ports Policy, National Ports Authority, South Africa 2002	Lead reviewer of the White Paper on National Commercial Ports Policy for South Africa. The review focussed on the integration of environmental and social issues into the port planning process. Mr Heather-Clark made a formal submission and presentation to the Portfolio Committee on Transport in the South African Parliament.

Environmental Liability and Risk Assessment for the Multi-Purpose Terminal at the Port of Saldanha, National Ports Operations, South Africa (2002)	Project Manager for the project. The purpose of the project was to identify key environmental risks associate with the material handling at the Multi-Purpose Terminal at the Port of Saldanha.
Environmental Overview of South Africa's major ports with special reference to future container terminal development, National Ports Authority Container Terminal Strategy, National Ports Authority, South Africa (2002)	Project Manager for the comparative assessment of the relative environmental sensitivity of the seven commercial ports in South Africa with reference to future container terminal development. The study included a detail review of secondary environmental information of all the ports, the identification of specific environmental criteria and the use of these criteria to rank each port in terms of its sensitivity to future container terminal development.
Review of the EIA undertaken for the Maputo Port Privatisation and Rehabilitation Project, Development Bank of Southern Africa (DBSA), South Africa (2002)	Environmental Adviser to the Development Bank of Southern Africa to review the Phase 1 EIA for the Maputo Port Privatisation and Rehabilitation Project. The review was undertaken against the Mozambican EIA Regulations and International Best Practice.
Oil Spill Contingency Plan, Agip Angola oil operations, Angola, (2002)	Team member of the team to develop an oil spill contingency plan according to the IPEICA International Guidelines.
Ecologically Sustainable Industrial Development Programme, United Nations Industrial Development Organisation (UNIDO), Tanzania (2002)	Team member of the project team appointed to review the Industrial Development Strategy for Industrial Development in Tanzania. The focus of the project was to integrate environmental and social issues into the programme.
Environmental Audit and Assessment of the Socio-economic Impacts of the Trans-Kgalagadi Highway, Botswana, Development Bank of Southern Africa, Botswana (2002)	Lead reviewer of the EIA and EMP implementation for the Trans-Kalagadi corridor in Botswana. The review included site visits, detailed interviews and review of secondary data and records.
World Bank EIA Project Management Training Course, World Bank/SAIEA, Zambia (2002)	Lead facilitator for the 5 day EIA Project Management Training Course. The course was presented to 20 African delegates from southern Africa. The course focused on the practical aspects of EIA project management including budgeting and scheduling an EIA, contract negotiations with clients, managing specialist studies, managing the public participation phase and compiling an integrated EIA report. The course formed part of a Southern Africa capacity building initiative lead by the SAIEA.
Environmental screening study for the establishment of a deep-water port at Ponta Dobela, Confidential Client, Mozambique (2001)	Team member of the project team who undertook a screening study to identify environmental, social and economic issues and show stoppers associated with the development of a deep-water port on the coast on Mozambique.
ESIA of the proposed seismic survey in licence area 2814a on the continental shelf of Namibia, Shell Exploration and Production Namibia B.V., Namibia (2001)	Team member of the ESIA for the offshore seismic exploration project. The ESIA included all issues associated with seismic surveys including seismic noise impacts on marine mammals, oil spill modelling and general environmental management issues.

Environmental Impact Review for the abandonment of the Cuntala Well Protector Platform off the coast of Angola (Block 2), Texaco Panama Inc., Angola (2001)	Team member of the project team who developed a decommissioning plan for a well protector platform off the coast of Angola.
Legal, Technical and Economic Feasibility Study for the Commercialisation of the SSF Association Milnerton Tank Farm and its links to the Port of Cape Town, SFF, Cape Town (2001)	Project Manager for this project.
ESIA of the Phase 2 expansion of the Mozal Aluminium Smelter and Matola Port Terminal in Maputo, BHP Billiton, Mozambique (2000-2001)	Project Manager and integrative writer for this ESIA. The EIA included an assessment of the expansion of the port terminal at the Port of Matola and a review of the Phase 2 expansion of the aluminium smelter. All reports together with the EIA process were reviewed and approved by the International Finance Corporation (IFC).
Scoping Phase of the Environmental Impact Assessment for the expansion of the Container Terminal at the Port of Cape Town, Portnet, South Africa (2000)	Project Manager for the EIA for the expansion of the container terminal at the Port of Cape Town. The project included the dredging of 1 million m3 dredge material to provide fill for the expansion of the port. Specialist studies that were required included coastal dynamic modelling, hydrodynamic modelling to assess water quality issues associated with dredging, marine archaeological issues, marine ecology issues, traffic, visual and noise.
Strategic Integrated Port Planning, Port of Saldanha, Transnet (1998)	Project Manager for the Strategic Integrated Port Planning process for the Port of Saldanha. The process culminated in the first Port Development Framework for the Port of Saldanha which integrated environmental and social issues into the port planning process. It included the identification and inclusion of environmental and social opportunities and constraints into the future port planning and development.
Environmental Impact Assessment for the PPC Slag Grinding Mill within the Saldanha Steel Complex, PPC (1998)	Project Manager for the EIA for PPC slag grinding mill. The EIA included a number of specialist studies and comprehensive stakeholder engagement.

MEMBERSHIPS	
CEAPSA	Certified as an Environmental Practitioner with the Interim Certification Board for Environmental Assessment Practitioners of South Africa (2006)
IAIAsa	Member of the International Association for Impact Assessment South Africa
IAIA International	Member of the International Association for Impact Assessment

PUBLICATIONS	
	Sep 2007: Co-author of case study for IIEDs 'User Guide' to effective tools and methods for integrating environment and development. South African case study: Role of environmental and social screening in informing the conceptual design and planning of large-scale projects in the pre-feasibility stage.
	Aug 2003: Author of a case study on the SEA for the Port of Cape Town, contained in "The Status and Potential of Strategic Environmental Assessment" by Barry Dalal-Clayton and Barry Saddler, DRAFT 17 September 2003.
	March 2002: Strategic Integrated Port Planning: Moving from EIA to SEA. International Conference on Coastal Zone Management and Development, Kuwait 18 to 20 March 2002.
	Nov 2000: Sustainable Port Development: Report on the preparatory seminar for Africa. 7th International Conference of the International Association for Cities and Ports, Marseilles – France.
	Mar 2000: The development of Strategic Environmental Assessment in South Africa: Journal of Impact Assessment and Project Appraisal, Vol 18, Number 3, pg 217-223. September 2000.
	April 1999: Integrating environmental opportunities and constraints into Port Planning, Development and Operation. 5th International Conference on Coastal and Port Engineering in Developing Countries, Cape Town, 19 to 23 April 1999.

CURRICULUM VITAE

LIANDRA SCOTT-SHAW

SENIOR ENVIRONMENTAL CONSULTANT

Environmental Management, Planning and Approvals, South Africa

QUALIFICATIONS

Pr.Sci.Nat	2017	Professional Natural Scientist (Ecological Science), South African Council for Natural Scientific Professions
BSc Hons.	2009	BSc Honours (Ecological Science), University of KwaZulu Natal
BSc	2008	BSc (Biological Science), University of KwaZulu Natal

EXPERTISE

- Environmental Impact Assessment
- Environmental licensing
- Environmental Compliance monitoring and auditing
- Vegetation Impacts Assessment and permitting
- Diatom Biomonitoring

Liandra joined SLR in March 2021 in her capacity as Senior Environmental Consultant and has over 8 years' experience as an Environmental Assessment Practitioner within the environmental consulting field. She has degrees in Biological and Ecological Science and has expertise in a wide range of environmental disciplines, including Environmental Impact Assessments, Environmental Management Programmes, Environmental Compliance Monitoring & Auditing and Vegetation Assessments and Diatom Biomonitoring.

She has been responsible for the management of a wide range of projects, including environmental authorisations, compliance monitoring and auditing, vegetation assessments and permitting and diatom biomonitoring.

Over the last few years Liandra's focus has been in the renewable energy sector. Specifically involved with Environmental Impact Assessments and specialist management for the Risk Mitigation Independent Power Producer Procurement and Renewable Energy Independent Power Producer Procurement Programmes (RMIPPPP and REIPPPP).

PROJECTS

A sample of Liandra's recent project experience, is provided below.

	RENEWABLE ENERGY
Oya Energy Hybrid Facility EIA and Grid Connection BA (2020-2021)	Completed the Environmental Impact Assessment, Basic Assessment, and associated Amendment Processes for the 128MW facility, which included powerlines, wind energy facility (WEF), solar photovoltaic (PV), Battery Energy Storage System (BESS) and fuel-based generators (FBG). Liandra project managed the processes and assisted the client in compiling and submitting the bid for RMIPPPP. The project is a preferred bidder for the RMIPPPP
Kudusberg Wind Energy Facility (WEF) Amendment (2020-2021)	Completed the Amendment Process for getting the facility bid ready, this included finalizing layouts and EMPrs.
Droogfontein 3 PV BESS BA (2020)	Completed the Basic Assessment for Battery Energy Storage System (BESS). Liandra project managed the processes as well as undertaking technical and report writing, public participation, specialist team management.

Mierdam PV BESS BA (2020)	Completed the Basic Assessment for Battery Energy Storage System (BESS). Liandra project managed the processes as well as undertaking technical and report writing, public participation, specialist team management.
Dwarsrug WEF BESS BA (2020)	Completed the Basic Assessment for Battery Energy Storage System (BESS). Liandra project managed the processes as well as undertaking technical and report writing, public participation, specialist team management.
Platsjambok East PV BESS BA (2020)	Completed the Basic Assessment for Battery Energy Storage System (BESS). Liandra project managed the processes as well as undertaking technical and report writing, public participation, specialist team management.
Platsjambok West PV BESS BA (2020)	Completed the Basic Assessment for Battery Energy Storage System (BESS). Liandra project managed the processes as well as undertaking technical and report writing, public participation, specialist team management.
Loeriesfontein 3 PV BESS BA (2020)	Completed the Basic Assessment for Battery Energy Storage System (BESS). Liandra project managed the processes as well as undertaking technical and report writing, public participation, specialist team management.
Grid connection for between the Dwarsrug WEF to Loeriesfontein PV	Completed the Basic Assessment for the Grid connection. Liandra project managed the processes as well as undertaking technical and report writing, public participation, specialist team management.
Tooverberg Wind Energy Facility (WEF) EIA and Grid Connection BA (2018-2019)	Assisted in completing the EIA and BA Processes for the facility. Liandra undertook technical and report writing and client liaison when the original project manager left.
Rondekop Wind Energy Facility (WEF) EIA (2018-2019)	Completed the EIA Process for the facility. Liandra project managed the processes as well as undertaking technical and report writing, public participation, specialist team management.
Umsobomvu PV Project EIAs (x3) and Grid Connections Bas (x3) near Noupoort and Middelburg, Eastern and Northern Cape Provinces (2018-2020)	Completed the Amendment Process for the facilities. Liandra project managed the processes as well as undertaking technical and report writing, public participation, specialist team management.
Amendments for the proposed development of the Hartebeest Leegte Wind Farm near Loeriesfontein, Northern Cape Province (2019)	Completed the Amendment Process for the facility. Liandra project managed the processes as well as undertaking technical and report writing, public participation, specialist team management.
Amendments for the development of the Graskoppies Wind Farm and grid near Loeriesfontein, Northern Cape Province (2019)	Completed the Amendment Process for the facility. Liandra project managed the processes as well as undertaking technical and report writing, public participation, specialist team management.

Amendments for the proposed development of the Ithemba Wind Farm near Loeriesfontein, Northern Cape Province (2019)	Completed the Amendment Process for the facility. Liandra project managed the processes as well as undertaking technical and report writing, public participation, specialist team management.
Amendments for the proposed development of the Xha! Boom Wind Farm near Loeriesfontein, Northern Cape Province (2019)	Completed the Amendment Process for the facility. Liandra project managed the processes as well as undertaking technical and report writing, public participation, specialist team management.
Amendment for the Proposed Beaufort West Wind Farm, Western Cape Province (2019)	Completed the Amendment Process for the facility. Liandra project managed the processes as well as undertaking technical and report writing, public participation, specialist team management.
Amendment for the Proposed Trakas Wind Farm, Western Cape Province (2019)	Completed the Amendment Process for the facility. Liandra project managed the processes as well as undertaking technical and report writing, public participation, specialist team management.
Amendments for the Proposed Dwarsrug Wind Farm near Loeriesfontein, Northern Cape Province	Completed the Amendment Process for the facility. Liandra project managed the processes as well as undertaking technical and report writing, public participation, specialist team management.
Amendments for the Grid Connections for Graskoppies, Haratebeest Leegte, Itemba and !Xha Boom Wind Energy Facilties near Loeriesfontein, Northerrn Cape Province	Completed the Amendment Process for the facility. Liandra project managed the processes as well as undertaking technical and report writing, public participation, specialist team management.
Regulation 54 Audits (2019)	• Darling Wind Energy Facility, Western Cape Province • Great Kei Wind Energy Facility, Eastern Cape Province • Motherwell Wind Energy Facility, Eastern Cape Province • Ncora Wind Energy Facility, Eastern Cape Province • Nqamakwe Wind Energy Facility, Northern Cape Province • Peddie Wind Energy Facility, Eastern Cape Province • Ukomeleza Wind Energy Facility, Eastern Cape Province • Umsobomvu Wind Energy Facility, Northern and Eastern Cape Provinces

MEMBERSHIPS

SACNASP	Registered with South African Council for Natural Scientific Professions as a Professional Natural Scientist (Pr.Sci.Nat) in Environmental Science (117442)
IAIAsa	Member of the International Association of Impact Assessors (3624)

PUBLICATIONS

	Lang P, Taylor J, Bertolli L, Lowe S, Dallas H, Kennedy MP, Gibbins C, Sichingabula H, Saili, Day J, Willems F, Briggs JA and Murphy KJ 2013. Proposed procedure for the sampling, preparation and analysis of benthic diatoms from Zambian rivers: a bioassessment and decision support tool applicable to freshwater ecoregions in tropical southern Africa. Africa, Caribbean, Pacific-European Union Project Report.
	Martins S, Kennedy M, Lowe S, Lang P, Briggs J, Dallas H, Taylor J, Bertolli L, Gibbins C, Soulsby C, Day J, Sichingabula H, Saili H, Kapungwe E, Willems F, Mbulwe F, Murphy K. 2013. SAFRASS Methodology Manual.
	Shrader AM, Bell C, Bertolli L and Ward D 2012. Forest or the trees: at what scale do elephants make foraging decisions? Acta Oecologica 42: 3-10.
	Lang P, Taylor J, Bertolli L, 2012. River diatom biodiversity assessments in Zambian rivers: a SAFRASS conservation perspective. European Congress of Conservation Biology, Glasgow.
	Martins S, Kennedy M, Lowe S, Lang P, Briggs J, Dallas H, Taylor J, Bertolli L, Gibbins C, Soulsby C, Day J, Sichingabula H, Saili H, Kapungwe E, Willems F, Mbulwe F, Murphy K. 2012. SAFRASS Photographic guide to the Aquatic Macroinvertebrates of Zambia. European Union Project Report

APPENDIX 1: SPECIALIST CURRICULUM VITAE

Johann Lanz
Curriculum Vitae

Education

M.Sc. (Environmental Geochemistry)	University of Cape Town	1996 - 1997
B.Sc. Agriculture (Soil Science, Chemistry)	University of Stellenbosch	1992 - 1995
BA (English, Environmental & Geographical Science)	University of Cape Town	1989 - 1991
Matric Exemption	Wynberg Boy's High School	1983

Professional work experience

I have been registered as a Professional Natural Scientist (Pri.Sci.Nat.) in the field of soil science since 2012 (registration number 400268/12) and am a member of the Soil Science Society of South Africa.

Soil & Agricultural Consulting **Self employed** **2002 - present**

In the past 5 years of running my soil and agricultural consulting business, I have completed more than 120 agricultural assessments (EIAs, SEAs, EMPRs) in all 9 provinces for renewable energy, mining, urban, and agricultural developments. My regular clients include: Aurecon; CSIR; SiVEST; Arcus; SRK; Environamics; Royal Haskoning DHV; Jeffares & Green; JG Afrika; Juwi; Mainstream; Redcap; G7; Mulilo; and Tiptrans. Recent agricultural clients for soil resource evaluations and mapping include Cederberg Wines; Western Cape Department of Agriculture; Vogelfontein Citrus; De Grendel Estate; Zewenwacht Wine Estate; and Goedgedacht Olives.

In 2018 I completed a ground-breaking case study that measured the agricultural impact of existing wind farms in the Eastern Cape.

Soil Science Consultant **Agricultural Consultors International (Tinie du Preez)** **1998 - 2001**

Responsible for providing all aspects of a soil science technical consulting service directly to clients in the wine, fruit and environmental industries all over South Africa, and in Chile, South America.

Contracting Soil Scientist **De Beers Namaqualand Mines** **July 1997 - Jan 1998**

Completed a contract to advise soil rehabilitation and re-vegetation of mined areas.

Publications

- Lanz, J. 2012. Soil health: sustaining Stellenbosch's roots. In: M Swilling, B Sebitosi & R Loots (eds). *Sustainable Stellenbosch: opening dialogues*. Stellenbosch: SunMedia.
- Lanz, J. 2010. Soil health indicators: physical and chemical. *South African Fruit Journal*, April / May 2010 issue.
- Lanz, J. 2009. Soil health constraints. *South African Fruit Journal*, August / September 2009 issue.
- Lanz, J. 2009. Soil carbon research. *AgriProbe*, Department of Agriculture.
- Lanz, J. 2005. Special Report: Soils and wine quality. *Wineland Magazine.*

I am a reviewing scientist for the *South African Journal of Plant and Soil*.

10. Appendix 1: Specialist CV

CURRICULUM VITAE
Dr Brian Michael Colloty
7212215031083

1 Rossini Rd
Pari Park
Gqeberha, 6070
b.colloty@gmail.com
083 498 3299

Profession: Ecologist & Environmental Assessment Practitioner (Pr. Sci. Nat. 400268/07)
Member of the South African Wetland Society
Specialisation: Ecology and conservation importance rating of inland habitats, wetlands, rivers & estuaries
Years experience: 25 years

SKILLS BASE AND CORE COMPETENCIES

- 25 years experience in environmental sensitivity and conservation assessment of aquatic and terrestrial systems inclusive of Index of Habitat Integrity (IHI), WET Tools, Riparian Vegetation Response Assessment Index (VEGRAI) for Reserve Determinations, estuarine and wetland delineation throughout Africa. Experience also includes biodiversity and ecological assessments with regard sensitive fauna and flora, within the marine, coastal and inland environments. Countries include Mozambique, Kenya, Namibia, Central African Republic, Zambia, Eritrea, Mauritius, Madagascar, Angola, Ghana, Guinea-Bissau and Sierra Leone. Current projects also span all nine provinces in South Africa.
- 15 years experience in the coordination and management of multi-disciplinary teams, such as specialist teams for small to large scale EIAs and environmental monitoring programmes, throughout Africa and inclusive of marine, coastal and inland systems. This includes project and budget management, specialist team management, client and stakeholder engagement and project reporting.
- GIS mapping and sensitivity analysis

TERTIARY EDUCATION

- 1994: B Sc Degree (Botany & Zoology) - NMU
- 1995: B Sc Hon (Zoology) - NMU
- 1996: M Sc (Botany - Rivers) - NMU
- 2000: Ph D (Botany – Estuaries & Mangroves) – NMU

EMPLOYMENT HISTORY

- 1996 – 2000 Researcher at Nelson Mandela University – SAB institute for Coastal Research & Management. Funded by the WRC to develop estuarine importance rating methods for South African Estuaries
- 2001 – January 2003 Training development officer AVK SA (reason for leaving – sought work back in the environmental field rather than engineering sector)
- February 2003- June 2005 Project manager & Ecologist for Strategic Environmental Focus (Pretoria) – (reason for leaving – sought work related more to experience in the coastal environment)
- July 2005 – June 2009 Principal Environmental Consultant Coastal & Environmental Services (reason for leaving – company restructuring)
- June 2009 – August 2018 Owner / Ecologist of Scherman Colloty & Associates cc
- August 2018 Owner / Ecologist - EnviroSci (Pty) Ltd

SELECTED RELEVANT PROJECT EXPERIENCE
World Bank IFC Standards

- Botswana South Africa 400kv transmission line (400km) biodiversity assessment on behalf of Aurecon -

current

- Farim phosphate mine and port development, Guinea Bissau – biodiversity and estuarine assessment on behalf of Knight Piesold Canada – 2016.
- Tema LNG offshore pipeline EIA – marine and estuarine assessment for Quantum Power (2015).
- Colluli Potash South Boulder, Eritrea, SEIA marine baseline and hydrodynamic surveys co-ordinator and coastal vegetation specialist (coastal lagoon and marine) (on-going).
- Wetland, estuarine and riverine assessment for Addax Biofeuls Sierra Leone, Makeni for Coastal & Environmental Services: 2009
- ESHIA Project manager and long-term marine monitoring phase coordinator with regards the dredge works required in Luanda bay, Angola. Monitoring included water quality and biological changes in the bay and at the offshore disposal outfall site, 2005-2011

South African

- Plant and animal search and rescue for the Dassies Ridge Wind Farm on behalf of EDF, Current
- Plant and animal search and rescue for the Karusa and Soetwater Wind Farms on behalf of Enel Green Power, Current
- Plant and animal search and rescue for the Nxuba, Oyster Bay and Garob Wind Farms on behalf of Enel Green Power, 2018 - 2019
- Plant and Animal Search and Rescue for the Port of Ngqura, Transnet Landside infrastructure Project & OTGC Tank Farm, with development and management of on site nursery (2019)
- Plant search and rescue, for NMBM (Driftsands sewer, Glen Hurd Drive) 2018
- Wetland specialist appointed to update the Eastern Cape Biodiversity Conservation Plan, for the Province on behalf of EOH CES appointment by SANBI – current. This includes updating the National Wetland Inventory for the province, submitting the new data to CSIR/SANBI.
- CDC IDZ Alien eradication plans for three renewable projects Coega Wind Farm, Sonop Wind Farm and Coega PV, on behalf of JG Afrika (2016 – 2017).
- Nelson Mandela Bay Municipality Baakens River Integrated Wetland Assessment (Inclusive of Rehabilitation and Monitoring Plans) for CEN IEM Unit - Current
- Rangers Biomass Gasification Project (Uitenhage), biodiversity and wetland assessment and wetland rehabilitation / monitoring plans for CEM IEM Unit – 2017
- Gibson Bay Wind Farm implementation of the wetland management plan during the construction and operation of the wind farm (includes surface / groundwater as well wetland rehabilitation & monitoring plan) on behalf of Enel Green Power - 2018
- Gibson Bay Wind Farm 133kV Transmission Line wetland management plan during the construction of the transmission line (includes wetland rehabilitation & monitoring plan) on behalf of Eskom – 2016.
- Tsitsikamma Community Wind Farm implementation of the wetland management plan during the construction of the wind farm (includes surface / biomonitoring, as well wetland rehabilitation & monitoring plan) on behalf of Cennergi – completed May 2016.
- Alicedale bulk sewer pipeline for Cacadu District, wetland and water quality assessment, 2016
- Mogalakwena 33kv transmission line in the Limpopo Province, on behlaf of Aurecon, 2016
- Cape St Francis WWTW expansion wetland and passive treatment system for the Kouga Municipality, 2015
- Macindane bulk water and sewer pipelines wetland and wetland rehabilitation plan 2015
- Eskom Prieska to Copperton 132kV transmission line aquatic assessment, Northern Cape on behalf of Savannah Environmental 2015.
- Joe Slovo sewer pipeline upgrade wetland assessment for Nelson Mandela Bay Municipality 2014
- Cape Recife Waste Water Treatment Works expansion and pipeline aquatic assessment for Nelson Mandela Bay Municipality 2013
- Pola park bulk sewer line upgrade aquatic assessment for Nelson Mandela Bay Municipality 2013
- Transnet Freight Rail – Swazi Rail Link (Current) wetland and ecological assessment on behalf of Aurecon for the proposed rail upgrade from Ermelo to Richards Bay

- Eskom Transmission wetland and ecological assessment for the proposed transmission line between Pietermaritzburg and Richards Bay on behalf of Aurecon (2012).
- Port Durnford Exarro Sands biodiversity assessment for the proposed mineral sands mine on behalf of Exxaro (2009)
- Fairbreeze Mine Exxaro (Mtunzini) wetland assessment on behalf of Strategic Environmental Services (2007).
- Wetland assessment for Richards Bay Minerals (2013) – Zulti North haul road on behalf of RBM.
- Biodiversity and aquatic assessments for renewable projects in the Western, Eastern, Northern Cape, KwaZulu-Natal and Free State provinces. Clients included RES-SA, Red Cap, ACED Renewables, Mainstream Renewable, GDF Suez, Globeleq, ENEL, Abengoa amongst others. Particular aquatic sensitivity assessment and Water Use License Applications on behalf of Mainstream Renewable Energy (8 wind farms and 3 PV facilities.), Cennergi / Exxaro (2 Wind farms), WKN Wind current (2 wind farms & 2 PV facilities), ACED (6 wind farms) and Windlab (3 Wind farms) were also conducted. Several of these projects also required the assessment of the proposed transmission lines and switching stations, which were conducted on behalf of Eskom.
- Vegetation assessments on the Great Brak rivers for Department of Water and Sanitation, 2006 and the Gouritz Water Management Area (2014)
- Proposed FibreCo fibre optic cable vegetation assessment along the PE to George, George to Graaf Reinet, PE to Colesburg, and East London to Bloemfontein on behalf of SRK (2013-2015).

JONATHAN JAMES SMALLIE
WildSkies Ecological Services (2011/131435/07)
Curriculum Vitae

Background

Date of birth:	20 October 1975
Qualifications:	BSC – Agriculture (Hons) (completed 1998) University of Natal – Pietermaritzburg MSC – Environmental Science (completed 2011) University of Witwaterstrand
Occupation:	Specialist avifaunal consultant
Profession registration:	South African Council for Natural Scientific Professions

Contact details

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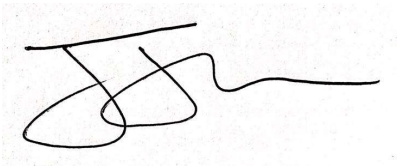
Fax: 086 615 5654
Email: jon@wildskies.co.za
Postal: 36 Utrecht Avenue, Bonnie Doon, East London, 5210
ID #: 7510205119085



Professional experience

IFC PS6 experience:

Amakhala Emoyeni Wind Farm – in collaboration with Simon Hulka (IFC) designed and implemented an operational phase monitoring programme and Biodiversity Monitoring & Mitigation Plan; Golden Valley Wind Farm – in collaboration with Leon Bennun (The Biodiversity Consultancy - TBC) compiled a Critical Habitat Assessment and Biodiversity Action Plan for the wind farm; Jeffrey's Bay Wind Farm – in collaboration with TBC compiled a Biodiversity Management Plan for the wind farm.

Renewable energy:

Post construction bird monitoring for wind energy facilities:

Dassieklip (Caledon) –initiated in April 2014 (2yrs); Dorper Wind Farm (Molteno) – initiated in July 2014 (5yrs); Jeffreys Bay Wind Farm – initiated in August 2014 (4yrs); Kouga Wind Farm – started Feb 2015 (2yrs); Cookhouse Wind Farm – started March 2015 (1yr); Grassridge Wind Farm – initiated in April 2015 (2yrs); Chaba Wind Farm – initiated December 2015 (1yr); **Amakhala Emoyeni 01 Wind Farm initiated August 2016 (5yrs) – IFC funded project;** Gibson Bay Wind Farm – initiated March 2017 (4yrs); Nojoli Wind Farm initiated March 2017 (4yrs); Sere Wind Farm (2yrs); Golden Valley Wind Farm (started Sep 2021 – 1 yr).

Pre-construction bird monitoring & EIA for wind energy facilities:
Golden Valley 1; Middleton; Dorper; Qumbu; Ncora; Nqamakhwe; Ndakana; Thomas River; Peddie; Mossel Bay; Hluhluwe; Richards Bay; Garob; Outeniqua; Castle; Wolf; Inyanda-Roodeplaat; Dassiesridge; Great Kei; Bayview; Grahamstown; Bakenskop; Umsobomvu; Stormberg; Zingesele; Oasis; Gunstfontein; Naumanii; Golden Valley Phase 2; Ngxwabangu; Hlobo; Woodstock; Scarlet Ibis; Albany; Golden Valley 1 2nd monitoring; Umtathi Emoyeni; **Serenje Zambia; Unika 1 Zambia;** Impofu East, West, and North; Nuweveld East, West and North; Elands Wind Farm; Ingwe Wind Farm; Hoogland Wind Farm; Cradock Wind Farm Cluster; Canyon Springs Wind Farm; Loxton Wind Farm; Taaibos Wind Farm; Aberdeen Wind Farm.

Screening studies for wind energy facilities:
Tarkastad Wind Farm; Quanti Wind Farm; Ruitjies Wind Farm; Beaufort West Wind Farm; Success Wind Farm; Cradock Wind Farm; Britstown Wind Farm; Clanwilliam Wind Farm; Ebenhezer Wind Farm.

Avifaunal walk through for wind energy facilities:
Garob Wind Farm; Golden Valley 1 wind farm; Nxuba Wind Farm.

Pre-construction bird monitoring and EIA for Solar energy facilities:
Bonnievale Solar Energy Facility; Dealesville Solar Energy Facility; Rooipunt Solar Energy Facility; De Aar Solar Energy Facility; Noupoort Solar Energy Facility, Aggeneys Solar Energy Facility; Eskom Concentrated Solar Power Plant; Bronkhorstspruit Solar Photovoltaic Plant; De Aar Solar Energy Facility; Paulputs Solar Energy Facility; Kenhardt Solar Energy Facility; Wheatlands Solar Energy Facility; Nampower CSP project; Dwaalboom PV; Slurry PV; De Hoek PV; Suikerbekkie PV; Springhaas PV.

Other Electricity Generation:
Port of Nqura Power Barge EIA; Tugela Hydro-Electric Scheme; Mmamabula West Coal Power Station (Botswana).

Electricity transmission & distribution:
Overhead transmission power lines (>132 000 kilovolts):
Oranjemund Gromis 220kv; Perseus Gamma 765kv; Aries Kronos 765kv; Aries Helios 765kv; Perseus Kronos 765kv; Helios Juno 765kv; Borutho Nzelele 400kv; Foskor Merensky 275kv; Kimberley Strengthening; Mercury Perseus 400kV; Eros Neptune Grassridge 400kV; Kudu Juno 400kV; Garona Aries 400kV; Perseus Hydra 765Kv; Tabor Witkop 275kV; Tabor Spencer 400kV; Moropule Orapa 220kV (Botswana); Coega Electrification; Majuba Venus 765kV; Gamma Grassridge 765kV; Gourikwa Proteus 400KV; Koeberg Strengthening 400kV; Ariadne Eros 400kV; Hydra Gamma 765kV; Zizabona transmission – Botswana; Maphutha Witkop 400kv; Makala B 400kv; Aggeneis Paulputs 400kv; Northern Alignment 765kv; Kappa Omega 765kv; Isundu 400kv and Substation; Senakangwedi B Integration; Oranjemund Gromis;

Overhead distribution power lines (<132 000 kilovolts):
Kanoneiland 22KV; Hydra Gamma 765kV; Komani Manzana 132kV; Rockdale Middelburg 132kV; Irenedale 132 kV; Zandfontein 132kV; Venulu Makonde 132 kV; Spencer Makonde 132 kV; Dalkeith Jackal Creek 132Kv; Glen Austin 88kV; Bulgerivier 132kV; Ottawa Tongaat 132kV; Disselfontein 132kV; Voorspoed Mine 132kV; Wonderfontein 132kV; Kabokweni Hlau Hlau 132kV; Hazyview Kiepersol 132kV; Mayfern Delta 132kV; VAAL Vresap 88kV; Arthursview Modderkuil 88kV; Orapa, AK6, Lethakane substations and 66kV lines (Botswana); Dagbreek Hermon 66kV; Uitkoms Majuba 88kV; Pilanesberg Spitskop 132kV; Qumbu PG Bison 132kV; Louis Trichardt Venetia 132kV; Rockdale Middelburg Ferrochrome 132kV; New Continental Cement 132KV; Hillside 88kV; Marathon Delta 132kV; Malelane Boulder 132kV; Nondela Strengthening 132kV; Spitskop Northern Plats 132kV; West Acres Mataffin 132kV; Westgate Tarlton Kromdraai 132kV; Sappi Elliot Ugie 132kV; Melkhout Thyspunt 132kV; St Francis Bay 66kv; Etna Ennerdale 88kv; Kroonstad 66kv; Firham Platrand; Paradise Fondwe 132kv; Kraal Mafube 132kv; Loeriesfontein 132kv; Albany Mimosa 66kv; Zimanga 132kv; Grootpan Brakfontein; Mandini Mangethe;

Valkfontein Substation; Sishen Saldanha; Corinth Mzongwana 132kv; Franklin Vlei 22kv; Simmerpan Strengthening; Ilanga Lethemba 132kv; Cuprum Burchell Mooidraai 132; Oliphantskop Grassridge 132;

Risk Assessments on existing power lines:

Hydra-Droerivier 1,2 & 3 400kV; Hydra-Poseidon 1,2 400kV; Butterworth Ncora 66kV; Nieu-Bethesda 22kV; Maclear 22kV (Joelshoek Valley Project); Wodehouse 22kV (Dordrecht district); Burgersdorp Aliwal North Jamestown 22kV; Cradock 22kV; Colesberg area 22kV; Loxton self build 11kV; Kanoneiland 22kV; Stutterheim Municipality 22kV; Majuba-Venus 400kV; Chivelston-Mersey 400kV; Marathon-Prairie 275kV; Delphi-Neptune 400kV; Ingagane – Bloukrans 275kV; Ingagane – Danskraal 275kV; Danskraal – Bloukrans 275kV

Avifaunal "walk through" (EMP's):

Kappa Omega 765kv; Rockdale Marble Hall 400kv; Beta Delphi 400kV; Mercury Perseus 765kV; Perseus 765kV Substation; Beta Turn 765kV in lines; Spencer Tabor 400kV line; Kabokweni Hlau Hlau 132kV; Mayfern Delta 132Kv; Eros Mtata 400kV; Cennergi Grid connect 132kV; Melkhout Thyspunt 132kv; Imvubu Theta 400kv; Outeniqua Oudshoorn 132kv; Clocolan Ficksburg 88kv.

Strategic Environmental Assessments for Master Electrification Plans:

Northern Johannesburg area; Southern KZN and Northern Eastern Cape; Northern Pretoria; Western Cape Peninsula

Other electrical infrastructure work

Investigation into rotating Bird Flapper saga – Aberdeen 22Kv; Special investigation into faulting on Ariadne-Eros 132kV; Special investigation into Bald Ibis faulting on Tutuka Pegasus 275kV; Special investigation into bird related faulting on 22kV Geluk Hendrina line; Special investigation into bird related faulting on Camden Chivelston 400kV line

Water sector:

Umkhomazi Dam and associated tunnel and pipelines; Rosedale Waste Water Treatment Works; Lanseria Outfall Sewer; Lanseria Wastewater Treatment Works;

Wildlife airport hazards:

Kigali International Airport – Rwanda; Port Elizabeth Airport – specialist study as part of the EIA for the proposed Madiba Bay Leisure Park; Manzini International Airport (Swaziland); Polokwane International Airport; Mafekeng International Airport; Lanseria Airport. Namibia Airports Company – wildlife hazard management plans for three airports.

Conservation planning:

East Cape Biodiversity Strategy & Action Plan – avifaunal input; City of Ekurhuleni Biodiversity Plan – avifaunal input.

Other sectors:

Submarine telecommunications cables project; Lizzard Point Golf Estate – Vaaldam; Lever Creek Estates housing development; East Cape Biodiversity Strategy and Action Plan 2017; Cathedral Peak Road diversion; Dube Tradeport; East London Transnet Ports Authority Biodiversity Management Plan; Leazonia Feedlot; Carisbrooke Quarry; Senekal Sugar Development; Frankfort Paper Mill;

Employment positions held to date:

- August 1999 to May 2004: Eastern Cape field officer for the South African Crane Working Group of the Endangered Wildlife Trust
- May 2004 to November 2007: National Field officer for Eskom-EWT Strategic Partnership and Airports Company SA – EWT Strategic Partnership (both programmes of Endangered Wildlife Trust)
- November 2007 to August 2011: Programme Manager – Wildlife & Energy Programme – Endangered Wildlife Trust
- **August 2011 to present: Independent avifaunal specialist – Director at WildSkies Ecological Sevices (Pty) Ltd**

Relevant achievements:

- Recipient of BirdLife South Africa's Giant Eagle Owl in 2011 for outstanding contribution to bird conservation in SA
- Founded and chaired for first two years – the Birds and Wind Energy Specialist Group (BAWESG) of the Endangered Wildlife Trust & BirdLife South Africa.

Conferences attended & presented at:

- 2021. African Conference on Linear Infrastructure and Environment
- 2018. Raptor Research Foundation conference, Kruger National Park.
- 2019. Conference on Wind Energy and Wildlife, Stirling, Scotland.
- 2017. Conference on Wind Energy and Wildlife, Estoril, Portugal.
- 2012-2020. Windaba Conference. Various attendance.
- May 2011. Conference of Wind Energy and Wildlife, Trondheim, Norway.
- March 2011. Chair and facilitator at Endangered Wildlife Trust – Wildlife & Energy Programme – "2011 Wildlife & Energy Symposium", Howick, SA
- September 2010 – Raptor Research Foundation conference, Fort Collins, Colorado. Presented on the use of camera traps to investigate Cape Vulture roosting behaviour on transmission lines
- May 2010 - Wind Power Africa 2010. Presented on wind energy and birds
- October 2008. Session chair at Pan-African Ornithological Conference, Cape Town, South Africa
- March 27 – 30 2006: International Conference on Overhead Lines, Design, Construction, Inspection & Maintenance, Fort Collins Colorado USA. Presented a paper entitled "Assessing the power line network in the Kwa-Zulu Natal Province of South Africa from a vulture interaction perspective".
- June 2005: IASTED Conference at Benalmadena, Spain – presented a paper entitled "Impact of bird streamers on quality of supply on transmission lines: a case study"
- May 2005: International Bird Strike Committee 27th meeting – Athens, Greece. Presented a paper entitled Bird Strike Data analysis at SA airports 1999 to 2004.
- 2003: Presented a talk on "Birds & Power lines" at the 2003 AGM of the Amalgamated Municipal Electrical Unions – in Stutterheim - Eastern Cape
- September 2000: 5th World Conference on Birds of Prey in Seville, Spain.

Papers & publications:

- Jenkins, A.R., Van Rooyen, C.S., Smallie, J., Harrison, J.A., Diamond, M., Smit-Robbinson, H.A. & Ralston, S. 2015. "Best practice guidelines for assessing and monitoring the impact of wind energy facilities on birds in southern Africa" Unpublished guidelines
- Ralston-Paton, S., Smallie, J., Pearson, A., & Ramalho, R. 2017. Wind energy's impacts on birds in South Africa: a preliminary review of the results of operational monitoring at the first wind farms of the Renewable Energy

Independent Power Producer Procurement Programme Wind Farms in South Africa. BirdLife South Africa Occasional Report Series No. 2. BirdLife South Africa, Johannesburg, South Africa.
- Prinsen, H.A.M., J.J. Smallie, G.C. Boere, & N. Pires. (compilers), 2011. Guidelines on how to avoid or mitigate impacts of electricity power grids on migratory birds in the African-Eurasian Region. CMS Technical Series Number XX. Bonn, Germany.
- Prinsen, H.A.M., J.J. Smallie, G.C. Boere, & N. Pires. (compilers), 2011. Review of the conflict between migratory birds and electricity power grids in the African-Eurasian region. CMS Technical Series Number XX, Bonn, Germany.
- Jenkins, A.R., van Rooyen, C.S, Smallie, J.J, Harrison, J.A., Diamond, M.D., Smit-Robinson, H.A & Ralston, S. 2014. Best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa
- Jenkins, A.R., Shaw, J.M., Smallie, J.J., Gibbons, B., Visagie, R. & Ryan, P.G. 2011. Estimating the impacts of power line collisions on Ludwig's Bustards Neotis ludwigii. Bird Conservation International.
- Jordan, M., & Smallie, J. 2010. A briefing document on best practice for pre-construction assessment of the impacts of onshore wind farms on birds. Endangered Wildlife Trust , Unpublished report
- Smallie, J., & Virani, M.Z. 2010. A preliminary assessment of the potential risks from electrical infrastructure to large birds in Kenya. Scopus 30: p32-39
- Shaw, J.M., Jenkins, A.R., Ryan, P.G., & Smallie, J.J. 2010. A preliminary survey of avian mortality on power lines in the Overberg, South Africa. Ostrich 2010. 81 (2) p109-113
- Jenkins, A.R., Smallie, J.J., & Diamond, M. 2010. Avian collisions with power lines: a global review of causes and mitigation with a South African perspective. Bird Conservation International 2010. 20: 263-278.
- Shaw, J.M., Jenkins, A.R., Ryan, P.G., & Smallie, J.J. 2010. Modelling power line collision risk for the Blue Crane *Anthropoides paradiseus* in South Africa. Ibis 2010 (152) p590-599.
- Jenkins, A.R., Allan, D.G., & Smallie, J.J. 2009. Does electrification of the Lesotho Highlands pose a threat to that countries unique montane raptor fauna? Dubious evidence from surveys of three existing power lines. Gabar 20 (2).
- Smallie, J.J., Diamond, M., & Jenkins, A.R. 2008. Lighting up the African continent – what does this mean for our birds? Pp 38-43. In Harebottle, D.M., Craig, A.J.F.K., Anderson, M.D., Rakotomanana, H., & Muchai. (eds). Proceedings of the 12th Pan-african Ornithological Congress. 2008. Cape Town. Animal Demography Unit. ISBN (978-0-7992-2361-3)
- Van Rooyen, C., & Smallie, J.J. 2006. The Eskom –EWT Strategic Partnership in South Africa: a brief summary. Nature & Faunae Vol 21: Issue 2, p25
- Smallie, J. & Froneman, A. 2005. Bird Strike data analysis at South African Airports 1999 to 2004. Proceedings of the 27th Conference of the International Bird Strike Committee, Athens Greece.
- Smallie, J. & Van Rooyen, C. 2005. Impact of bird streamers on quality of supply on transmission lines: a case study. Proceedings of the Fifth IASTED International Conference on Power and Energy Systems, Benalmadena, Spain.
- Smallie, J. & Van Rooyen, C. 2003. Risk assessment of bird interaction on the Hydra-Droërivier 1 and 2 400kV. Unpublished report to Eskom Transmission Group. Endangered Wildlife Trust. Johannesburg. South Africa
- Van Rooyen, C. Jenkins, A. De Goede, J. & Smallie J. 2003. Environmentally acceptable ways to minimise the incidence of power outages associated with large raptor nests on Eskom pylons in the Karoo: Lessons learnt to date. Project number 9RE-00005 / R1127 Technology Services International. Johannesburg. South Africa
- Smallie, J. J. & O'Connor, T. G. (2000) Elephant utilization of *Colophospermum mopane*: possible benefits of hedging. African Journal of Ecology 38 (4), 352-359.

Courses & training:

- Successfully completed a 5 day course in High Voltage Regulations (modules 1 to 10) conducted by Eskom – Southern Region
- Successfully completed training on, and obtained authorization for, live line installation of Bird Flappers

APPENDIX 1 – Curriculum Vitae

Curriculum Vitae

Jayson David John Orton

ARCHAEOLOGIST AND HERITAGE CONSULTANT

Contact Details and personal information:

Address: 23 Dover Road, Muizenberg, 7945
Telephone: (021) 788 1025
Cell Phone: 083 272 3225
Email: jayson@asha-consulting.co.za

Birth date and place: 22 June 1976, Cape Town, South Africa
Citizenship: South African
ID no: 760622 522 4085
Driver's License: Code 08
Marital Status: Married to Carol Orton
Languages spoken: English and Afrikaans

Education:

SA College High School	Matric	1994
University of Cape Town	B.A. (Archaeology, Environmental & Geographical Science)	1997
University of Cape Town	B.A. (Honours) (Archaeology)*	1998
University of Cape Town	M.A. (Archaeology)	2004
University of Oxford	D.Phil. (Archaeology)	2013

*Frank Schweitzer memorial book prize for an outstanding student and the degree in the First Class.

Employment History:

Spatial Archaeology Research Unit, UCT	Research assistant	Jan 1996 – Dec 1998
Department of Archaeology, UCT	Field archaeologist	Jan 1998 – Dec 1998
UCT Archaeology Contracts Office	Field archaeologist	Jan 1999 – May 2004
UCT Archaeology Contracts Office	Heritage & archaeological consultant	Jun 2004 – May 2012
School of Archaeology, University of Oxford	Undergraduate Tutor	Oct 2008 – Dec 2008
ACO Associates cc	Associate, Heritage & archaeological consultant	Jan 2011 – Dec 2013
ASHA Consulting (Pty) Ltd	Director, Heritage & archaeological consultant	Jan 2014 –

Professional Accreditation:

Association of Southern African Professional Archaeologists (ASAPA) membership number: 233
CRM Section member with the following accreditation:

- Principal Investigator: Coastal shell middens (awarded 2007)
  Stone Age archaeology (awarded 2007)
  Grave relocation (awarded 2014)
- Field Director: Rock art (awarded 2007)
  Colonial period archaeology (awarded 2007)

Association of Professional Heritage Practitioners (APHP) membership number: 43

- Accredited Professional Heritage Practitioner

➢ *Memberships and affiliations:*

South African Archaeological Society Council member	2004 – 2016
Assoc. Southern African Professional Archaeologists (ASAPA) member	2006 –
UCT Department of Archaeology Research Associate	2013 –
Heritage Western Cape APM Committee member	2013 –
UNISA Department of Archaeology and Anthropology Research Fellow	2014 –
Fish Hoek Valley Historical Association	2014 –
Kalk Bay Historical Association	2016 –
Association of Professional Heritage Practitioners member	2016 –

Fieldwork and project experience:

Extensive fieldwork and experience as both Field Director and Principle Investigator throughout the Western and Northern Cape, and also in the western parts of the Free State and Eastern Cape as follows:

Feasibility studies:

- Heritage feasibility studies examining all aspects of heritage from the desktop

Phase 1 surveys and impact assessments:

- Project types
  - Notification of Intent to Develop applications (for Heritage Western Cape)
  - Desktop-based Letter of Exemption (for the South African Heritage Resources Agency)
  - Heritage Impact Assessments (largely in the Environmental Impact Assessment or Basic Assessment context under NEMA and Section 38(8) of the NHRA, but also self-standing assessments under Section 38(1) of the NHRA)
  - Archaeological specialist studies
  - Phase 1 archaeological test excavations in historical and prehistoric sites
  - Archaeological research projects
- Development types
  - Mining and borrow pits
  - Roads (new and upgrades)
  - Residential, commercial and industrial development
  - Dams and pipe lines
  - Power lines and substations
  - Renewable energy facilities (wind energy, solar energy and hydro-electric facilities)

Phase 2 mitigation and research excavations:

- ESA open sites
  - Duinefontein, Gouda, Namaqualand
- MSA rock shelters
  - Fish Hoek, Yzerfontein, Cederberg, Namaqualand
- MSA open sites
  - Swartland, Bushmanland, Namaqualand
- LSA rock shelters
  - Cederberg, Namaqualand, Bushmanland
- LSA open sites (inland)
  - Swartland, Franschhoek, Namaqualand, Bushmanland
- LSA coastal shell middens
  - Melkbosstrand, Yzerfontein, Saldanha Bay, Paternoster, Dwarskersbos, Infanta, Knysna, Namaqualand
- LSA burials
  - Melkbosstrand, Saldanha Bay, Namaqualand, Knysna
- Historical sites
  - Franschhoek (farmstead and well), Waterfront (fort, dump and well), Noordhoek (cottage), variety of small excavations in central Cape Town and surrounding suburbs
- Historic burial grounds
  - Green Point (Prestwich Street), V&A Waterfront (Marina Residential), Paarl

Awards:

Western Cape Government Cultural Affairs Awards 2015/2016: Best Heritage Project.

Appendix 2

CURRICULUM VITAE

ELIZE BUTLER

PROFESSION:	Palaeontologist
YEARS' EXPERIENCE:	28 years in Palaeontology
EDUCATION:	B.Sc Botany and Zoology, 1988
	University of the Orange Free State
	B.Sc (Hons) Zoology, 1991
	University of the Orange Free State
	Management Course, 1991
	University of the Orange Free State
	M. Sc. *Cum laude* (Zoology), 2009
	University of the Free State

Dissertation title: The postcranial skeleton of the Early Triassic non-mammalian Cynodont *Galesaurus planiceps*: implications for biology and lifestyle

MEMBERSHIP

Palaeontological Society of South Africa (PSSA)	2006-currently

EMPLOYMENT HISTORY

Part time Laboratory assistant	Department of Zoology & Entomology University of the Free State Zoology 1989-1992
Part time laboratory assistant	Department of Virology

	University of the Free State Zoology 1992
Research Assistant	National Museum, Bloemfontein 1993 – 1997
Principal Research Assistant	National Museum, Bloemfontein
and Collection Manager	1998–currently

TECHNICAL REPORTS

Butler, E. 2014. Palaeontological Impact Assessment of the proposed development of private dwellings on portion 5 of farm 304 Matjesfontein Keurboomstrand, Knysna District, Western Cape Province. Bloemfontein.

Butler, E. 2014. Palaeontological Impact Assessment for the proposed upgrade of existing water supply infrastructure at Noupoort, Northern Cape Province. 2014. Bloemfontein.

Butler, E. 2015. Palaeontological impact assessment of the proposed consolidation, re-division and development of 250 serviced erven in Nieu-Bethesda, Camdeboo local municipality, Eastern Cape. Bloemfontein.

Butler, E. 2015. Palaeontological impact assessment of the proposed mixed land developments at Rooikraal 454, Vrede, Free State. Bloemfontein.

Butler, E. 2015. Palaeontological exemption report of the proposed truck stop development at Palmiet 585, Vrede, Free State. Bloemfontein.

Butler, E. 2015. Palaeontological impact assessment of the proposed Orange Grove 3500 residential development, Buffalo City Metropolitan Municipality East London, Eastern Cape. Bloemfontein.

Butler, E. 2015. Palaeontological Impact Assessment of the proposed Gonubie residential development, Buffalo City Metropolitan Municipality East London, Eastern Cape Province. Bloemfontein.

Butler, E. 2015. Palaeontological Impact Assessment of the proposed Ficksburg raw water pipeline. Bloemfontein.

Butler, E. 2015. Palaeontological Heritage Impact Assessment report on the establishment of the 65 mw Majuba Solar Photovoltaic facility and associated infrastructure on portion 1, 2 and 6 of the farm Witkoppies 81 HS, Mpumalanga Province. Bloemfontein.

Butler, E. 2015. Palaeontological Impact Assessment of the proposed township establishment on the remainder of portion 6 and 7 of the farm Sunnyside 2620, Bloemfontein, Mangaung metropolitan municipality, Free State, Bloemfontein.

Butler, E. 2015. Palaeontological Impact Assessment of the proposed Woodhouse 1 photovoltaic solar energy facilities and associated infrastructure on the farm Woodhouse729, near Vryburg, North West Province. Bloemfontein.

Butler, E. 2015. Palaeontological Impact Assessment of the proposed Woodhouse 2 photovoltaic solar energy facilities and associated infrastructure on the farm Woodhouse 729, near Vryburg, North West Province. Bloemfontein.

Butler, E. 2015. Palaeontological Impact Assessment of the proposed Orkney solar energy farm and associated infrastructure on the remaining extent of Portions 7 and 21 of the farm Wolvehuis 114, near Orkney, North West Province. Bloemfontein.

Butler, E. 2015. Palaeontological Impact Assessment of the proposed Spectra foods broiler houses and abattoir on the farm Maiden Manor 170 and Ashby Manor 171, Lukhanji Municipality, Queenstown, Eastern Cape Province. Bloemfontein.

Butler, E. 2016. Palaeontological Impact Assessment of the proposed construction of the 150 MW Noupoort concentrated solar power facility and associated infrastructure on portion 1 and 4 of the farm Carolus Poort 167 and the remainder of Farm 207, near Noupoort, Northern Cape. Prepared for Savannah Environmental. Bloemfontein.

Butler, E. 2016. Palaeontological Impact Assessment of the proposed Woodhouse 1 Photovoltaic Solar Energy facility and associated infrastructure on the farm Woodhouse 729, near Vryburg, North West Province. Bloemfontein.

Butler, E. 2016. Palaeontological Impact Assessment of the proposed Woodhouse 2 Photovoltaic Solar Energy facility and associated infrastructure on the farm Woodhouse 729, near Vryburg, North West Province. Bloemfontein.

Butler, E. 2016. Proposed 132kV overhead power line and switchyard station for the authorised Solis Power 1 CSP project near Upington, Northern Cape. Bloemfontein.

Butler, E. 2016. Palaeontological Impact Assessment of of the proposed Senqu Pedestrian Bridges in Ward 5 of Senqu Local Municipality, Eastern Cape Province. Bloemfontein.

Butler, E. 2016. Recommendation from further Palaeontological Studies: Proposed Construction of the Modderfontein Filling Station on Erf 28 Portion 30, Founders Hill, City Of Johannesburg, Gauteng Province. Bloemfontein.

Butler, E. 2016. Recommendation from further Palaeontological Studies: Proposed Construction of the Modikwa Filling Station on a Portion of Portion 2 of Mooihoek 255 Kt, Greater Tubatse Local Municipality, Limpopo Province. Bloemfontein.

Butler, E. 2016. Recommendation from further Palaeontological Studies: Proposed Construction of the Heidedal filling station on Erf 16603, Heidedal Extension 24, Mangaung Local Municipality, Bloemfontein, Free State Province. Bloemfontein.

Butler, E. 2016. Recommended Exemption from further Palaeontological studies: Proposed Construction of the Gunstfontein Switching Station, 132kv Overhead Power Line (Single Or Double Circuit) and ancillary infrastructure for the Gunstfontein Wind Farm Near Sutherland, Northern Cape Province. Savannah South Africa. Bloemfontein.

Butler, E. 2016. Palaeontological Impact Assessment of the proposed Galla Hills Quarry on the remainder of the farm Roode Krantz 203, in the Lukhanji Municipality, division of Queenstown, Eastern Cape Province. Bloemfontein.

Butler, E. 2016. Chris Hani District Municipality Cluster 9 water backlog project phases 3a and 3b: Palaeontology inspection at Tsomo WTW. Bloemfontein.

Butler, E. 2016. Palaeontological Impact Assessment of the proposed construction of the 150 MW Noupoort concentrated solar power facility and associated infrastructure on portion 1 and 4 of the farm Carolus Poort 167 and the remainder of Farm 207, near Noupoort, Northern Cape. Savannah South Africa. Bloemfontein.

Butler, E. 2016. Palaeontological Impact Assessment of the proposed upgrading of the main road MR450 (R335) from Motherwell to Addo within the Nelson Mandela Bay Municipality and Sunday's River valley Local Municipality, Eastern Cape Province. Bloemfontein.

Butler, E. 2016. Palaeontological Impact Assessment construction of the proposed Metals Industrial Cluster and associated infrastructure near Kuruman, Northern Cape Province. Savannah South Africa. Bloemfontein.

Butler, E. 2016. Palaeontological Impact Assessment for the proposed construction of up to a 132kv power line and associated infrastructure for the proposed Kalkaar Solar Thermal Power Plant near Kimberley, Free State and Northern Cape Provinces. PGS Heritage. Bloemfontein.

Butler, E. 2016. Palaeontological Impact Assessment of the proposed development of two burrow pits (DR02625 and DR02614) in the Enoch Mgijima Municipality, Chris Hani District, Eastern Cape.

Butler, E. 2016. Ezibeleni waste Buy-Back Centre (near Queenstown), Enoch Mgijima Local Municipality, Eastern Cape. Bloemfontein.

Butler, E. 2016. Palaeontological Impact Assessment for the proposed construction of two 5 Mw Solar Photovoltaic Power Plants on Farm Wildebeestkuil 59 and Farm Leeuwbosch 44, Leeudoringstad, North West Province. Bloemfontein.

Butler, E. 2016. Palaeontological Impact Assessment for the proposed development of four Leeuwberg Wind farms and basic assessments for the associated grid connection near Loeriesfontein, Northern Cape Province. Bloemfontein.

Butler, E. 2016. Palaeontological impact assessment for the proposed Aggeneys south prospecting right project, Northern Cape Province. Bloemfontein.

Butler, E. 2016. Palaeontological impact assessment of the proposed Motuoane Ladysmith Exploration right application, KwaZulu Natal. Bloemfontein.

Butler, E. 2016. Palaeontological impact assessment for the proposed construction of two 5 MW solar photovoltaic power plants on farm Wildebeestkuil 59 and farm Leeuwbosch 44, Leeudoringstad, North West Province. Bloemfontein.

Butler, E. 2016: Palaeontological desktop assessment of the establishment of the proposed residential and mixed use development on the remainder of portion 7 and portion 898 of the farm Knopjeslaagte 385 Ir, located near Centurion within the Tshwane Metropolitan Municipality of Gauteng Province. Bloemfontein.

Butler, E. 2017. Palaeontological impact assessment for the proposed development of a new cemetery, near Kathu, Gamagara local municipality and John Taolo Gaetsewe district municipality, Northern Cape. Bloemfontein.

Butler, E. 2017. Palaeontological Impact Assessment Of The Proposed Development Of The New Open Cast Mining Operations On The Remaining Portions Of 6, 7, 8 And 10 Of The Farm Kwaggafontein 8 In The Carolina Magisterial District, Mpumalanga Province. Bloemfontein.

Butler, E. 2017. Palaeontological Desktop Assessment for the Proposed Development of a Wastewater Treatment Works at Lanseria, Gauteng Province. Bloemfontein.

Butler, E. 2017. Palaeontological Scoping Report for the Proposed Construction of a Warehouse and Associated Infrastructure at Perseverance in Port Elizabeth, Eastern Cape Province.

Butler, E. 2017. Palaeontological Desktop Assessment for the Proposed Establishment of a Diesel Farm and a Haul Road for the Tshipi Borwa mine Near Hotazel, In the John Taolo Gaetsewe District Municipality in the Northern Cape Province. Bloemfontein.

Butler, E. 2017. Palaeontological Desktop Assessment for the Proposed Changes to Operations at the UMK Mine near Hotazel, In the John Taolo Gaetsewe District Municipality in the Northern Cape Province. Bloemfontein.

Butler, E. 2017. Palaeontological Impact Assessment for the Development of the Proposed Ventersburg Project-An Underground Mining Operation near Ventersburg and Henneman, Free State Province. Bloemfontein.

Butler, E. 2017. Palaeontological desktop assessment of the proposed development of a 3000 MW combined cycle gas turbine (CCGT) in Richards Bay, Kwazulu-Natal. Bloemfontein.

Butler, E. 2017. Palaeontological Impact Assessment for the Development of the Proposed Revalidation of the lapsed General Plans for Elliotdale, Mbhashe Local Municipality. Bloemfontein.

Butler, E. 2017. Palaeontological assessment of the proposed development of a 3000 MW Combined Cycle Gas Turbine (CCGT) in Richards Bay, Kwazulu-Natal. Bloemfontein.

Butler, E. 2017. Palaeontological Impact Assessment of the proposed development of the new open cast mining operations on the remaining portions of 6, 7, 8 and 10 of the farm Kwaggafontein 8 10 in the Albert Luthuli Local Municipality, Gert Sibande District Municipality, Mpumalanga Province. Bloemfontein.

Butler, E. 2017. Palaeontological Impact Assessment of the proposed mining of the farm Zandvoort 10 in the Albert Luthuli Local Municipality, Gert Sibande District Municipality, Mpumalanga Province. Bloemfontein.

Butler, E. 2017. Palaeontological Desktop Assessment for the proposed Lanseria outfall sewer pipeline in Johannesburg, Gauteng Province. Bloemfontein.

Butler, E. 2017. Palaeontological Desktop Assessment of the proposed development of open pit mining at Pit 36W (New Pit) and 62E (Dishaba) Amandelbult Mine Complex, Thabazimbi, Limpopo Province. Bloemfontein.

Butler, E. 2017. Palaeontological impact assessment of the proposed development of the sport precinct and associated infrastructure at Merrifield Preparatory school and college, Amathole Municipality, East London. PGS Heritage. Bloemfontein.

Butler, E. 2017. Palaeontological impact assessment of the proposed construction of the Lehae training and fire station, Lenasia, Gauteng Province. Bloemfontein.

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CURRICULUM VITAE

Dr. David Barry Hoare

B.Sc. (Hons), M.Sc., Ph.D., Pr.Nat.Sci. (Ecology, Botany)

Contact details
Postnet Suite #116
Private Bag X025, Lynnwood Ridge, 0040
Tel.: (012) 804 2281
Fax: 086 550 2053
Cell: 083 284 5111
E-mail: dhoare@lantic.net

Personal information
Date of birth: 04 November 1966, Grahamstown, South Africa
Citizenship: Republic of South Africa
ID no.: 661104 5024 088

Education
Matric - Graeme College, Grahamstown, 1984
B.Sc (majors: Botany, Zoology) - Rhodes University, 1991-1993
B.Sc (Hons) (Botany) - Rhodes University, 1994 with distinction
M.Sc (Botany) - University of Pretoria, 1995-1997 with distinction
PhD (Botany) – Nelson Mandela Metropolitan University, Port Elizabeth

Main areas of specialisation
- Vegetation ecology, primarily in grasslands, thicket, coastal systems, wetlands.
- Plant biodiversity and threatened plant species specialist.
- Alien plant identification and control / management plans.
- Remote sensing, analysis and mapping of vegetation.
- Specialist consultant for environmental management projects.

Membership
Professional Natural Scientist, South African Council for Natural Scientific Professions, 16 August 2005 – present. Reg. no. 400221/05 (Ecology, Botany)
Member, International Association of Vegetation Scientists (IAVS)
Member, Ecological Society of America (ESA)
Member, International Association for Impact Assessment (IAIA)
Member, Herpetological Association of Africa (HAA)

Employment history
1 December 2004 – present, Director, David Hoare Consulting (Pty) Ltd. Consultant, specialist consultant contracted to various companies and organisations.
1January 2009 – 30 June 2009, Lecturer, University of Pretoria, Botany Dept.
1January 2013 – 30 June 2013, Lecturer, University of Pretoria, Botany Dept.
1 February 1998 – 30 November 2004, Researcher, Agricultural Research Council, Range and Forage Institute, Private Bag X05, Lynn East, 0039. Duties: project management, general vegetation ecology, remote sensing image processing.

Experience as consultant
Ecological consultant since 1995. Author of over 380 specialist ecological consulting reports. Wide experience in ecological studies within grassland, savanna and fynbos, as well as riparian, coastal and wetland vegetation.

Publication record:
Refereed scientific articles (in chronological order):
Journal articles:

HOARE, D.B. & BREDENKAMP, G.J. 1999. Grassland communities of the Amatola / Winterberg mountain region of the Eastern Cape, South Africa. *South African Journal of Botany* 64: 44-61.

HOARE, D.B., VICTOR, J.E., LUBKE, R.A. & MUCINA, L., 2000. Vegetation of the coastal fynbos and rocky headlands south of George, South Africa. *Bothalia* 30: 87-96.

VICTOR, J.E., **HOARE, D.B.** & LUBKE, R.A., 2000. Checklist of plant species of the coastal fynbos and rocky headlands south of George, South Africa. *Bothalia* 30: 97-101.

MUCINA, L, BREDENKAMP, G.J., **HOARE, D.B** & MCDONALD, D.J. 2000. A National Vegetation Database for South Africa *South African Journal of Science* 96: 1-2.

HOARE, D.B. & BREDENKAMP, G.J. 2001. Syntaxonomy and environmental gradients of the grasslands of the Stormberg / Drakensberg mountain region of the Eastern Cape, South Africa.. *South African Journal of Botany* 67: 595 – 608.

LUBKE, R.A., **HOARE, D.B.**, VICTOR, J.E. & KETELAAR, R. 2003. The vegetation of the habitat of the Brenton blue butterfly, Orachrysops niobe (Trimen), in the Western Cape, South Africa. *South African Journal of Science* 99: 201–206.

HOARE, D.B & FROST, P. 2004. Phenological classification of natural vegetation in southern Africa using AVHRR vegetation index data. *Applied Vegetation Science* 7: 19-28.

FOX, S.C., HOFFMANN, M.T. and HOARE, D. 2005. The phenological pattern of vegetation in Namaqualand, South Africa and its climatic correlates using NOAA-AVHRR NDVI data. South African Geographic Journal, 87: 85–94.

PFAB, M.F., COMPAAN, P.C., WHITTINGTON-JONES, C.A., ENGELBRECHT, I., DUMALISILE, L., MILLS, L., WEST, S.D., MULLER, P., MASTERSON, G.P.R., NEVHUTALU, L.S., HOLNESS, S.D., **HOARE, D.B.** 2017. The Gauteng Conservation Plan: Planning for biodiversity in a rapidly urbanising province. Bothalia, Vol. 47:1. a2182. https://doi.org/10.4102/abc.v47i1.2182.

Book chapters and conference proceedings:

HOARE, D.B. 2002. Biodiversity and performance of grassland ecosystems in communal and commercial farming systems in South Africa. Proceedings of the FAO's Biodiversity and Ecosystem Approach in Agriculture, Forestry and Fisheries Event: 12–13 October, 2002. Food and Agriculture Organisation of the United Nations, Viale delle Terme di Caracalla, Rome, Italy. pp. 10 - 27.

STEENKAMP, Y., VAN WYK, A.E., VICTOR, J.E., **HOARE, D.B.**, DOLD, A.P., SMITH, G.F. & COWLING, R.M. 2005. Maputaland-Pondoland-Albany Hotspot. In: Mittermeier, R.A., Gil, P.R., Hoffmann, M., Pilgrim, J., Brooks, T., Mittermeier, C.G., Lamoreux, J. & Fonseca, G.A.B. da (eds.) *Hotspots revisited.* CEMEX, pp.218–229. ISBN 968-6397-77-9

STEENKAMP, Y., VAN WYK, A.E., VICTOR, J.E., **HOARE, D.B.**, DOLD, A.P., SMITH, G.F. & COWLING, R.M. 2005. Maputaland-Pondoland-Albany Hotspot. http://www.biodiversityhotspots.org/xp/hotspots/maputaland/.

HOARE, D.B., MUCINA, L., RUTHERFORD, M.C., VLOK, J., EUSTON-BROWN, D., PALMER, A.R., POWRIE, L.W., LECHMERE-OERTEL, R.G., PROCHES, S.M., DOLD, T. and WARD, R.A. *Albany Thickets.* in Mucina, L. and Rutherford, M.C. (eds.) 2006. The vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* 19, South African National Biodiversity Institute, Pretoria.

MUCINA, L., **HOARE, D.B.**, LÖTTER, M.C., DU PREEZ, P.J., RUTHERFORD, M.C., SCOTT-SHAW, C.R., BREDENKAMP, G.J., POWRIE, L.W., SCOTT, L., CAMP, K.G.T., CILLIERS, S.S., BEZUIDENHOUT, H., MOSTERT, T.H., SIEBERT, S.J., WINTER, P.J.D., BURROWS, J.E., DOBSON, L., WARD, R.A., STALMANS, M., OLIVER, E.G.H., SIEBERT, F., SCHMIDT, E., KOBISI, K., KOSE, L. 2006. *Grassland Biome.* In: Mucina, L. & Rutherford, M.C. (eds.) The vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* 19. South African National Biodiversity Institute, Pretoria.

RUTHERFORD, M.C., MUCINA, L., LÖTTER, M.C., BREDENKAMP, G.J., SMIT, J.H.L., SCOTT-SHAW, C.R., **HOARE, D.B.**, GOODMAN, P.S., BEZUIDENHOUT, H., SCOTT, L. & ELLIS, F., POWRIE, L.W., SIEBERT, F., MOSTERT, T.H., HENNING, B.J., VENTER, C.E., CAMP, K.G.T., SIEBERT, S.J., MATTHEWS, W.S., BURROWS, J.E., DOBSON, L., VAN ROOYEN, N., SCHMIDT, E., WINTER, P.J.D., DU PREEZ, P.J., WARD, R.A., WILLIAMSON, S. and HURTER, P.J.H. 2006. *Savanna Biome.* In: Mucina, L. & Rutherford, M.C. (eds.) The vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* 19. South African National Biodiversity Institute, Pretoria.

MUCINA, L., RUTHERFORD, M.C., PALMER, A.R., MILTON, S.J., SCOTT, L., VAN DER MERWE, B., **HOARE, D.B.**, BEZUIDENHOUT, H., VLOK, J.H.J., EUSTON-BROWN, D.I.W., POWRIE, L.W. & DOLD, A.P.

2006. *Nama-Karoo Biome.* In: Mucina, L. & Rutherford, M.C. (eds.) The vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* 19. South African National Biodiversity Institute, Pretoria.

MUCINA, L., SCOTT-SHAW, C.R., RUTHERFORD, M.C., CAMP, K.G.T., MATTHEWS, W.S., POWRIE, L.W. and **HOARE, D.B.** 2006. *Indian Ocean Coastal Belt.* In: Mucina, L. & Rutherford, M.C. (eds.) The vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* 19. South African National Biodiversity Institute, Pretoria.

Conference Presentations:

HOARE, D.B. & LUBKE, R.A. *Management effects on diversity at Goukamma Nature Reserve, Southern Cape*; Paper presentation, Fynbos Forum, Bienne Donne, July 1994

HOARE, D.B., VICTOR, J.E. & LUBKE, R.A. *Description of the coastal fynbos south of George, southern Cape*; Paper presentation, Fynbos Forum, Bienne Donne, July 1994

HOARE, D.B. & LUBKE, R.A. *Management effects on fynbos diversity at Goukamma Nature Reserve, Southern Cape*; Paper presentation, South African Association of Botanists Annual Congress, Bloemfontein, January 1995

HOARE, D.B. & BOTHA, C.E.J. *Anatomy and ecophysiology of the dunegrass Ehrharta villosa var. maxima*; Poster presentation, South African Association of Botanists Annual Congress, Bloemfontein, January 1995

HOARE, D.B., PALMER, A.R. & BREDENKAMP, G.J. 1996. *Modelling grassland community distributions in the Eastern Cape using annual rainfall and elevation*; Poster presentation, South African Association of Botanists Annual Congress, Stellenbosch, January 1996

HOARE, D.B. *Modelling vegetation on a past climate as a test for palaeonological hypotheses on vegetation distributions*; Paper presentation, Randse Afriakaanse Universiteit postgraduate symposium, 1997

HOARE, D.B., VICTOR, J.E. & BREDENKAMP, G.J. *Historical and ecological links between grassy fynbos and afromontane fynbos in the Eastern Cape*; Paper presentation, South African Association of Botanists Annual Congress, Cape Town, January 1998

LUBKE, R.A., HOARE, D.B., VICTOR, J.E. & KETELAAR, R. *The habitat of the Brenton Blue Butterfly*. Paper presentation, South African Association of Botanists Annual Congress, Cape Town, January 1998

HOARE, D.B. & PANAGOS, M.D. Satellite stratification of vegetation – structure or floristic composition? Poster presentation at the 34th Annual Congress of the Grassland Society of South Africa, Warmbaths, 1-4 February 1999.

HOARE, D.B. & WESSELS, K. Conservation status and threats to grasslands of the northern regions of South Africa, Poster presentation at the South African Association of Botanists Annual Congress, Potchefstroom, January 2000.

HOARE, D.B. Phenological dynamics of Eastern Cape vegetation. Oral paper presentation at the South African Association of Botanists Annual Congress, Grahamstown, January 2002.

HOARE, D.B., MUCINA, L., VAN DER MERWE, J.P.H. & PALMER, A.R. Classification and digital mapping of grasslands of the Eastern Cape Poster presentation at the South African Association of Botanists Annual Congress, Grahamstown, January 2002.

HOARE, D.B. Deriving phenological variables for Eastern Cape vegetation using satellite data Poster presentation at the South African Association of Botanists Annual Congress, Grahamstown, January 2002.

MUCINA, L., RUTHERFORD, M.C., HOARE, D.B. & POWRIE, L.W. 2003. VegMap: The new vegetation map of South Africa, Lesotho and Swaziland. In: Pedrotti, F. (ed.) Abstracts: Water Resources and Vegetation, 46th Symposium of the International Association for Vegetation Science, June 8 to 14 – Napoli, Italy.

HOARE, D.B. 2003. Species diversity patterns in moist temperate grasslands of South Africa. Proceedings of the VIIth International Rangeland Congress, 26 July – 1 August 2003, Durban South Africa. African Journal of Range and Forage Science. 20: 84.

Unpublished technical reports:

PALMER, A.R., HOARE, D.B. & HINTSA, M.D., 1999. Using satellite imagery to map veld condition in Mpumalanga: A preliminary report. Report to the National Department of Agriculture (Directorate Resource Conservation). ARC Range and Forage Institute, Grahamstown.

HOARE, D.B. 1999. The classification and mapping of the savanna biome of South Africa: methodology for mapping the vegetation communities of the South African savanna at a scale of 1:250 000. Report to the National Department of Agriculture (Directorate Resource Conservation). ARC Range and Forage Institute, Pretoria.

HOARE, D.B. 1999. The classification and mapping of the savanna biome of South Africa: size and coverage of field data that exists on the database of vegetation data for South African savanna. Report to the National Department of Agriculture (Directorate Resource Conservation). ARC Range and Forage Institute, Pretoria.

THOMPSON, M.W., VAN DEN BERG, H.M., NEWBY, T.S. & HOARE, D.B. 2001. Guideline procedures for national land-cover mapping and change monitoring. Report no. ENV/P/C 2001-006 produced for Department of Water Affairs and Forestry, National Department of Agriculture and Department of Environment Affairs and Tourism. Copyright: Council for Scientific and Industrial Research (CSIR) and Agricultural Research Council (ARC).

HOARE, D.B. 2003. Natural resource survey of node O R Tambo, using remote sensing techniques, Unpublished report and database of field data for ARC Institute for Soil, Climate & Water, ARC Range and Forage Institute, Grahamstown.

HOARE, D.B. 2003. Short-term changes in vegetation of Suikerbosrand Nature Reserve, South Africa, on the basis of resampled vegetation sites. Gauteng Department of Agriculture, Conservation, Environment and Land Affairs, Conservation Division.

BRITTON, D., SILBERBAUER, L., ROBERTSON, H., LUBKE, R., HOARE, D., VICTOR, J., EDGE, D. & BALL, J. 1997. The Life-history, ecology and conservation of the Brenton Blue Butterfly (*Orachrysops niobe*) (Trimen)(*Lycaenidea*) at Brenton-on-Sea. Unpublished report for the Endangered Wildlife Trust of Southern Africa, Johannesburg. 38pp.

HOARE, D.B., VICTOR, J.E. & MARNEWIC, G. 2005. Vegetation and flora of the wetlands of Nylsvley River catchment as component of a project to develop a framework for the sustainable management of wetlands in Limpopo Province.

Consulting reports:

Total of over 380 specialist consulting reports for various environmental projects from 1995 – present.

Workshops / symposia attended:

International Association for Impact Assessment Annual Congress, Durban, 16 – 19 May 2018.

Workshop on remote sensing of rangelands presented by Paul Tueller, University of Nevada Reno, USA, VIIth International Rangeland Congress, 26 July – 1 August 2003, Durban South Africa.

VIIth International Rangeland Congress, 26 July – 1 August 2003, Durban South Africa.

BioMap workshop, Stellenbosch, March 2002 to develop strategies for studying vegetation dynamics of Namaqualand using remote sensing techniques

South African Association of Botanists Annual Congress, Grahamstown, January 2002.

28th International Symposium on Remote Sensing of Environment, Somerset West, 27-31 March 2000.

Workshop on Vegetation Structural Characterisation: Tree Cover, Height and Biomass, 28th International Symposium on Remote Sensing of Environment, Strand, 26 March 2000.

South African Association of Botanists Annual Congress, Potchefstroom, January 2000

National Botanical Institute Vegmap Workshop, Kirstenbosch, Cape Town, 30 September-1 October 1999.

Sustainable Land Management – Guidelines for Impact Monitoring, Orientation Workshop: Sharing Impact Monitoring Experience, Zithabiseni, 27-29 September 1999.

WWF Macro Economic Reforms and Sustainable Development in Southern Africa, Environmental Economic Training Workshop, development Bank, Midrand, 13-14 September 1999.

34th Annual Congress of the Grassland Society of South Africa, Warmbaths, 1-4 February 1999

Expert Workshop on National Indicators of Environmental Sustainable Development, Dept. of Environmental Affairs and Tourism, Roodevallei Country Lodge, Roodeplaat Dam, Pretoria, 20-21 October 1998.

South African Association of Botanists Annual Congress, Cape Town, January 1998

Randse Afriakaanse Universiteit postgraduate symposium, 1997.

South African Association of Botanists Annual Congress, Bloemfontein, January 1995.

Referees:

Prof. Roy Lubke, Associate Professor Emeritus, Botany Department, Rhodes University, Grahamstown Tel: 0461-318 592. E-mail: r.lubke@ru.ac.za

Prof. Richard Cowling, Botany Department, Nelson Mandela Metropolitan University, Tel (042) 298 0259 E-mail: rmc@kingsley.co.za

Michele Pfab, Scientific Co-ordinator: Scientific Authority, Applied Biodiversity Research, South African National Biodiversity Institute, (012) 843 5025, E-mail: M.Pfab@sanbi.org.za

CURRICULUM VITAE

KERRY LIANNE SCHWARTZ

ASSOCIATE GIS CONSULTANT

EMPA, South Africa

QUALIFICATIONS

BA	1982	Geography, Leeds Trinity University, UK

EXPERTISE

- GIS, spatial modelling and 3D analysis
- Visual Impact Assessment
- Fatal Flaw Assessments
- Glint and Glare Assessments

Kerry is a highly focused and dedicated Spatial Professional with strong technical skills and some 27 years' experience in the application and use of geographic analysis and geospatial technologies in support of a range of environmental and development planning projects. While Kerry's expertise is largely centred on the management and presentation of geospatial data for environmental impact assessments, her GIS skills are frequently utilised in support of a range of other projects, including:

- Strategic environmental assessments and management plans;
- Visual and landscape assessments;
- Glint and glare assessments;
- Wetland / surface water assessments;
- Catchment delineation for floodline analysis;
- Urban and Rural Development Planning;
- Transport Assessments; and
- Infrastructure Development Planning.

Kerry has extended her skills base to include the undertaking of specialist Visual Impact Assessments (VIAs) for a range of projects, including renewable energy, power line and residential / mixed-use developments.

PROJECTS

A selection of Kerry's key project's are presented below.

Built Infrastructure

EIA and EMP for a 9km railway line and water pipeline for manganese mine – Kalagadi Manganese	Kerry was responsible for GIS analysis and mapping in support of the EIA project in the Northern Cape, South Africa.
EIA and EMP for 5x 440kV Transmission Lines between Thyspunt (proposed nuclear power station site) and several substations	Kerry was responsible for GIS analysis and mapping in support of the EIA project in the Port Elizabeth area in the Eastern Cape, South Africa.

EIA for multi petroleum products pipeline from Kendall Waltloo, and from Jameson Park to Langlaagte Tanks farms Pipelines	Kerry was responsible for GIS analysis and mapping in support of the EIA project.
Environmental Management Plan for copper and cobalt mine	Kerry was responsible for GIS analysis and mapping in support of the EMP project in the Democratic Republic of Congo.
EIA and Agricultural Feasibility study for Miwani Sugar Mill	Kerry was responsible for GIS analysis and mapping in support of the EIA project in Kenya.
EIAs for several Solar Photovoltaic Energy Facilities and associated infrastructure	Kerry was responsible for GIS analysis and mapping in support of several EIAs for Solar PV facilities, the most recent projects being: • Oya Energy Facility (Western Cape Province); • Mooi Plaats, Wonderheuvel and Paarde Valley Solar PV Facilities (Northern Cape Province); and • Sendawo 1, 2 and 3 Solar Energy Facilities (North West Province).
EIAs / BAs for several WEFs and associated infrastructure	Kerry was responsible for GIS analysis and mapping in support of several EIAs for Wind Energy Farms, the most recent projects being: • Tooverberg WEF (Western Cape Province); • Rondekop WEF (Western Cape Province); and • Graskoppies, Hartebeest Leegte, Ithuba and !Xha Boom (Leeuwberg Cluster) WEFs (Northern Cape Province).
Basic Assessments for various 400kV and 132kV Distribution Lines for the Transnet Coal Link Upgrade Project	Kerry was responsible for GIS analysis and mapping in support of the powerline BA project in KwaZulu-Natal and Mpumalanga, South Africa.
Environmental Assessment for the proposed Moloto Development Corridor	Kerry was responsible for GIS analysis and mapping in support of the EIA project in the Limpopo Province.
Environmental Advisory Services for the Gauteng Rapid Rail Extensions Feasibility Project	Kerry was responsible for GIS analysis and mapping in support of a feasibility study for a rail extension in Gauteng, South Africa.
Environmental Screening for the Strategic Logistics and Industrial Corridor Plan for Strategic Infrastructure Project 2	Kerry was responsible for GIS analysis and mapping in support of the environmental screening for strategic infrastructure in KwaZulu-Natal, the Free State and Gauteng.

Fatal Flaw Assessments for various proposed Renewable Energy Facilities	Kerry was responsible for GIS analysis and mapping in support of fatal flaw assessment for renewable energy projects in the Northern Cape and Western Cape Provinces.
	Strategic Planning
Lesotho Highlands Development Association – Lesotho	GIS database development for socio-economic and health indicators arising from Social Impact Assessments
Development Plans for the adjacent towns of Kasane and Kazungula and for the rural village of Hukuntsi	Kerry was responsible for GIS database management, spatial data analysis and mapping for the development plans for towns in Botswana.
Integrated Development Plans for various District and Local Municipalities	Kerry was responsible for GIS database management, spatial data analysis and mapping for various IDPs for District Municipalities in KwaZulu-Natal.
Rural Development Initiative and Rural Roads Identification for uMhlathuze Local Municipality	Kerry was responsible for GIS database management, spatial data analysis and mapping for rural road identification in the uMhlathuze Local Municipality in KwaZulu-Natal.
Tourism Initiatives and Master Plans for areas such as the Mapungubwe Cultural Landscape	Kerry was responsible for GIS database management, spatial data analysis and mapping for various Master Plans in the Limpopo and Northern Cape Provinces.
Spatial Development Frameworks for various Local and District Municipalities	Kerry was responsible for GIS database management, spatial data analysis and mapping for Spatial Development Frameworks for various Municipalities in KwaZulu-Natal, Mpumalanga and the Free State.
Land Use Management Plans/Systems (LUMS) for various Local Municipalities	Kerry was responsible for GIS database management, spatial data analysis and mapping for the development of Land Use Management Systems for various Local Municipalities in KwaZulu-Natal.
Land use study for the Johannesburg Inner City Summit and Charter	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Johannesburg Inner City land use study.
Due Diligence Investigation for the Port of Richards Bay	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Port of Richards Bay Due Diligence Investigation.
	State of the Environment Reporting
2008 State of the Environment Report for City of Johannesburg	Kerry was responsible for GIS database management, spatial data analysis and mapping for the 2008 Johannesburg State of the Environment Report.

	Strategic Environmental Assessments and Environmental Management Frameworks
SEA for Greater Clarens	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Greater Clarens SEA in the Free State Province.
SEA for the Marula Region of the Kruger National Park	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Marula Region SEA on behalf of SANParks.
SEA for Thanda Private Game Reserve	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Thanda Private Game Reserve SEA in KwaZulu-Natal.
SEA for KwaDukuza Local Municipality	Kerry was responsible for GIS database management, spatial data analysis and mapping for the KwaDukuza Local Municipality SEA in KwaZulu-Natal.
SEA for Molemole Local Municipality, Capricorn District Municipality	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Molemole Local Municipality SEA in Limpopo Province.
SEA for Blouberg Local Municipality, Capricorn District Municipality	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Blouberg Local Municipality in Limpopo Province.
SEA for the Bishopstowe study area in the Msunduzi Local Municipality	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Bishopstowee SEA in KwaZulu-Natal.
EMF for proposed Renishaw Estate	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Reinshaw Estate EMF in KwaZulu-Natal.
EMF for Mogale City Local Municipality, Mogale City Local Municipality	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Mogale City Local Municipality EMF in Gauteng.
	Visual Impact Assessments
VIAs for various Solar Power Plants and associated grid connection infrastructure	Kerry was responsible for the GIS mapping and visual impact assessments for various Solar Power Plants and associated grid connection infrastructure (Northern Cape, Free State, Limpopo and North West Province) the most recent projects being: • Oya Energy Facility (Western Cape Province); • Mooi Plaats, Wonderheuvel and Paarde Valley Solar PV facilities (Northern Cape Province); and • Nokukhanya Solar PV Facility (Limpopo Province.

VIAs for various WEFs and associated grid connection infrastructure	Kerry was responsible for the GIS mapping and visual impact assessments for various Wind Energy Farms and associated grid connection infrastructure (Northern Cape and Western Cape), the most recent projects including: • Gromis and Komas WEFs (Northerrn Cape Province). • Paulputs WEF (Northern Cape Province); • Kudusberg WEF (Western Cape Province); • Tooverberg WEF (Western Cape Province); • Rondekop WEF (Northern Cape Province); and • San Kraal and Phezukomya WEFs (Northern Cape Province).
VIAs for various 400kV and 132kV Distribution Lines for the Transnet Coal Link Upgrade Project	Kerry was responsible for the GIS mapping and visual impact assessments for various powerlines in KwaZulu-Natal and Mpumalanga Provinces.
VIAs for the proposed Assagay Valley and Kassier Road North Mixed Use Development	Kerry was responsible for the GIS mapping and a visual impact assessment for the Assagay Valley and Kassier Road North Mixed Use Development in KwaZulu-Natal.
VIA for the proposed Tinley Manor South Banks Development	Kerry was responsible for the GIS mapping and a visual impact assessment for the Tinley Manor Southbanks Coastal Development in KwaZulu-Natal.
VIA for the proposed Tinley Manor South Banks Beach Enhancement Solution	Kerry was responsible for the GIS mapping and a visual impact assessment for the Tinley Beach Enhancement EIA in KwaZulu-Natal.
VIA for the proposed Mlonzi Hotel and Golf Estate Development	Kerry was responsible for the GIS mapping and a visual impact assessment for the Mlonzi Hotel and Golf Estate in the Eastern Cape.
Landscape Assessment for the Mogale City Local Municipality	Kerry was responsible for the GIS mapping and a visual impact assessment for the Mogale City Local Municipality landscape assessment.

MEMBERSHIPS

GISSA	Member of Geo-Information Society of South Africa
SAGC	Registered as GISc Technician with the South African Geomatics Council, Membership No. GTc GISc 1187

KSchwartz

04 February 2022

APPENDIX B: SENSITIVITY OVERLAY MAP

PERSEUS

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LEGEND

- Artemis-Oxford_132kV_Line
- Artemis-Oxford_400kV_Line
- Proposed_132kV_400kV_150m_Buffer
- Approved_132kV_400kV_MTS
- Approved Kentani_Substation
- Approved Kentani_Solar_PV_Area

Heritage Waypoints

- NFEPA wetlands clipped 50m buffer
- Wetlands
- Wetlands 50m buffer
- Wetlands 500m WUA Regulated Zone
- 1.50000 watercourse 32m buffer
- Water courses
- Critical biodiveristy area 1
- Ecological support area 1
- Ecological support area 2
- Eskom_Substations

N

0 0,375 0,75 1,5 2,25 3

Kilometers

Scale - 1: 40 000 @ A3

Projection: Transverse Mercator
WGS84,

Artemis-Oxford Mast and 132kV and 400kV

Sensitivity Map

SLR Consulting
(Cape Town office), 5th Floor,
Letterstedt House, Newlands on Main
Cnr Main and Campground Roads
Newlands Cape Town 7700

720.13101.00013 | Date: 2022/09/06

APPENDIX C: METHOD STATEMENT CONTROL SHEET

To be prepared by the contractor prior to commencement of the activity.

AFRICAN OFFICES

South Africa

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