



**Appendix 8**  
**Draft EMPr**




**MOOI PLAATS SOLAR POWER (PTY) LTD**

**Proposed Development of the  
Mooi Plaats On-site Eskom  
Substation, Eskom Collector  
Substation and associated  
132kV Power Line near  
Noupoort in the Northern Cape  
Province**

**Draft Environmental Management  
Programme (EMPr)**

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# MOOI PLAATS SOLAR POWER (PTY) LTD

## PROPOSED DEVELOPMENT OF THE MOOI PLAATS ON-SITE ESKOM SUBSTATION, ESKOM COLLECTOR SUBSTATION AND ASSOCIATED 132KV POWER LINE NEAR NOUPOORT IN THE NORTHERN CAPE PROVINCE

### DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

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## **Glossary of Terms:**

**Construction Phase:** The activities pertaining to the preparation for and the physical construction of the proposed development.

**Contractor:** Persons/organisations contracted by the Project Company to carry out parts of the work for the proposed development.

**Decommissioning:** Means to take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily recommissioned.

**Engineer (E) / Project Manager (PM):** Person/ organisation appointed by the Project Company to oversee the work of all consultants, sub-developers, contractors, residents and visitors.

**Environmental Control Officer (ECO):** Person/organisation appointed by the Project Company who will provide direction to the Project Manager concerning the activities within the Construction one, and who will be responsible for conducting the environmental audit of the project during the construction phase of the project according to the provisions of the Environmental Management Programme.

**Environmental Management Programme (EMPr):** The EMPr is a detailed plan for the implementation of the mitigation measures to minimise negative environmental impacts during the life-cycle of a project. The EMP contributes to the preparation of the contract documentation by developing clauses to which the contractor must adhere for the protection of the environment. The EMPr specifies how the construction of the project is to be carried out and includes the actions required for the Post-Construction Phase to ensure that all the environmental impacts are managed for the duration of the project's life-cycle.

**Operational Phase (Post Construction):** The period following the Construction Phase, during which the proposed development will be operational.

**Pre-Construction Phase:** The period prior to commencement of the Construction Phase, during which various activities associated with the preparation for the Construction Phase will be undertaken.

**Rehabilitation:** Rehabilitation is defined as the return of a disturbed area to a state which approximates the state (where possible) which it was in before disruption. Rehabilitation for the purposes of this specification is aimed at post-reinstatement re-vegetation of a disturbed area and the insurance of a stable land surface. Re-vegetation should aim to accelerate the natural succession processes so that the plant community develops in the desired way, i.e. promote rapid vegetation establishment.

**Site Manager:** The person, representing the Contractor, responsible for all the Contractor's activities on the site including supervision of the construction staff and activities associated with the Construction Phase. The Site Manager will liaise with the Project Manager in order to ensure that the project is conducted in accordance with the Environmental Management Programme



**Abbreviations:**

ASOD	Average Speed Over Distance
BA	Basic Assessment
DBAR	Draft Basic Assessment Report
DEFF	Department of Environment, Forestry and Fisheries
DoE	Department of Energy
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EO	Environmental Officer
EHS	Environment, Health and Safety
EIA	Environmental Impact Assessment
ELO	Environmental Liaison Officer
EMPr	Environmental Management Programme
EP	E uator Principles
FBAR	Final Basic Assessment Report
FMP	Fire Management Plan
HOD	Head of Department
IFC	International Finance Corporation (World Bank Group)
I&APs	Interested and Affected Parties
MC	Main Contractor
MSDS	Material Safety Data Sheets
NEMA	National Environmental Management Act
OECD	Organisation for Economic Co-operation and Development
OHL	Overhead Line
PM	Project Manager
PS	Performance Standards
SABS	South African Bureau of Standards
SAHRA	South African Heritage Resources Agency

# MOOI PLAATS SOLAR POWER (PTY) LTD

## PROPOSED DEVELOPMENT OF THE MOOI PLAATS ON-SITE ESKOM SUBSTATION, ESKOM COLLECTOR SUBSTATION AND ASSOCIATED 132KV POWER LINE NEAR NOUPOORT IN THE NORTHERN CAPE PROVINCE

### DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

#### 1 INTRODUCTION

Mooi Plaats Solar Power (Pty) Ltd (hereafter referred to as 'Mooi Plaats Solar Power') is proposing to construct one (1) 33/132kV on-site Eskom substation, one (1) 33/132kV Eskom collector substation and an associated 132kV overhead power line (hereafter referred to as the 'proposed development') near Noupoort in the Umsobomvu Local Municipality, which falls within the Pixley ka Seme District Municipality in the Northern Cape Province of South Africa (**DEFF Ref No.:** [14/12/16/3/3/1/2132](#)). The overall objective of the proposed development is to feed the electricity generated by the proposed Mooi Plaats Solar Photovoltaic (PV) Energy Facility (part of a separate EIA process with **DEFF Ref No.:** [14/12/16/3/3/2/1134](#)) into the national grid.

The proposed development forms one (1) of three (3) electrical infrastructure developments (substations and overhead power lines) that are being proposed as part of the greater Umsobomvu PV project. In addition, three (3) solar PV energy facilities are also being proposed as part of the greater Umsobomvu PV project (**Figure 1**). The other proposed developments (solar PV and grid) which form part of the greater Umsobomvu PV project include the following:

- Mooi Plaats Solar PV – **DEFF Reference Number:** [14/12/16/3/3/2/1134](#) (part of separate EIA process);
- Wonderheuvel Solar PV – **DEFF Reference Number:** [14/12/16/3/3/2/1135](#) (part of separate EIA process);
- Wonderheuvel Grid – **DEFF Reference Number:** [14/12/16/3/3/1/2134](#) (part of separate on-going BA process);
- Paarde Valley Solar PV – **DEFF Reference Number:** [14/12/16/3/3/2/1136](#) (part of separate EIA process); and
- Paarde Valley Grid – **DEFF Reference Number:** [14/12/16/3/3/1/2133](#) (part of separate on-going BA process).

As mentioned, the proposed development is being proposed to feed the electricity generated by the Mooi Plaats Solar PV Energy Facility into the national grid. The proposed solar PV energy facility will however require a separate Environmental Authorisation (EA) and is subject to a separate Environmental Impact Assessment (EIA) process (**DEFF Ref No.:** [14/12/16/3/3/2/1134](#)). It should be noted that the proposed electrical infrastructure development (substations and overhead 132kV power line) will be handed over to Eskom once constructed. The on-site and collector substations will include an Eskom portion and an Independent Power Producer (IPP) portion, hence the substations have been

included in the solar PV energy facility EIA (**DEFF Ref No.:** 14/12/16/3/3/2/1134) and in this associated electrical infrastructure BA to allow for handover to Eskom.

The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) requires that an Environmental Management Programme (EMPr) be submitted where an EIA has been identified as the environmental instrument to be utilised as the basis for a decision on an application for EA. The content of an EMPr must either contain the information set out in Appendix 4 of the EIA Regulations, 2014, as amended, 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). As per Government Notice 435, which was published in Government Gazette 42323 on 22 March 2019, the relevant gazetted Generic EMPrs must be used in respect of the following:

- overhead electricity transmission and distribution infrastructure, and
- substation infrastructure for the transmission and distribution of electricity.

In light of the above, the Draft EMPr for the proposed Mooi Plaats On-site Eskom Substation, Eskom Collector Substation and associated 132kV Power Line development has been compiled in order to align with the Generic EMPr templates mentioned above. It should be noted that elements of both Generic EMPrs have been incorporated into this EMPr, as the proposed development involves the construction of overhead electricity transmission and distribution infrastructure (namely the overhead 132kV power line) as well as substation infrastructure for the transmission and distribution of electricity (namely the on-site and collector substations).

Section 1 of Part B of both Generic EMPrs comprises of a pre-approved template containing generally accepted impact management outcomes and actions required for the avoidance, management and mitigation of impacts and risks associated with the development of overhead electricity transmission and distribution infrastructure and substation infrastructure. This section of the template 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. Once completed and signed, the template represents the EMPr for the activity approved by the CA. This section will however not be submitted to the CA namely the national Department of Environment, Forestry and Fisheries (DEFF) as it has already been pre-approved and gazetted. To allow Interested and Affected Parties (I&APs) access to the pre-approved EMPr template for consideration through the decision-making process, the Draft EMPr will be made available for public review with the Final Basic Assessment Report (FBAR). The Generic Templates in respect of overhead electricity transmission and distribution infrastructure as well as substation infrastructure for the transmission and distribution of electricity are included in **Annexure B** of this EMPr.

Section 2 of Part B of both relevant Generic EMPrs has been completed to include site specific information, a route alignment map, and a declaration that the applicant / holder of the EA will comply with the pre-approved generic EMPr template contained in Part B: Section 1. This section will be submitted to the CA (namely the DEFF) for review along with the FBAR and has been included in **Section 5** (site specific information), **Section 6** (preliminary infrastructure layout) and **Section 7** (declaration of the Applicant) and of this EMPr respectively. Site-specific mitigation measures /

recommendations from the respective specialist studies using are included in **Section 9** (Site-specific EMPr).

Part C of the ga etted Generic EMPr, as presented in **Section 5** of this EMPr, will be submitted to the CA (namely the DEFF) with the FBAR. This section includes the site specific impact management outcomes and impact management actions that are not included in the pre-approved generic EMPrs. This section has been prepared by the Environmental Assessment Practitioner (EAP), with input from the relevant specialists. Details and expertise of the EAP and the relevant specialists are provided in **Section 1.1** and **Section 5.1** of this EMPr respectively, with relevant Curriculum Vitae provided in **Annexure A**.

Compliance with Appendix 4 of the NEMA EIA Regulations, 2014 (as amended), Content of Environmental Management Programme (EMPr), is detailed in the table below.

**Table 1:** Compliance with Appendix 4 of the NEMA EIA Regulations, 2014 (as amended)

Requirements of Appendix 4 – GN R326 EIA Regulations of 7 April 2017	Section of EMPr
1. (1) An EMPr must comply with section 24N of the Act and include— (a) details of— (i) the EAP who prepared the EMPr; and (ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;	Details of the EAP and full project team are in <b>Sections 5.1.1</b> and <b>5.1.2</b> . CVs are included in <b>Annexure A</b> .
(b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Detailed descriptions of the aspects of the activities that are covered by the EMPr can be found in <b>Sections 1, 2, 3</b> and <b>5</b> .
(c) a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	This map can be found in <b>Section 6, Figure 4</b> . It shows the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;
(d) a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including— (i) planning and design; (ii) pre-construction activities; (iii) construction activities; (iv) rehabilitation of the environment after construction and where applicable post closure; and	Descriptions 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 can be found in <b>Section 9</b> .

(v) where relevant, operation activities;	
(f) a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to — (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) comply with any prescribed environmental management standards or practices; (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable;	Descriptions of proposed impact management actions, identifying the manner in which the impact management outcomes above are contemplated can be found in <b>Section 9</b> and in <b>Section 10</b> .
(g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Refer to <b>Sections 9</b> and <b>10</b> which outline High Level monitoring methods.
(h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Refer to <b>Sections 9</b> and <b>10</b> which outline High Level monitoring methods including the frequency monitoring is to be implemented.
(i) an indication of the persons who will be responsible for the implementation of the impact management actions;	Refer to <b>Section 4</b> which outlines the roles and responsibilities for the Proposed PV Facility.
(j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Refer to <b>Section 9</b> which outlines the time periods monitoring is to be implemented
(k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	This EMPr inclusive of Method statements ensure compliance.
(l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	This EMPr inclusive of Method statements ensure compliance.
(m) an environmental awareness plan describing the manner in which— (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and	This plan can be found in <b>Section 10.12</b> and addresses all risks associated with the proposed development.

(n) any specific information that may be required by the competent authority.	No specific information has been requested by the competent authority at this stage
(2) Where a government notice <i>gazetted</i> by the Minister provides for a generic EMP, such generic EMP as indicated in such notice will apply.	Noted. The Draft EMP for the proposed Mooi Plaats On-site Eskom Substation, Eskom Collector Substation and associated 132kV Power Line development has been compiled in order to align with the Generic EMP templates as per Government Notice 435, which was published in Government Gazette 42323 on 22 March 2019.

## 1.1 Details of the EAP

SiVEST Environmental Division has considerable experience in the undertaking of EIA and BA processes. Staff and specialists who were involved in this BA process and contributed to the compilation of this report are listed in **Table 2** below.

**Table 2:** Project Team

Name	Organisation	Role
Andrea Gibb	SiVEST	Lead Project Coordinator and Visual Reviewer
Stephan Jacobs	SiVEST	Environmental Consultant / EAP
Hlengiwe Ntuli	SiVEST	Public Participation Consultant
Liandra Scott-Shaw	SiVEST	Environmental Consultant / Lead Project Coordinator
Kerry Schwartz	SiVEST	GIS, Mapping and Visual
<b>Specialist Input</b>		
Stephen van Staden	Scientific Aesthetic Services (SAS)	Visual Peer / External Reviewer
Stephen Burton	SiVEST	Surface Water
Bruce Scott-Shaw	NatureStamp	Surface Water Peer / External Reviewer
Johann Lan	Private	Agriculture & Soils
Chris van Rooyen	Chris van Rooyen Consulting	Avifauna
Wouter Fourie	PGS Heritage	Heritage, Archaeology & Cultural Landscape
Elië Butler	Banai Environmental for PGS Heritage	Palaeontology
Neville Bews	Dr Neville Bews & Associates	Social

**MOOI PLAATS SOLAR POWER (PTY) LTD**

**prepared by: SiVEST Environmental**

Proposed Development of the Mooi Plaats On-site Eskom Substation, Eskom Collector Substation and associated 132kV Power Line near Noupport in the Northern Cape Province - Draft Environmental Management Programme (EMP)

Version No. 1.0

8 August 2020

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Name	Organisation	Role
David Hoare	David Hoare Consulting	Terrestrial Ecology
Kerry Schwart	SiVEST	Visual
Cecilia Canahai	G Afrika	Geotechnical

\* No longer employed by SiVEST

*\*\*Specialist assessments undertaken by SiVEST's in-house specialists. Assessments have been externally reviewed by suitably qualified specialists. Details regarding the specialists who were appointed to undertake external reviews of the in-house specialist assessments have been provided in table above. In addition, CVs of these specialists have been provided in **Appendix 2** of the FBAR, while copies of the Declarations of Independence (Dols) for these specialists have been provided in **Appendix 3** of the FBAR.*

**Table 3: Expertise of the EAP**

<b>Environmental Assessment Practitioner (EAP)</b>	SiVEST SA (Pty) Ltd - Stephan Jacobs
<b>Contact Details</b>	stephanj@sivest.co.za
<b>Qualifications</b>	B.Sc. Environmental Sciences (undergraduate) and B.Sc. (Hons) Environmental Management and Analysis
<b>Expertise</b>	Stephan joined SiVEST in May 2015 and holds the position of Environmental Consultant in the Johannesburg and Pretoria offices. Stephan specialises in the field of Environmental Management and has been extensively involved in Environmental Impact Assessment (EIA) and Basic Assessment (BA) processes for various types of projects / developments, in particular renewable energy projects / developments which form part of South Africa's Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). As such, Stephan has vast experience with regards to the compilation of EIAs and BAs. Additionally, Stephan has extensive experience in undertaking public participation and stakeholder engagement processes. Stephan has also assisted extensively in the undertaking of field work and the compilation of reports for specialist studies such as Surface Water and Visual Impact Assessments. Stephan also has considerable experience in Environmental Compliance and Auditing and has acted as an Environmental Control Officer (ECO) for several infrastructure projects.
<b>Lead Project Coordinator / Environmental Consultant</b>	SiVEST SA (Pty) Ltd – Liandra Scott-Shaw
<b>Contact Details</b>	liandras@sivest.co.za
<b>Qualifications</b>	B.Sc. Biological Science and B.Sc. (Hons) Ecological Science
<b>Expertise</b>	Liandra joined SiVEST in January 2014 and holds the position of Environmental Consultant in the Pietermaritzburg office. Liandra specialises in the field of Vegetation Ecology and Environmental Management and has been involved in the compilation of Environmental Impact Assessments (EIAs) and Basic Assessments (BAs) and specialist vegetation studies since

Dols signed by the EAP and by the relevant specialists are included in **Appendix 3 of the FBAR**. CVs of the project team and respective specialists have been provided in **Appendix 2** of the FBAR, as well as in **Annexure A** of this EMPr.

## 2 PURPOSE AND OBJECTIVES OF THE EMPr

An EMPr is defined as “an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented or mitigated, and that the positive benefits of the projects are enhanced”. The objective of this EMPr is to provide information and guidance for implementing the management and monitoring methods established and to help ensure continuous improvement of environmental performance, reducing negative impacts and enhancing positive effects during the construction and operation of the grid connection infrastructure development (substations and 132kV overhead power line).

The EMPr provides specific environmental guidance for the construction and operation phases of a project, and is intended to manage and mitigate construction and operation activities so that negative environmental impacts are mitigated or do not result.

The EMPr also defines monitoring requirements in order to ensure that the specified objectives are met.

This EMPr is applicable to all employees and contractors working on the pre-construction, construction, and operation and maintenance phases of the proposed Mooi Plaats On-site Eskom Substation, Eskom Collector Substation and 132kV overhead power line development. The document will be adhered to and updated throughout the project life cycle.

As previously mentioned, the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) requires that an EMPr be submitted where an EIA process has been identified as the environmental instrument to be utilised as the basis for a decision on an application for EA. The content of an EMPr must either contain the information set out in Appendix 4 of the EIA Regulations, 2014, as amended, or must be a generic EMPr relevant to an application as identified and gazetted by the Minister in a government notice. Generic EMPrs were gazetted in March 2019 for the development of overhead electricity transmission and distribution infrastructure, as well as substation infrastructure development for the transmission and distribution of electricity. Accordingly, this EMPr has been compiled in compliance with the requirements of the gazetted EMPrs (Gazette 42323, Government Notice 435). As mentioned, elements of both Generic EMPrs have been incorporated into this EMPr, as the proposed development involves the construction of overhead electricity transmission and distribution infrastructure (namely the overhead 132kV power line) as well as substation infrastructure for the transmission and distribution of electricity (namely the on-site and collector substations).

The EMPr has been developed as a set of environmental specifications (i.e. principles of environmental management), which are appropriately contextualised in order to provide clear guidance in terms of the on-site implementation of these specifications.



The EMPr has the following objectives:

- Outline mitigation measures and environmental specifications which must be implemented for the planning, construction, rehabilitation and operation phases of the project in order to minimise the extent of environmental impacts, and to manage environmental impacts associated with the Mooi Plaats On-site Eskom Substation, Eskom Collector Substation and 132kV overhead power line development;
- Ensure that the construction and operation phases do not result in undue or reasonably avoidable adverse environmental impacts and ensure that any potential environmental benefits are enhanced;
- Identify entities who will be responsible for the implementation of the measures and outline functions and responsibilities;
- Propose mechanisms and frequency for monitoring compliance and prevent long-term or permanent environmental degradation; and
- Facilitate appropriate and proactive responses to unforeseen events or changes in project implementation that were not considered in the BA process.

The mitigation measures identified within the BA process are systematically addressed in the EMPr, ensuring the minimal adverse environmental impacts.

The Developer must ensure that the implementation of the project complies with the requirements of all EAs, permits, and obligations arising from relevant environmental legislation. This obligation is partly met through the development and the implementation of this EMPr, and through its integration into the relevant contract documentation provided to parties responsible for construction and/or operation activities on the site. The adequacy and efficacy of implementation is to be monitored by an independent Environmental Control Officer (ECO). Since this EMPr is part of the BA process for the Mooi Plaats On-site Eskom Substation, Eskom Collector Substation and 132kV overhead power line development (**DEFF Ref No.:** [14/12/16/3/3/1/2132](#)), it is important that this document be read in conjunction with the BA report compiled for this proposed development. This will contextualise the EMPr and enable understanding of its purpose in the integrated environmental management process. Should there be a conflict of interpretation between this EMPr and the EA, the stipulations in the EA shall prevail over those of the EMPr, unless otherwise agreed by the authorities in writing. Similarly, any provisions in legislation overrule any provisions or interpretations within this EMPr.

This EMPr shall be binding on all the parties involved in the planning, construction and operational phases of the project, and shall be enforceable at all levels of contract and operational management within the project. The document must be adhered to and updated as required throughout the project life cycle

### **3 STRUCTURE OF THE EMPr**

This Site Specific EMPr includes the following:

- **Section 5:** Site specific information;

- **Section 6:** Preliminary infrastructure layout and development footprint site map;
- **Section 7:** Declaration that the Applicant will comply with the pre-approved template provided in Part B: Section 1 of the gazetted EMPs (which are included in **Appendix A** of this EMP); and
- **Section 9:** Site-Specific EMP as required by Part C of the gazetted EMPs. The Site-Specific EMP follows the same template as that of Part B – Section 1 of the gazetted EMPs, as recommended. Where applicable, each section of the Site-Specific EMP is divided into the following four (4) phases of the project cycle:
  - Planning and design activities;
  - Construction activities;
  - Operation activities; and
  - Decommissioning activities

These chapters set out the processes necessary for the Holder of the EA and/or Developer to minimise environmental impacts and achieve environmental compliance. For each of the phase of implementation, environmental objectives are listed. The EMP has been structured to show each phase and associated objectives, activities / risk sources, mitigation actions, monitoring requirements and performance indicators. A specific EMP table has been established for each environmental objective.

The objectives and EMP tables are required to be reviewed and possibly modified throughout the life of the proposed grid connection infrastructure development (substations and overhead power line), whenever changes, such as the following, occur:

- Planned activities change (i.e. in terms of the components of the grid connection infrastructure);
- Modification to or addition to environmental objectives and targets;
- Additional or unforeseen environmental impacts are identified and additional measures are required to be included in the EMP to prevent deterioration or further deterioration of the environment;
- Relevant legal or other requirements are changed or introduced; and
- Significant progress has been made in achieving an objective or target such that it should be re-examined to determine if it is still relevant or should be modified, etc.

## 4 PROJECT ROLES AND RESPONSIBILITIES

The effective implementation of the EMP is dependent on established and clear roles, responsibilities and reporting lines within an institutional framework. This section of the EMP 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 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.

The generic roles and responsibilities of all the key role players involved in the EMP are represented below.

- Developer's Project Manager (DPM);
- Developer Site Supervisor (DSS)
- Environmental Control Officer (ECO);
- Developer's Environmental Officer (DEO);
- Contractor; and
- Contractor's Environmental Officer (CEO).

A guide to roles and responsibilities for implementation of the EMPr are detailed in **Table 4** below. It should be noted that these roles and the associated responsibilities are the same as those defined in **SECTION 3: ROLES AND RESPONSIBILITIES FOR ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) IMPLEMENTATION** of the ga etted generic EMPs which are attached in **Annexure B** of this EMPr

**Table 4:** Guide to roles and responsibilities for implementation of an EMPr

Responsible Person(s)	Role and Responsibilities
Developer's Project Manager (DPM)	<p><u>Role</u> The Project Developer is accountable for ensuring compliance with the EMPr and any conditions of approval from the competent authority (CA). Where required, an environmental control officer (ECO) must be contracted by the Project Developer to objectively monitor the implementation of the EMPr according to relevant environmental legislation, and the conditions of the environmental authorisation (EA). The Project Developer is further responsible for providing and giving mandate to enable the ECO to perform responsibilities, and he must ensure that the ECO is integrated as part of the project team while remaining independent.</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> <li>- Be fully conversant with the conditions of the EA;</li> <li>- Ensure that all stipulations within the EMPr are communicated and adhered to by the Developer and its Contractor(s);</li> <li>- Issuing of site instructions to the Contractor for corrective actions required;</li> <li>- Monitor the implementation of the EMPr throughout the project by means of site inspections and meetings.</li> <li>- Overall management of the project and EMPr implementation; and</li> <li>- Ensure that periodic environmental performance audits are undertaken on the project implementation.</li> </ul>
Developer Site Supervisor (DSS)	<p><u>Role</u> The DSS reports directly to the DPM, oversees site works, liaises with the contractor(s) and the ECO. The DSS is responsible for the day to day implementation of the EMPr and for ensuring the compliance of all contractors with the conditions and requirements stipulated in the EMPr.</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> <li>- Ensure that all contractors identify a contractor's Environmental Officer (cEO);</li> <li>- Must be fully conversant with the conditions of the EA. Oversees site works, liaison with Contractor, DPM and ECO;</li> <li>- Must ensure that all landowners have the relevant contact details of the site staff, ECO and cEO;</li> <li>- Issuing of site instructions to the Contractor for corrective actions required;</li> <li>- Will issue all non-compliances to contractors; and</li> <li>- Ratify the Monthly Environmental Report.</li> </ul>

Responsible Person(s)	Role and Responsibilities
Environmental Control Officer (ECO)	<p><u>Role</u></p> <p>The ECO should have appropriate training and experience in the implementation of environmental management specifications. The primary role of the ECO is to act as an independent quality controller and monitoring agent regarding all environmental concerns and associated environmental impacts. In this respect, the ECO is to conduct periodic site inspections, attend regular site meetings, pre-empt problems and suggest mitigation and be available to advise on incidental issues that arise. The ECO is also required to conduct compliance audits, verifying the monitoring reports submitted by the cEO. The ECO provides feedback to the DSS and Project Manager regarding all environmental matters. The Contractor, cEO and dEO are answerable to the Environmental Control Officer for non-compliance with the Performance Specifications as set out in the EA and EMPr.</p> <p>The ECO provides feedback to the DSS and Project Manager, who in turn reports back to the Contractor and potential and Registered Interested &amp; Affected Parties' (RI&amp;AP's), as required. Issues of non-compliance raised by the ECO must be taken up by the Project Manager, and resolved with the Contractor as per the conditions of his contract. Decisions regarding environmental procedures, specifications and requirements which have a cost implication (i.e. those that are deemed to be a variation, not allowed for in the Performance Specification) must be endorsed by the Project Manager. The ECO must also, as specified by the EA, report to the relevant CA as and when required.</p> <p><u>Responsibilities</u></p> <p>The responsibilities of the ECO will include the following:</p> <ul style="list-style-type: none"> <li>- Be aware of the findings and conclusions of all EA related to the development;</li> <li>- Be familiar with the recommendations and mitigation measures of this EMPr;</li> <li>- Be conversant with relevant environmental legislation, policies and procedures, and ensure compliance with them;</li> <li>- 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;</li> <li>- Educate the construction team about the management measures contained in the EMPr and environmental licenses;</li> <li>- Compilation and administration of an environmental monitoring plan to ensure that the environmental management measures are implemented and are effective;</li> </ul>

Responsible Person(s)	Role and Responsibilities
	<ul style="list-style-type: none"> <li>- Monitoring the performance of the Contractors and ensuring compliance with the EMPr and associated Method Statements;</li> <li>- 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;</li> <li>- Liaison between the DPM, Contractors, authorities and other lead stakeholders on all environmental concerns;</li> <li>- Compile a regular environmental audit report highlighting any non-compliance issues as well as satisfactory or exceptional compliance with the EMPr;</li> <li>- Validating the regular site inspection reports, which are to be prepared by the contractor Environmental Officer (cEO);</li> <li>- Checking the cEO's record of environmental incidents (spills, impacts, legal transgressions etc.) as well as corrective and preventive actions taken;</li> <li>- Checking the cEO's public complaints register in which all complaints are recorded, as well as action taken;</li> <li>- Assisting in the resolution of conflicts;</li> <li>- Facilitate training for all personnel on the site – this may range from carrying out the training, to reviewing the training programmes of the Contractor;</li> <li>- 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;</li> <li>- Maintenance, update and review of the EMPr;</li> <li>- Communication of all modifications to the EMPr to the relevant stakeholders.</li> </ul>

Responsible Person(s)	Role and Responsibilities
developer Environmental Officer (dEO)	<p><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.</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> <li>- Be fully conversant with the EMPr;</li> <li>- Be familiar with the recommendations and mitigation measures of this EMPr, and implement these measures;</li> <li>- Ensure that all stipulations within the EMPr are communicated and adhered to by the Employees, Contractor(s);</li> <li>- Confine the development site to the demarcated area;</li> <li>- Conduct environmental internal audits with regards to EMPr and authorisation compliance (on cEO);</li> <li>- Assist the contractors in addressing environmental challenges on site;</li> <li>- Assist in incident management:</li> <li>- Reporting environmental incidents to developer and ensuring that corrective action is taken, and lessons learnt shared;</li> <li>- Assist the contractor in investigating environmental incidents and compile investigation reports;</li> <li>- Follow-up on pre-warnings, defects, non-conformance reports;</li> <li>- Measure and communicate environmental performance to the Contractor;</li> <li>- Conduct environmental awareness training on site together with ECO and cEO;</li> <li>- Ensure that the necessary legal permits and / or licenses are in place and up to date;</li> <li>- Acting as Developer's Environmental Representative on site and work together with the ECO and contractor;</li> </ul>

Responsible Person(s)	Role and Responsibilities
Contractor	<p><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 of substation infrastructure for the transmission and distribution of electricity activities.</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> <li>- project delivery and quality control for the development services as per appointment;</li> <li>- 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;</li> <li>- 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;</li> <li>- attend on site meeting(s) prior to the commencement of activities to confirm the procedure and designated activity zones;</li> <li>- 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.</li> </ul>



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

## 5 SITE SPECIFIC INFORMATION

### 5.1 Contact Details and Description of Project

#### 5.1.1 Details of the Applicant

<b>Name of the Applicant:</b>	Mooi Plaats Solar Power (Pty) Ltd
<b>Name of contact person</b>	Sheldon Vandrey
<b>Tel No:</b>	041 506 4900
<b>Fax No:</b>	N/A
<b>Postal address:</b>	P.O. Box 71664, Central, Port Eli abeth, 6001
<b>Physical address:</b>	16 Irvine Street, Richmond Hill, Port Eli abeth, 6001

#### 5.1.2 Details and Expertise of the EAP

<b>Company of EAP</b>	SiVEST SA(Pty) Ltd
<b>Environmental Practitioner</b>	Stephan acobs
<b>Tel No.</b>	011 798 0600
<b>Fax No:</b>	011 803 7272
<b>E-mail address</b>	<a href="mailto:stephanj_sivest.co.a">stephanj_sivest.co.a</a>
<b>Expertise</b>	<p><b>Qualifications:</b>            B.Sc. Environmental Sciences (undergraduate) (UP)            B.Sc. (Hons) Environmental Management and Analysis (UP)</p> <p><b>Expertise:</b>            Stephan joined SiVEST in May 2015 and holds the position of Environmental Consultant in the Johannesburg and Pretoria offices. Stephan specialises in the field of Environmental Management and has been extensively involved in Environmental Impact Assessment (EIA) and Basic Assessment (BA) processes for various types of projects / developments, in particular renewable energy projects / developments which form part of South Africa's Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). As such, Stephan has vast experience with regards to the compilation of EIAs and BAs. Additionally, Stephan has extensive experience in undertaking public participation and stakeholder engagement processes. Stephan has also assisted extensively in the undertaking of field work and the compilation of reports for specialist studies such as Surface Water and Visual Impact Assessments. Stephan also has considerable experience in Environmental Compliance and Auditing and has acted as an Environmental Control Officer (ECO) for several infrastructure projects.</p> <p><b>Professional Affiliations:</b>            IAIA Membership Number: 5736</p>

	In the process of registering with the Environmental Assessment Practitioners Association of South Africa (EAPASA)
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### 5.1.3 Project Name

<b>Project Name:</b>	Proposed Development of the Mooi Plaats On-site Eskom Substation, Eskom Collector Substation and associated 132kV Power Line near Noupoot in the Northern Cape Province
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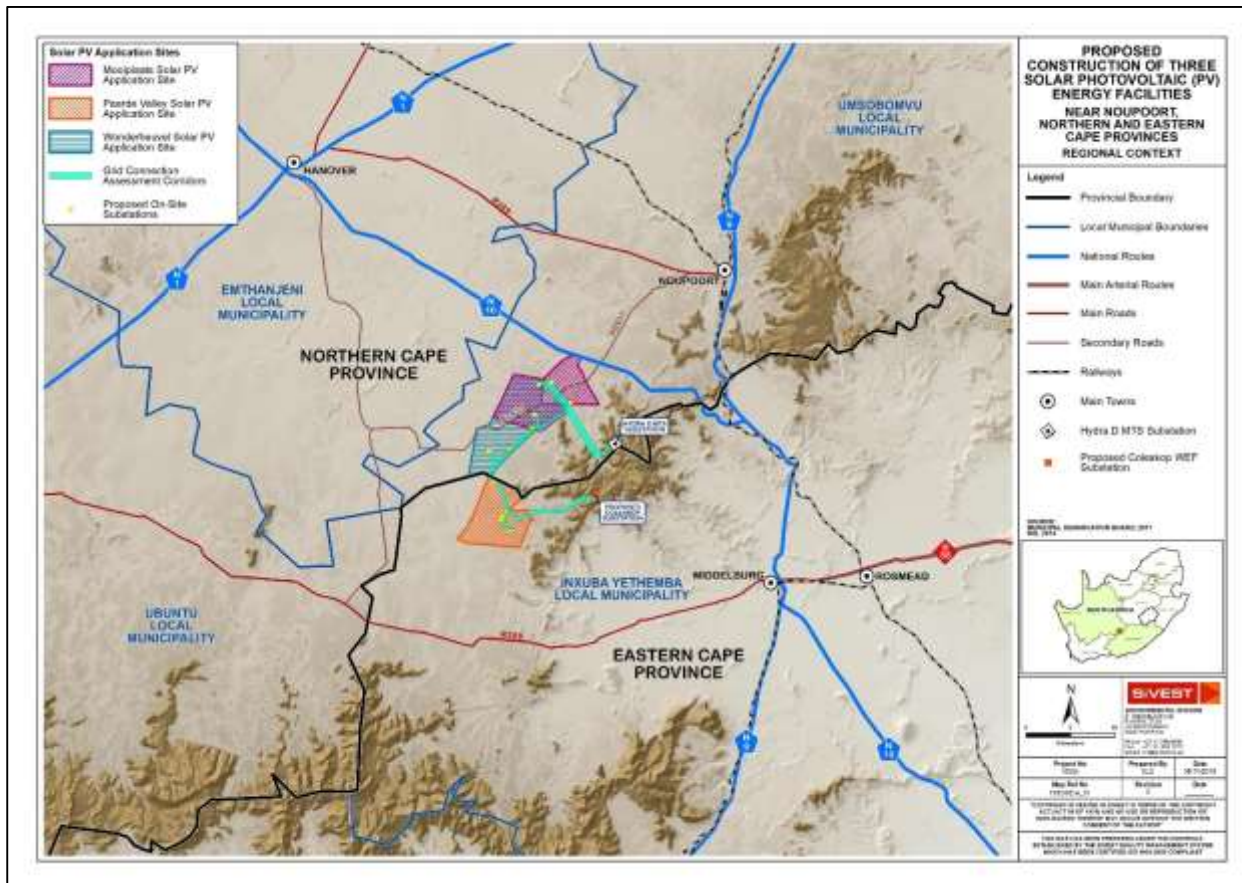
### 5.1.4 Description of Project

As mentioned, Mooi Plaats Solar Power is proposing to construct one (1) 33/132kV on-site Eskom substation, one (1) 33/132kV Eskom collector substation and an associated 132kV overhead power line (hereafter referred to as the 'proposed development') near Noupoot in the Umsobomvu Local Municipality, which falls within the Pixley ka Seme District Municipality in the Northern Cape Province of South Africa (**DEFF Ref No.:** 14/12/16/3/3/1/2132). The overall objective of the proposed development is to feed the electricity generated by the proposed Mooi Plaats Solar PV Energy Facility (part of a separate EIA process with **DEFF Ref No.:** 14/12/16/3/3/2/1134) into the national grid.

The proposed development forms one (1) of three (3) electrical infrastructure developments (substations and overhead power lines) that are being proposed as part of the greater Umsobomvu PV project. In addition, three (3) solar PV energy facilities are also being proposed as part of the greater Umsobomvu PV project (**Figure 1**). The other proposed developments (solar PV and grid) which form part of the greater Umsobomvu PV project include the following:

- Mooi Plaats Solar PV – **DEFF Reference Number:** 14/12/16/3/3/2/1134 (part of separate EIA process);
- Wonderheuvél Solar PV – **DEFF Reference Number:** 14/12/16/3/3/2/1135 (part of separate EIA process);
- Wonderheuvél Grid – **DEFF Reference Number:** 14/12/16/3/3/1/2134 (part of separate on-going BA process);
- Paarde Valley Solar PV – **DEFF Reference Number:** 14/12/16/3/3/2/1136 (part of separate EIA process); and
- Paarde Valley Grid – **DEFF Reference Number:** 14/12/16/3/3/1/2133 (part of separate on-going BA process).

As mentioned, the proposed development is being proposed to feed the electricity generated by the Mooi Plaats Solar PV Energy Facility into the national grid. The proposed solar PV energy facility will however require a separate EA and is subject to a separate EIA process (**DEFF Ref No.:** 14/12/16/3/3/2/1134). It should be noted that the proposed electrical infrastructure development (substations and overhead 132kV power line) will be handed over to Eskom once constructed. The on-site and collector substations will include an Eskom portion and an IPP portion, hence the substations have been included in the solar PV energy facility EIA (**DEFF Ref No.:** 14/12/16/3/3/2/1134) and in this associated electrical infrastructure BA to allow for handover to Eskom.



**Figure 1:** Regional context of greater Umsobomvu PV project

At this stage, it is anticipated that the proposed development will include the following components:

- One (1) new on-site substation (namely Substation 2) and one (1) new collector substation (namely Substation 1a – Northern Collector) to serve the Mooi Plaats Solar PV Energy Facility (part of separate EIA process with **DEFF Ref No.:** 14/12/16/3/3/2/1134), each occupying an area of up to approximately 4 hectares (ha). The proposed substations will be step-up substations and will include an Eskom portion and an IPP portion, hence the substations have been included in the solar PV energy facility EIA and in the grid infrastructure BA to allow for handover to Eskom; and
- A new 132kV overhead power line connecting the on-site and collector substations to the Hydra D Main Transmission Substation (MTS) (part of separate EIA process with **DEFF Ref No.:** 14/12/16/3/3/2/730/2<sup>1</sup>), based on the power line corridor route associated with the grid connection infrastructure alternative which was chosen as ‘preferred’, from where the electricity will be fed into the national grid. The type of power line towers being considered at this stage includes both lattice and monopole towers, which will be up to approximately 25m in height.

<sup>1</sup> Originally formed part of Umsobomvu WEF (14/12/16/3/3/2/730) which was issued with an EA on 17 February 2017. EA however split into three (3) separate EAs, namely Umsobomvu I WEF (14/12/16/3/3/2/730/AM2), Coleskop WEF (14/12/16/3/3/2/730/1/AM2) and Eskom Infrastructure MTS (14/12/16/3/3/2/730/2) (which includes Eskom Hydra D MTS)

Internal access roads, between 4m and 12m wide, to the Mooi Plaats On-site Eskom Substation and Mooi Plaats Eskom Collector Substation will form part of the associated infrastructure. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary. As mentioned, the proposed on-site and collector substations will each occupy an area of up to approximately 4ha. At this stage, the type of towers being considered for the proposed power line includes both lattice and monopole towers. It is assumed that the proposed towers will be located approximately 200m to 250m apart. The towers will be up to approximately 25m in height, depending on the terrain, but will ensure minimum overhead line clearances from buildings and surrounding infrastructure. In addition, the proposed power line will have a servitude width of approximately 36m. The exact servitude width and location of the power line towers will however be confirmed during the final design stages of the power line design process. It should be noted that the surface area which is to be covered by the proposed power line towers cannot be determined yet. The surface area which is to be covered by the entire proposed development will be confirmed during the detailed design phase of the project, when the final design details have been confirmed and become available. The length of the proposed preferred power line corridor (i.e. Option 1a) is however approximately 13.34km

As previously mentioned, the four (4) main phases of the project cycle are as follows:

- Planning and Design Phase;
- Construction Phase;
- Operational Phase; and
- Decommissioning Phase.

Activities associated with the **Planning and Design Phase** include the following:

- Ensure that the design of the grid connection components (namely the 132kV overhead power line and substation components) respond to the identified environmental constraints and opportunities;
- Ensure that pre-construction activities are undertaken in accordance with all relevant legislative requirements;
- Ensure that adequate regard has been taken of identified environmental sensitivities, as well as any landowner and community concerns and that these are appropriately addressed through design and planning (where applicable);
- Plan for construction activities to be undertaken without significant disruption to other land uses and activities in the area; and
- Ensure that the best environmental options are selected for the proposed development.

Activities associated with the **Construction Phase** include the following:

- Removal of vegetation from the substation sites and the power line servitude;
- Site clearance and earthworks to accommodate substation and power line infrastructure as well as temporary laydown areas;
- Stockpiling of topsoil;
- Vehicular traffic carrying equipment and personnel to and from the site; and
- Construction of the substation and power line infrastructure.

Activities associated with the **Operation Phase** include the following:

- The transfer of electricity generated from the proposed Mooi Plaats Solar PV Energy Facility to the national grid via the Hydra D MTS; and
- On-going maintenance of the power lines, substations and gravel access roads.

Activities associated with the **Decommissioning Phase** include the following:

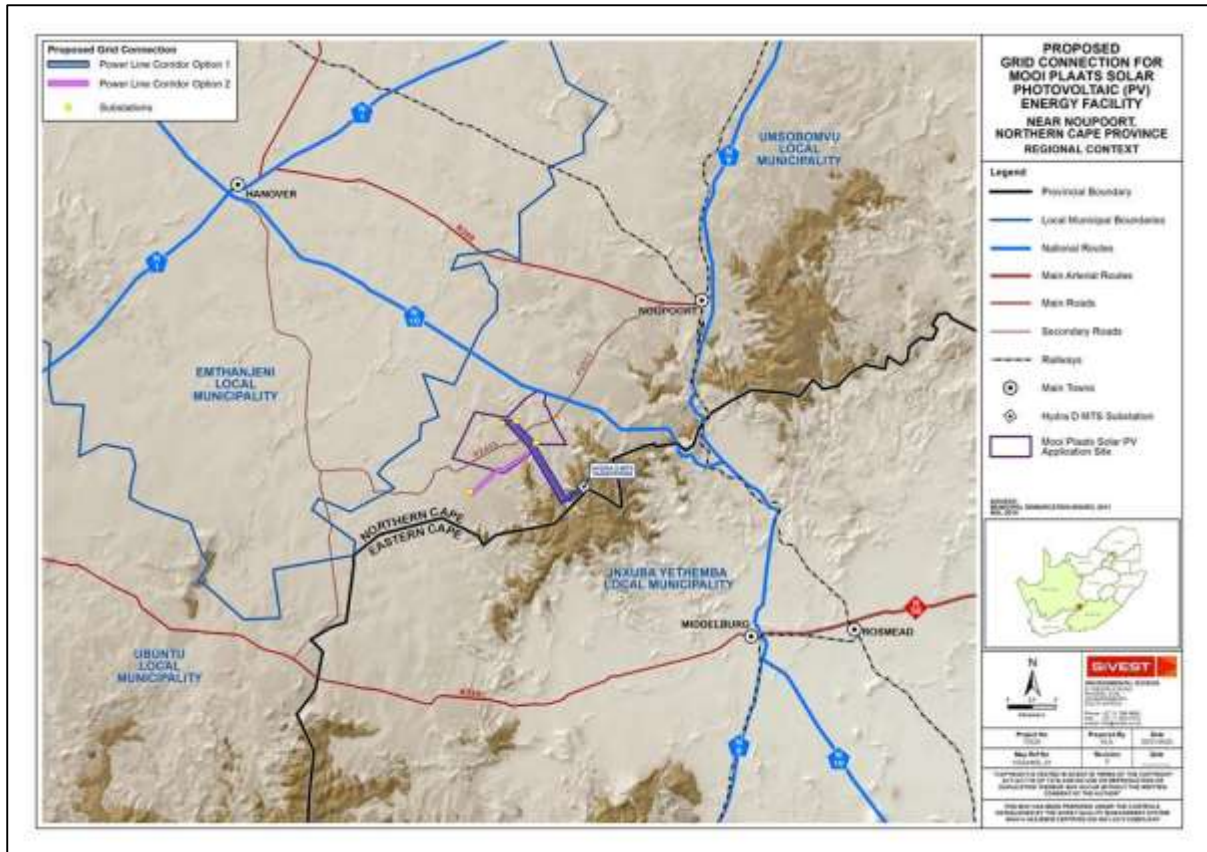
- Removal of infrastructure that is no longer required.

Potential environmental impacts resulting from the above phases of the project cycle were assessed by the respective specialists as part of the BA process. The respective specialist assessments are included in **Appendix 6** of the FBAR.

#### *5.1.5 Project Location*

The proposed development is located approximately 23km south-west of the town of Noupoot, within the Umsobomvu Local Municipality, in the Pixley ka Seme District Municipality of the Northern Cape Province (**Figure 2**).

The proposed development can be accessed via the existing gravel road (DR2433) which bisects the proposed solar PV energy facility (part of separate EIA process with **DEFF Ref No.: 14/12/16/3/3/2/1134**). In addition, this existing gravel road (namely the DR2433) connects to the tarred N10 national road.



**Figure 2:** Regional context map

The proposed On-site Eskom Substation (namely Substation 2) will be located on Remainder of the Farm Mooi Plaats No. 121, while the proposed Eskom Northern Collector Substation (namely Substation 1a) will be located on Portion 1 of the Farm Leuwe Kop No. 120 (**Figure 3**). Grid Connection Option 1a has been selected as the ‘preferred’ grid connection infrastructure alternative and therefore the power line corridor route associated with this alternative is being proposed. The development area assessed by the specialists incorporated six (6) farm portions. However, only five (5) farm portions are affected by the power line corridor route associated with the ‘preferred’ grid connection infrastructure alternative (namely Grid Connection Option 1a).

The preferred alternatives in relation to environmental sensitivities are shown in **Figure 3** and the relevant coordinates are provided in the table below.

**Table 5: Grid Connection Infrastructure Components**

<b>PREFERRED 132kV POWER LINE CORRIDOR ALTERNATIVE</b>				
<b>CENTRE LINE COORDINATES (DD MM SS.sss)</b>				
<b>CORRIDOR ALTERNATIVE</b>	<b>START POINT</b>	<b>MIDDLE POINT</b>	<b>END POINT (HYDRA D MTS)</b>	<b>APPROX LENGTH (KM)</b>
Option 1a	S31 17 39.289	S31 20 5.021	S31 21 20.482	13.34
	E24 43 51.440	E24 46 36.932	S31 21 20.482	
<b>PREFERRED ON-SITE AND COLLECTOR SUBSTATION SITE ALTERNATIVE COORDINATES</b>				
<b>ALTERNATIVE</b>	<b>AREA (HECTARES)</b>	<b>CENTRE POINT COORDINATES</b>		
		<b>SOUTH</b>	<b>EAST</b>	
Substation 1a (Eskom Northern Collector Substation)	4	S31 18 47.922	E24 46 6.243	
Substation 2 (On-site Eskom Substation)	4	S31 17 39.289	E24 43 51.440	

As mentioned, the development area assessed by the specialists incorporated six (6) farm portions, however, only five (5) farm portions are affected by the power line corridor route associated with the 'preferred' grid connection infrastructure alternative (namely Grid Connection Option 1a). These include the following:

- Remainder of the Farm Mooi Plaats No. 121;
- Portion 1 of the Farm Leuwe Kop No. 120;
- Portion 6 of the Farm Uit icht No. 3;
- Portion 7 of the Farm Uit icht No. 3; and
- Portion 8 of the Farm Uit icht No. 3.

Details of the above-mentioned affected properties / farm portions are provided in **Table 6** below.

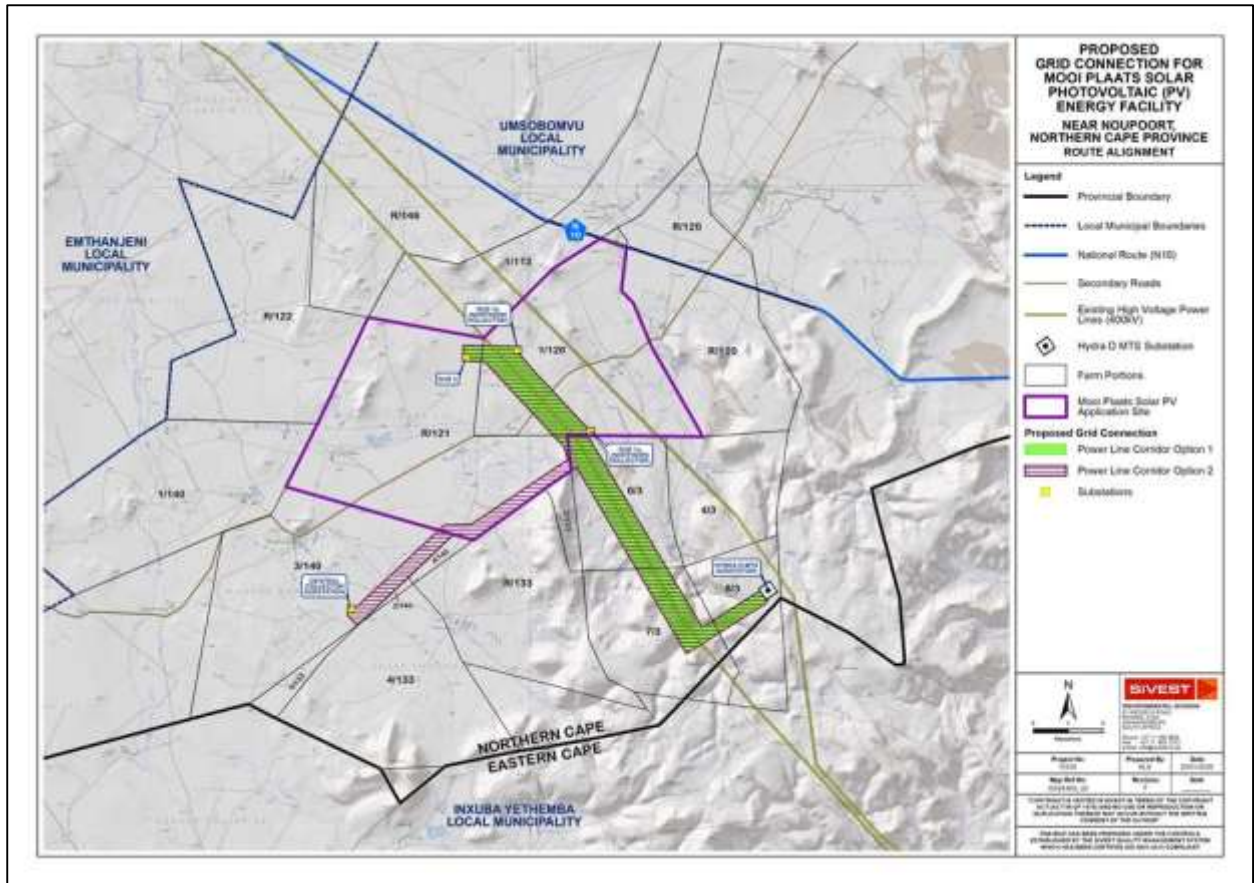
The grid connection infrastructure alternatives (which include on-site and collector substation sites and 132kV power line corridors) which were considered and assessed as part of the BA process are shown in **Figure 3** below.



**Table 6: Affected Properties / Farm Portions**

<b>NO</b>	<b>21-DIGIT SURVEYOR (SG) GENERAL CODE</b>	<b>FARM NAME (if applicable)</b>	<b>FARM NUMBER (if applicable)</b>	<b>PORTION NAME</b>	<b>PORTION NUMBER</b>	<b>LATITUDE*</b>	<b>LONGITUDE*</b>
1	C03000000000012100000	Mooi Plaats No. 121	121	Remainder	N/A	31 18 56.76 S	24 43 8.83 E
2	C03000000000012000001	Leuwe Kop No. 120	120	Portion 1	1	31 17 46.53 S	24 45 45.75 E
3	C0480000000000300006	Uit icht No. 3	3	Portion 6	6	31 19 56.74 S	24 46 40.87 E
4	C0480000000000300007	Uit icht No. 3	3	Portion 7	7	31 21 57.99 S	24 47 14.69 E
5	C0480000000000300008	Uit icht No. 3	3	Portion 8	8	31 21 53.54 S	24 48 59.30 E

*\*Latitude and longitude provided for centre-point of property / farm portion*



**Figure 3:** Route overview map showing grid connection infrastructure alternatives

It should be noted that the proposed layout has been informed by the environmental sensitive and 'no-go' areas which were identified by the respective specialists. The proposed layout will be further refined and updated, should this be required, following the pre-construction walk-throughs of the project footprint by the respective specialists (where required).

It is important to note that the preferred layout provided above is not the final layout for the proposed development. A final layout will be submitted to the DEFF for review and approval, along with a Final EMP, prior to construction commencing. The alignment of the power line within the authorised power line corridor will be determined and confirmed during the detailed design phase, taking the identified sensitive areas into account. This is to enable the avoidance of any unidentified features on-site, including those identified as a result of the detailed palaeontological assessment, or any design constraints when the development reaches construction. In addition, routing the power line within the authorised corridor would not be regarded as a change to the scope of work or the findings of the impact assessments undertaken during the BA process. This is based on the understanding that the specialists have assessed the larger area / corridor in detail and all identified sensitive areas have been excluded from this area, if possible. Therefore, moving the components within the assessed corridor would not change the impact significance. Any changes to the power line route within the boundaries of the authorised corridor following the issuing of the EA (should it be granted) will therefore be considered to be non-substantive.

### 5.1.6 Preliminary Technical Specification of the Overhead Power Line Infrastructure

The technical details provided below are based on preliminary design proposals. Detailed design, including tower types, route alignment and micro-siting will only be undertaken if the proposed development is awarded preferred bidder status as part of South Africa's Renewable Energy Independent Power Producer Procurement Programme (REIPPPP).

**Table 7: 132kV Power Line Preliminary Technical Specifications**

<b>Power Line Type:</b>	At this stage, type of towers being considered includes both lattice and monopole towers.
<b>Power Line Length:</b>	Approximately 13.34km.
<b>Power Line Servitude Width:</b>	Approximately 36m
<b>Tower Spacing (Mean and Maximum):</b>	Approximately 200m to 250m apart, depending on the terrain and subject to detailed design
<b>Tower Height (Lowest, Mean and height):</b>	Up to approximately 25m high, depending on the terrain and subject to detailed design. Will however ensure minimum overhead line clearances from buildings and surrounding infrastructure
<b>Conductor Attachment Height (mean):</b>	To be determined during detailed design phase.

The key technical details and infrastructure required as part of the proposed development are presented in the table below (**Table 8**).

**Table 8: Summary of key components**

PROJECT	DEFF REFERENCE	FARM NAMES AND AREA
Mooi Plaats On-site Eskom Substation, Eskom Collector Substation and 132kV Power Line	<u>14/12/16/3/3/1/2132</u>	<p><b><u>On-site Eskom Substation (Substation 2):</u></b></p> <ul style="list-style-type: none"> <li>▪ Remainder of the Farm Mooi Plaats No. 121.</li> </ul> <p><b><u>Eskom Collector Substation (Substation 1a – Northern Collector):</u></b></p> <ul style="list-style-type: none"> <li>▪ Portion 1 of the Farm Leuwe Kop No. 120.</li> </ul> <p><b><u>Preferred Power Line Corridor (Option 1a):</u></b></p> <ul style="list-style-type: none"> <li>▪ Remainder of the Farm Mooi Plaats No. 121;</li> <li>▪ Portion 1 of the Farm Leuwe Kop No. 120;</li> <li>▪ Portion 6 of the Farm Uitsicht No. 3;</li> <li>▪ Portion 7 of the Farm Uitsicht No. 3; and</li> <li>▪ Portion 8 of the Farm Uitsicht No. 3.</li> </ul> <p><b>Area of on-site and collector substations (combined) = 8 hectares (ha)</b></p> <p><b>Area of entire development footprint = Unknown at this stage. Surface area which is to be covered by entire development footprint cannot be determined yet. Will be confirmed during the detailed design</b></p>

		<b>phase of the project, when final design details have been confirmed and become available.</b>
<b>TECHNICAL DETAILS OF ASSOCIATED INFRASTRUCTURE</b>		
	Access roads	<ul style="list-style-type: none"> <li>▪ Internal access roads, up to approximately 14m during construction (to be partly rehabilitated) and between 4m and 12m wide during operation, will provide access to proposed on-site (Substation 2) and collector (Substation 1a – Northern Collector) substations; and</li> <li>▪ Existing site roads will be used wherever possible, although new site roads will be constructed where necessary.</li> </ul>
	Substations (On-site and Collector)	<ul style="list-style-type: none"> <li>▪ One (1) new 33/132kV On-site Eskom Substation (namely Substation 2). Referred to as Mooi Plaats On-site Eskom Substation;</li> <li>▪ One (1) new 33/132kV Eskom Collector Substation (Substation 1a – Northern Collector). Referred to as Mooi Plaats Eskom Collector Substation;</li> <li>▪ On-site and collector substations each occupy an area of up to approx. 4ha;</li> <li>▪ Height of substations and other infrastructure will be confirmed during the final design stages of the respective substations;</li> <li>▪ Will be step-up substations. Will contain transformers for voltage step-up from medium voltage to high voltage. Direct Current (DC) power from PV panels will be converted into Alternating Current (AC) power in inverters and voltage will be stepped up to medium voltage in inverter transformers; and</li> <li>▪ Substations will include an Eskom portion and an IPP portion.</li> </ul>
	Overhead Power Line	<ul style="list-style-type: none"> <li>▪ Voltage capacity of up to approximately 132kV;</li> <li>▪ Preferred power line will link proposed Mooi Plaats On-site Eskom Substation (Substation 2) to the Mooi Plaats Eskom Collector Substation (Substation 1a – Northern Collector) and finally to the Hydra D MTS (part of separate EIA process with <b>DEFF Ref No.: 14/12/16/3/3/2/730/2</b>), which will still be constructed;</li> <li>▪ Length of approximately 13.34km for preferred power line (namely Option 1a);</li> <li>▪ Grid connection is to the Hydra D MTS, which will still be constructed;</li> <li>▪ Type of power line towers being considered at this stage includes both lattice and monopole towers, which will be up to approx. 25m in height, depending on height. Will however ensure minimum overhead line clearances from buildings and surrounding infrastructure;</li> </ul>

		<ul style="list-style-type: none"> <li>▪ Assumed that proposed power line towers will be located approximately 200m to 250m apart;</li> <li>▪ Exact location of towers will be confirmed during the final design stages of power line design process; and</li> <li>▪ Area to be cleared for proposed power line to be confirmed during the detailed design phase of the project, when final design details have been confirmed and become available.</li> </ul>
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## 6 DEVELOPMENT FOOTPRINT SITE MAP

This sub-section includes a map of the site sensitivity overlaid with the preliminary infrastructure layout.

Several specialist studies were conducted during the BA process to identify and assess issues or legislative implications associated with the proposed development. These include:

- Terrestrial Ecology (Fauna and Flora) Impact Assessment;
- Avifauna (Bird) Impact Assessment (incl. pre-construction monitoring);
- Surface Water Impact Assessment;
- Desktop Agricultural and Soils Impact Assessment;
- Desktop Geotechnical Impact Assessment;
- Visual Impact Assessment;
- Heritage Impact Assessment;
- Palaeontology Impact Assessment; and
- Desktop Social Impact Assessment.

Based on the specialist assessments which were conducted, a few potentially sensitive areas were identified within the study area. These sensitive areas were subsequently used to inform the area for the potential erection of the substations (on-site and collector) and 132kV overhead power line. In addition, the proposed layout was further refined to avoid environmental sensitivities and was subsequently investigated by the respective specialists. The areas also informed the assessment of grid connection infrastructure alternatives (which include on-site and collector substation sites and 132kV power line corridors), which were comparatively assessed by the respective specialists during the BA process. The significant environmental features and ‘no-go’ areas identified by the respective specialist assessments were therefore used to inform and guide the proposed infrastructure layout.

A summary of the specialists’ findings and recommendations is provided in the table below. Full details of the specialist findings can be found in the respective specialist reports, provided in **Appendix 6 of the FBAR**.

Study	Summary
Terrestrial Ecology (Fauna and Flora)	<p>There are various Acts that limit development or require permits before development can proceed. The most important of these are permits required in terms of protected species that could potentially occur on-site, including the National Environmental Management: Biodiversity Act, the Northern Cape Nature Conservation Act and the National Forests Act.</p> <p>Details of the description of the ecological receiving environment are summarised as follows:</p> <ol style="list-style-type: none"> <li>1. The study area is situated in an area that is on the boundary between relatively flat plains and a low mountain range with moderately to steeply sloping topography. Habitat on-site is in a largely natural state and is in a rural environment. There is very little transformation or serious degradation on-site.</li> <li>2. There are two (2) regional vegetation types occurring in the project study area, Eastern Upper Karoo (most of the area), and Besemkaree Koppies Shrubland (mountain areas). There are three (3) other national vegetation types in the vicinity, namely Southern Karoo Riviere, Tarkastad Montane Shrubland and Karoo Escarpment Grassland. Floristic components of all five (5) of these units occur in the study area, even though they are not all mapped as occurring within the study area. All these vegetation types are listed in the scientific literature as Least Threatened and none are listed in the National List of Ecosystems that are Threatened and need of protection (GN 1002 of 2011).</li> <li>3. All habitat is mapped as 'Critical Biodiversity Area 2' (CBA2) or 'Critical Biodiversity Area 1' (CBA1) in the Provincial Conservation Plan and there are also patches mapped as 'Ecological Support Area' (ESA). The remaining natural vegetation on-site, therefore has high value for conservation of vegetation in the Province according to the broadscale CBA maps.</li> <li>4. Habitats on-site were divided into five (5) units, namely 'Mountain Vegetation', 'Lowland Plains Vegetation', 'Low Ridges and Koppies', 'Broad Drainage Areas' and 'Mountain Stream'. The vegetation on the plains on-site was found to be a karroid dwarf shrubland that resembles the description for Eastern Upper Karoo, but the mountain vegetation was a mixed grassy shrubland that appears to be a floristic mix of Besemkaree Koppies Shrubland and Karoo Escarpment Grassland. The mountain vegetation has the highest local diversity and greatest variation in species composition. A map of natural habitats of the study area was produced by mapping from aerial imagery, based on information collected in the field.</li> <li>5. There are no plant species occurring on-site or likely to occur on-site that are protected according to the National Environmental Management: Biodiversity Act (Act No. 10. of 2004) (NEM:BA).</li> <li>6. There are a number of plant species occurring on-site that are protected according to the Northern Cape Nature Conservation Act (Act 9 of 2009). It is likely that additional protected species occur there that were not observed during the field survey. None of</li> </ol>

Study	Summary
	<p>these are of conservation concern, but a permit is required from the Provincial authorities to destroy them. These are listed in the text in the body of this report.</p> <ol style="list-style-type: none"> <li>7. There are no protected tree species that are likely to occur in the study area.</li> <li>8. A total of 79 mammal species have a geographical distribution that includes the general study area in which the sites are found. Of the species currently listed as threatened or protected (see Appendix 5 of Terrestrial Ecology Impact Assessment Report for list of protected species), the following are considered to have a very high, high or medium probability of occurring on-site, based on habitat suitability and evidence collected in the field: the Black-footed Cat (Vulnerable), the Cape Clawless Otter (Near Threatened), the South African Hedgehog (Near Threatened), Grey Rhebok (Near Threatened), White-tailed Rat (Vulnerable), and the Spectacled Dormouse (Near Threatened). There is strong evidence to suggest that the Black-footed Cat and the Cape Clawless Otter both definitely occur on-site.</li> <li>9. The study area contains habitat that is suitable for a small number of frog species. One (1) protected frog species, the Giant Bullfrog, could potentially occur on-site.</li> <li>10. A total of 55 reptile species have a geographical distribution that includes the general study area in which the sites are found. No reptile species of conservation concern could potentially occur in the study area.</li> <li>11. A preliminary sensitivity map of the study area was produced that identifies areas of higher sensitivity that should be taken into account during activities on-site. This includes drainage areas and associated wetland-related habitat, low ridges, parts of the mountain area, and CBA1 and CBA2 areas.</li> </ol> <p>The preliminary assessment of impacts indicates that all impacts are of low significance or can be reduced to low significance with mitigation, with the exception of loss of natural vegetation, for which the impact remains of medium significance after mitigation.</p> <p>Proposed mitigation measures include the following:</p> <ul style="list-style-type: none"> <li>▪ shifting infrastructure positions to avoid sensitive habitats;</li> <li>▪ select infrastructure options that cause the least amount of damage to natural habitats;</li> <li>▪ cross watercourses at right angles;</li> <li>▪ install appropriate structures at watercourse crossings to minimise impacts on these systems;</li> <li>▪ minimise vegetation clearing and disturbance;</li> </ul>

Study	Summary
	<ul style="list-style-type: none"> <li>▪ formalise a rehabilitation programme;</li> <li>▪ undertaking a pre-construction botanical walk-through survey of the footprint of the selected options;</li> <li>▪ obtaining permits for any protected species that may be affected;</li> <li>▪ undertaking a search and rescue of plants for which it is appropriate to rescue; and</li> <li>▪ compile an alien plant management plan and undertaking regular monitoring.</li> </ul> <p>The report concludes that there are some sensitivities in the study area related to natural habitat and to individual species, but that these can be minimised or avoided with the application of appropriate mitigation or management measures. There will be residual impacts, primarily on natural habitat, but the amount of habitat that will be lost to the proposed development is insignificant compared to the area in hectares of the regional vegetation type that occurs on-site and therefore the residual impacts are considered acceptable, on condition local sensitivities of biodiversity importance are avoided. On this basis, it is recommended that the proposed development be authorised.</p>
Avifauna (Birds)	<p>The proposed development will have some pre-mitigation impacts on avifauna at a site and local level which will range from Medium to Low.</p> <p>The impact of displacement due to disturbance associated with the construction of the proposed 132kV grid connection and substations, is assessed to be Medium and can be mitigated to a Low level. The potential for displacement due to habitat destruction associated with the construction of the substations is rated as Low and could be further reduced with appropriate mitigation. The impact of bird collisions with the 132kV grid connection is rated as High and could be reduced to Medium with the application of mitigation measures. The potential impact of electrocutions is assessed to be Medium, but it can be reduced to Low with appropriate mitigation. The impact of displacement due to disturbance associated with the decommissioning of the proposed 132kV grid connection and substations, is assessed to be Medium and can be mitigated to a Low level. The cumulative impact of the proposed grid connections within a 35km radius is rated as Medium, but it can be reduced to Low with the application of appropriate mitigation.</p> <p><b><u>IMPACT STATEMENT</u></b></p> <p>From an avifaunal impact perspective, there is no objection to the proposed development of the grid connections, provided the proposed mitigation measures are strictly implemented. No further monitoring will be required during the operational phase.</p>



Study	Summary
Surface Water	<p>Findings were based on the method for delineating wetlands and riparian habitats as per the DWAF (2005 &amp; 2008) guidelines. At a broad level, the study site is located within the Orange Catchment. More specifically, the study area is situated within the uaternary catchments D32B &amp; D32C. The fieldwork assessment found that there are no wetlands on the study site. However, a number of watercourses, both perennial and non-perennial, were identified throughout the entire study area.</p> <p>In terms of the Ecological Condition of the non-perennial, and perennial watercourses, Ecological Condition was assessed to be a class C – Moderately Modified systems.</p> <p>The Environmental Importance and Sensitivity Class (EISC) for the watercourses was determined. The results showed that the EISC for the watercourses were categorised as a Class B (High). The classification of high EISC was primarily due to the condition of the watercourses assessed, as well as the presence of endangered species.</p> <p>The buffer one determination for the watercourses took into account the type of the proposed development, potential impacts, condition of the habitat as well as other characteristics of the watercourse. As a result, the following buffer ones were assessed and are to be implemented as far as possible:</p> <ul style="list-style-type: none"> <li>▪ Construction Phase Buffer: 15m</li> <li>▪ Operation Phase Buffer: 15m</li> </ul> <p>Foreseen potential negative impacts related to the proposed development were identified and assessed. The potential construction-related impacts included impacts to watercourses (-20 low pre- and -8 low post-mitigation impact rating), hydrology of the watercourses (-20 low pre- and -9 low post-mitigation impact rating) and water uality impacts (-39 medium pre- and -9 low post-mitigation impact rating). The operational impacts identified included impacts to the hydrology of the watercourse (-36 medium pre- and -18 low post-mitigation impact rating). Overall, all impacts were assessed to be low, post-implementation of mitigation measures.</p> <p>In terms of potentially applicable environmental and water-related legislation, listed activities were identified to be triggered in terms of NEMA (1998) and the EIA Regulations (2014, as amended) from a surface water perspective. With respect to the National Water Act (NWA) (1998), water uses (c) and (i) were identified as being potentially applicable. However, the application of the risk assessment</p>

Study	Summary
	<p>matrix protocol as per Government Notice 509 of 2016 (No. 40229) was undertaken, the findings show that the risk of potential impacts on the watercourse was assessed to be in the LOW-risk class. Where risks were identified, a number of control measures have been stipulated which will assist in decreasing the level of risk to an even lower level. In accordance with the implementation of control measures, all potential risks are classed as LOW. Therefore, registration for General Authorisation (GA) can be undertaken where required and agreed upon with the Department of Water and Sanitation (DWS).</p> <p>The decision on whether the proposed development is to proceed will rest on environmental and water governmental departments whom will need to make a trade-off between meeting the conservation targets of the province or meeting the energy demands of the country. However, it is the opinion of the specialist that the proposed development may proceed where the relevant control measures and mitigation measures stipulated are implemented.</p> <p>There are a number of recommendations to be implemented for the proposed development. These include the following:</p> <ul style="list-style-type: none"> <li>▪ A stormwater management plan for all phases of the proposed development is required to be compiled and implemented which accounts for control of increased run-off, erosion and sedimentation; and</li> <li>▪ An Alien Eradication and Removal Programme is to be compiled and implemented for the duration of the proposed development.</li> </ul> <p>Based on the findings above, with the implementation of the control and mitigation measures stipulated, it is the opinion of the specialist that the proposed development may proceed.</p>
Agricultural and Soils (Desktop)	<p>It should be noted that a field investigation was not considered necessary. The assessment was based on a desktop analysis of existing soil and agricultural potential data and other data for the site, which is considered entirely adequate for a thorough assessment of all the agricultural impacts of the proposed development (see section 4.1 of the Agricultural and Soils Impact Assessment Report).</p> <p>The key findings of the Agricultural and Soils Impact Assessment are provided below:</p> <ul style="list-style-type: none"> <li>▪ The proposed project area is dominated by shallow, loamy sands on underlying rock or less commonly clay. Dominant soil forms are Swartland, Hutton, Mispah, and Valsrivier.</li> </ul>

Study	Summary
	<ul style="list-style-type: none"> <li>▪ The major limitations to agriculture are the limited climatic moisture availability (low rainfall), the rugged terrain and the shallow, rocky soils.</li> <li>▪ As a result of these limitations, the agricultural use of the study area is limited to low-intensity grazing only, except for some isolated patches of irrigation land.</li> <li>▪ The proposed project area is classified with land capability evaluation values between 1 (very low) and 7 (low to moderate), with 6 being most predominant.</li> <li>▪ The significance of all agricultural impacts is kept low by the limited agricultural potential of the land.</li> <li>▪ The only parts of the study area that do not have low sensitivity are the small patches of irrigation. These are considered no-go areas for any footprint of development that will exclude cultivation.</li> <li>▪ Two (2) potential negative impacts of the development on agricultural resources and productivity were identified. These are: <ul style="list-style-type: none"> <li>○ Loss of agricultural land use; and</li> <li>○ Soil erosion and degradation.</li> </ul> </li> <li>▪ One (1) potential positive impact of the development on agricultural resources and productivity was identified as: <ul style="list-style-type: none"> <li>○ Increased financial security of farming operations through rental income</li> </ul> </li> <li>▪ Soil erosion and degradation was assessed as having medium significance before and after mitigation. The other two (2) impacts were assessed as having low significance before and after mitigation.</li> <li>▪ The recommended mitigation measures are for implementation of an effective system of stormwater run-off control; maintenance of vegetation cover; and to strip, stockpile and re-spread topsoil.</li> <li>▪ There is no material difference between the significance of impacts of any of the proposed project alternatives. All proposed alternatives have an equal impact.</li> <li>▪ Due to the low agricultural potential of the site, and the consequent low to medium negative agricultural impact, there are no restrictions relating to agriculture which preclude authorisation of the proposed development (including all alternatives) and therefore, from an agricultural impact point of view, the development should be authorised.</li> </ul>
Visual	Overall, sparse human habitation and the predominance of natural vegetation cover across much of the study area would give the viewer the general impression of a largely natural setting with some pastoral elements. As such, solar PV developments and their associated grid connections would alter the visual character and contrast significantly with the typical land use and/or pattern and form

Study	Summary
	<p>of human elements present across the broader study area. The level of contrast will however be reduced by the presence of the N10 national route and existing high voltage power lines in the northern sector of the study area.</p> <p>The area is not typically valued for its tourism significance and there is limited human habitation resulting in relatively few potentially sensitive receptors in the area. A total of twenty-six (26) potentially sensitive receptors were identified in the combined study area, three (3) of which are considered to be sensitive receptors as they are linked to leisure/nature-based tourism activities in the area. None of the receptors are however expected to experience high levels of visual impact from the proposed grid connection infrastructure. Although the N10 receptor road traverses the study area, motorists travelling along this route are only expected to experience moderate impacts from the proposed Mooi Plaats Solar PV Energy Facility (part of a separate on-going EIA process with <b>DEFF Ref No.:</b> <u>14/12/16/3/3/2/1134</u>).</p> <p>An overall impact rating was also conducted in order to allow the visual impact to be assessed alongside other environmental parameters. The assessment revealed that impacts associated with the proposed grid connection infrastructure would be of low significance during both construction and decommissioning phases. Visual impacts associated with the grid connection infrastructure during operation would be of low significance.</p> <p>Although other renewable energy developments and infrastructure projects, either proposed or in operation, were identified within a 35km radius of the proposed development, it was determined that only one (1) of these would have any significant impact on the landscape within the visual assessment one, namely the Umsobomvu WEF. This proposed WEF, in conjunction with the proposed associated grid connection infrastructure, will alter the inherent sense of place and introduce an increasingly industrial character into a largely natural, pastoral landscape, thus giving rise to significant cumulative impacts. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommendations and mitigation measures stipulated for each of these developments by the visual specialists. In light of this and the relatively low level of human habitation in the study area, however, cumulative impacts have been rated as medium.</p> <p>No fatal flaws were identified for any of the grid connection infrastructure alternatives and a summary of the preference rating is provided below:</p>

Study	Summary
	<ul style="list-style-type: none"> <li>▪ <u>Mooi Plaats grid connection infrastructure</u>: No preference was determined for any of the substation sites. The Option 1 alternatives were rated as preferred due to the fact that the route is shorter and most almost entirely aligned with the existing power lines.</li> </ul> <p>It is the specialist's opinion that the visual impacts associated with the proposed grid connection infrastructure are of moderate significance. Given the low level of human habitation and the relative absence of sensitive receptors, the project is deemed acceptable from a visual impact perspective and the EA should be granted for the relevant BA application. The specialist is of the opinion that the impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.</p>
Heritage	<p>The Heritage Impact Assessment (HIA) consisted of a scoping phase during which background information and landscape analysis was done to determine the heritage resources that can potentially occur within the study area. This was followed up with fieldwork by a team of archaeologist and a palaeontologist with the aim of identifying heritage resources in the development footprint areas and to make recommendations on the management of these resources and the possible chance finds during construction activities.</p> <p>The fieldwork identified a total of ten (10) areas of heritage significance. Adjustments to the project layouts based on the various specialist input resulted in the total avoidance of three (3) heritage areas that was excluded from the reporting. The remaining seven (7) sites consist of three (3) large, low to medium density scatters of later stone age sites (UMS005,008 and 009). UMS004, 006 and 007 are all round stone packed enclosures. UMS007 situated in the Mooi Plaats Solar PV Energy Facility (part of a separate on-going EIA process with <b>DEFF Ref No.:</b> <a href="#">14/12/16/3/3/2/1134</a>) was excluded from direct impact by design changes. UMS004 and 006 will need to be avoided during construction of the power grid through the implementation of a 30m buffer.</p> <p>UMS010 was identified as a fossil find spot and a 50m buffer around the fossil bearing material must be implemented. Any construction in the demarcated area must be monitored by a palaeontologist.</p> <p>The impact rating on the heritage resources indicated that pre-mitigation a negative high impact is projected but with the implementation of the recommended management measures this impact rating will be reduced to low negative.</p>

Study	Summary
	<p>The results of the comparative assessment of the grid connection infrastructure alternatives provided found there to be no preference between the grid connection infrastructure alternatives. This is due to the fact that no heritage issues were identified for any of the footprints. The palaeontological sensitive area at UMS010 is the only heritage resource that influences the Options assessment, but those options affected are still favourable with the implementation of the recommended management measures.</p> <p>It is the specialist's considered opinion, based on the current data available, that with the consideration of the position of heritage sensitivities during the layout design and the implementation of the proposed management measures, the proposed development will have an acceptable low impact on heritage resources and can continue.</p>
Palaeontology	<p>The National Heritage Resources Act (No 25 of 1999, section 38) (NHRA), states that a Palaeontological Impact Assessment (PIA) is key to detect the presence of fossil material within the planned development footprint. This PIA is thus necessary to evaluate the effect of the construction on the palaeontological resources.</p> <p>The proposed development is underlain by the continental sediments of the Latest Permian sediments of the Balfour Formation (Upper Beaufort Group, Adelaide Subgroup) and earliest Triassic sediments of the Katberg Formation (Upper Beaufort Group, Tarkastad Subgroup, Karoo Supergroup) as well as urassic Karoo Dolerite. These sediments are generally mantled by a thick layer of uaternary to Recent colluvium and alluvium. The uppermost Balfour and Katberg Formations are of extraordinary interest in that they provide some of the best existing information on ecologically complex terrestrial ecosystems during the catastrophic end-Permian mass extinction. According to the PalaeoMap of South African Heritage Resources Information System (SAHRIS), the Palaeontological Sensitivity of the Tarkastad and Adelaide Subgroups has a Very High Palaeontological Sensitivity, while that of the uaternary superficial deposits of the Central interior is high and the Karoo dolerite (igneous rocks) is insignificant and rated as ero.</p> <p>A site-specific field survey of the development footprint was conducted on foot and by motor vehicle from the 24<sup>th</sup> – 28<sup>th</sup> of anuary 2019. Elsewhere in the Karoo Basin numerous fossils have been uncovered in these geological sediments but only two (2) sites on koppies with fossiliferous outcrops were identified. Although these localities do not currently fall in the proposed development sites, these fossiliferous sites have been identified as Highly Sensitive and No-go areas and it is recommended that a 50m buffer will be placed around these areas. In the event that construction is necessary in these sensitive areas, it is recommended that the fossils will be collected by a professional palaeontologist. Preceding excavation of any fossil material, the specialist would need to apply for a</p>

Study	Summary
	<p>collection permit from the South African Heritage Resources Agency (SAHRA). Fossil material must be curated in an accredited collection (museum or university collection), while all fieldwork and reports should meet the minimum standards for palaeontological impact studies suggested by SAHRA.</p> <p>With the above-mentioned in consideration, the proposed development, as well as all alternatives have a similar geology and therefore there is no preferences on the grounds of palaeontological fossil heritage for any specific layout among the different options under consideration. As impacts on fossil heritage usually only occur during the excavation phase, no further impacts on fossil heritage are expected during the operation and decommissioning phases of the proposed development.</p> <p>The impact of development on fossil heritage are usually negative but it could also have a positive impact due to the discovery of newly uncovered fossil material that would have been unavailable for scientific research. The proposed development could also provide a long-term benefit to the country by supplying renewable energy to the electricity grid.</p> <p>In the event that fossil remains are discovered during any phase of construction, either on the surface or exposed by fresh excavations, the Chance Find Protocol must be implemented by the Environmental Control Officer (ECO) in charge of these developments. These discoveries ought to be protected (if possible, <i>in situ</i>) and the ECO must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: 27 21 462 4509. Web: <a href="http://www.sahra.org">www.sahra.org</a>) so that correct mitigation (e.g. recording and collection) can be carried out by a palaeontologist.</p> <p>It is consequently recommended that no further palaeontological heritage studies, ground-truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils. From a Palaeontological Heritage view there is no fatal flaws in the proposed development. However, it is recommended that the mitigation measures are included in the Environmental Management Programme (EMPr) and be fully implemented.</p>
Social (Desktop)	<p><b><u>APPROACH TO STUDY</u></b></p> <p>Data was gathered using the following techniques:</p> <p><b>Collection of data</b></p>

Study	Summary
	<p>Data was gathered through:</p> <ul style="list-style-type: none"> <li>▪ The project description prepared by the project proponent;</li> <li>▪ Statistics South Africa, Census 2011 and other relevant demographic data generated by Stats SA such as the quarterly Labour Force Survey and Mid-year population estimates;</li> <li>▪ Discussions with the project proponents and Environmental Impact Assessment (EIA) Consultants;</li> <li>▪ A literature review of various documents such as the relevant Municipal Integrated Development Plans (IDPs) and other specialist reports and documents; and</li> <li>▪ A broader literature scan.</li> </ul> <p><b>Impact assessment technique</b></p> <p>The assessment technique used to evaluate the social impacts was provided by SiVEST Environmental Division and is attached in Appendix 1 of the Social Impact Assessment Report (<b>Appendix 6F</b>).</p> <p><b><u>IMPACTS IDENTIFIED</u></b></p> <p>The impacts are assessed in respect of the following phases of the project:</p> <ul style="list-style-type: none"> <li>▪ Planning and design;</li> <li>▪ Construction;</li> <li>▪ Operational;</li> <li>▪ Decommissioning; and</li> <li>▪ The 'no-go' option.</li> </ul> <p><b>Construction phase</b></p> <p>Most of the impacts discussed above apply over the short-term to the construction phase of the proposed development and include:</p> <ul style="list-style-type: none"> <li>▪ Annoyance, dust and noise;</li> <li>▪ Increase in crime;</li> <li>▪ Increased risk of HIV infections;</li> <li>▪ Influx of construction workers and job seekers;</li> </ul>



Study	Summary
	<ul style="list-style-type: none"> <li>▪ Hard exposure;</li> <li>▪ Disruption of daily living patterns;</li> <li>▪ Disruptions to social and community infrastructure;</li> <li>▪ Job creation and skills development; and</li> <li>▪ Socio-economic stimulation.</li> </ul> <p><b>Operational phase</b></p> <p>The social impacts that apply to the operational phase of the proposed development are:</p> <ul style="list-style-type: none"> <li>▪ Transformation of the sense of place; and</li> <li>▪ Economic. <ul style="list-style-type: none"> <li>○ Job creation and skills development.</li> <li>○ Socio-economic stimulation.</li> </ul> </li> </ul> <p><b>Decommissioning</b></p> <p>If the proposed development were to be completely decommissioned, the major social impacts likely to be associated with this would be the loss of jobs and revenue stream that stimulated the local economy and flowed into the municipal coffers.</p> <p><b>'No Go' Alternative</b></p> <p>The 'no go' option would mean that the social environment is not affected as the status quo would remain. On a negative front it would also mean that all the positive aspects associated with the proposed development would not materialise. Considering that Eskom's coal-fired power stations are a huge contributor to carbon emissions, the loss of a chance to supplement the national grid through renewable energy would be significant at a national, if not at a global level.</p> <p><b>Cumulative Impacts</b></p> <p>In this regard, the following cumulative impacts are addressed below:</p> <ul style="list-style-type: none"> <li>▪ Risk of HIV;</li> <li>▪ Sense of place;</li> </ul>

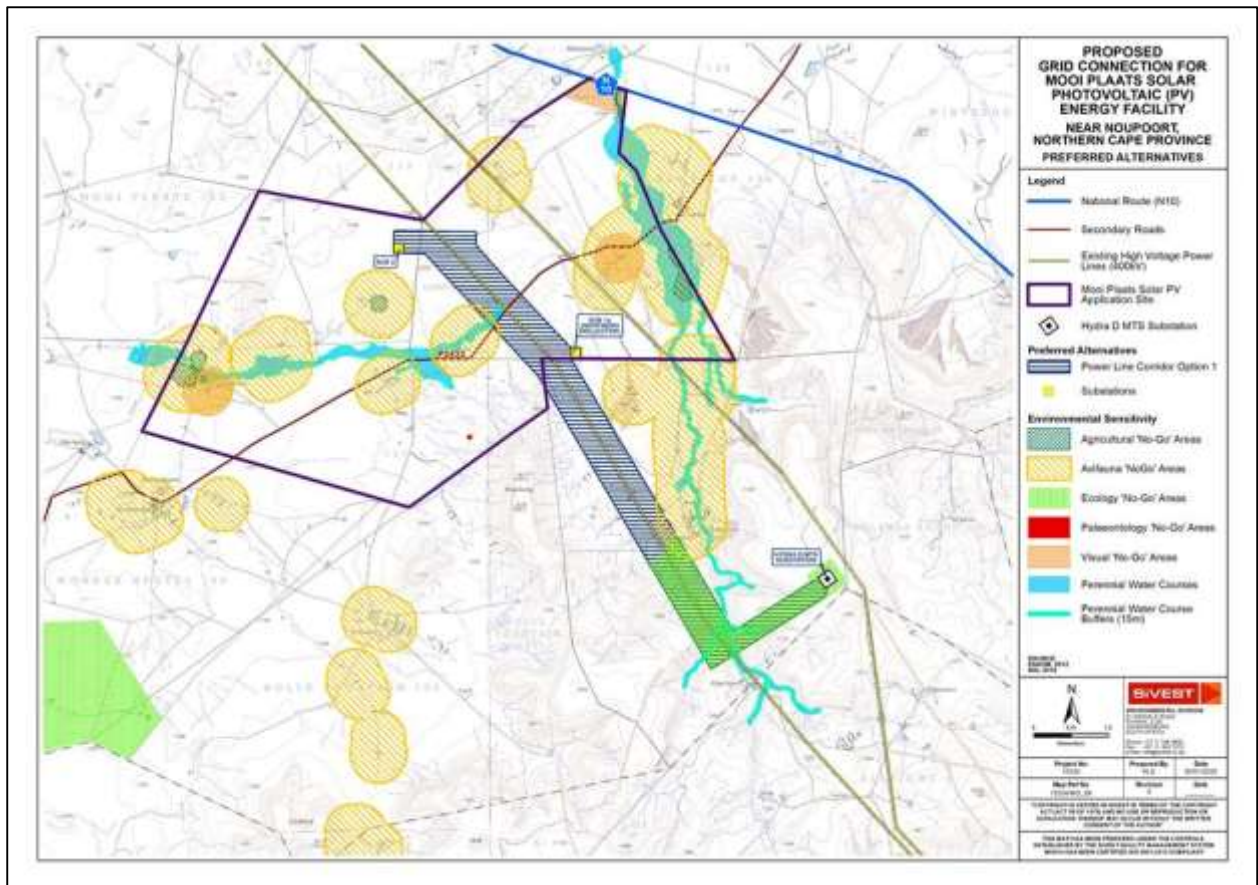
Study	Summary
	<ul style="list-style-type: none"> <li>▪ Service supplies and infrastructure; and</li> <li>▪ The economic benefit.</li> </ul> <p>No fatal flaws associated with the cumulative impacts are evident at a social level. The findings support the recommendations of the various reports undertaken for the different renewable energy projects in the region that, on an overall basis, the social benefits of renewable energy projects outweigh the negative benefits and that the negative social impacts can be mitigated.</p> <p><b><u>COMPARATIVE ASSESSMENT OF GRID CONNECTION INFRASTRUCTURE ALTERNATIVES (POWER LINE CORRIDORS AND ASSOCIATED SUBSTATIONS)</u></b></p> <p>As no social preference emerged in respect of any of the grid connection options, the other specialist reports were perused to establish if there was any preference that would have an influence on the social. Based on this analysis, the following preferences were identified and supported on a social basis:</p> <ul style="list-style-type: none"> <li>▪ Grid Connection Option 1a Preferred;</li> <li>▪ Grid Connection Option 1b Preferred;</li> <li>▪ Grid Connection Option 2a Favourable; and</li> <li>▪ Grid Connection Option 2b Favourable.</li> </ul> <p><b><u>CONCLUSION AND RECOMMENDATIONS</u></b></p> <p>In assessing the social impact of the proposed development, it was found that in respect of the energy needs of the country and South Africa's need to reduce its carbon emissions that the proposed development fits with national, provincial and municipal policy.</p> <p>Regarding the social impacts associated with the proposed development, it was found that most apply over the short term to the construction phase of the proposed development. Of these impacts, all can be mitigated to within acceptable ranges and there are no fatal flaws associated with the construction or operation of the proposed development.</p> <p>On a cumulative basis it is evident that the cumulative impacts associated with changes to the social environment of the region are more significant than those attached to the proposed development in isolation. On a negative front there are two (2) issues associated</p>

Study	Summary
	<p>with developments in the region that are of most concern. The first of these issues is the change to the sense of place of an area that was once considered a pristine region of South Africa. The second is the potential, through an influx of labour and an increase in transportation to constructions sites, of the risk for the prevalence of HIV to rise in an area that has a relatively low HIV prevalence rate. In this regard, it is important that the relevant authorities recognise these issues and find ways of mitigating them to ensure that they do not undermine the benefit that renewable energy developments bring, both to the region as well as to the country as a whole. These issues are beyond a project-specific basis and as such will need to be addressed at a higher level.</p> <p><b>Impact Statement</b></p> <p>The project site and surrounding areas are sparsely populated with the agricultural potential of the area being low. Accordingly, the negative social impacts associated with the proposed grid connection infrastructure are of low to moderate significance with most occurring over the short term construction phase. The proposed development has a positive element which outweighs the negative in that it will contribute towards the supply of renewable energy into a grid system heavily reliant on coal-powered energy generation. In this sense, the proposed development forms part of a national effort to reduce South Africa’s carbon emissions and thus carries with it a significant social benefit and is thus supported and should proceed.</p> <p>As the area is sparsely populated and the negative social impacts associated with the grid connection infrastructure are of moderate significance, it is most unlikely that any further social study will be necessary. This will, however, be dependent on the outcome of the public participation process which may result in a need to update the current report by incorporating the comments recorded and updating the social impacts accordingly.</p>
Geotechnical (Desktop)	<p>The desktop geotechnical assessment did not identify any fatal flaws that, from a geological and geotechnical perspective, would prevent the construction of the proposed development.</p> <p>The potential impacts the proposed development may have on the geology relate to soils that could be impacted by the construction activities. There may be a potential for soil erosion, due to removal of vegetation and exposure of the soils to the elements, during construction. The impacts were found to be of ‘negative low impact’.</p>

Study	Summary
	<p>Various corridor options were studied. While all options are considered suitable for development, the following option was found to be preferable from a geological and geotechnical perspective:</p> <ul style="list-style-type: none"> <li>▪ Mooi Plaats – Grid Option 1.</li> </ul> <p>The geological impacts will be similar.</p> <p>Due the very similar bedrock geology, similar geotechnical conditions are expected across all options.</p> <p>From a geological and geotechnical perspective, based on the minimal negative impacts on the geology and soils and the recommendations for mitigation measures, it is recommended that the proposed development receives the ‘go-ahead’ from the Competent Authority.</p>

The specialist assessments were conducted to address the potential impacts relating to the proposed development. An impact assessment was conducted to ascertain the level of each identified impact, as well as mitigation measures which may be required. The potential positive and negative impacts associated with the specialist assessments were evaluated and rated accordingly. In addition, as mentioned, grid connection infrastructure alternatives (which include on-site and collector substation sites and 132kV power line corridors) were also investigated and comparatively assessed by the respective specialists. The results of the specialist assessments have indicated that the preferred options contain no fatal flaws. In addition, all applicable environmental aspects were thoroughly investigated as part of the BA process, and the specialists did not recommend any further studies and/or investigations to be undertaken.

The 'preferred' grid connection infrastructure alternative (which include on-site and collector substation sites and a 132kV power line corridor) in relation to environmentally sensitive areas is indicated in **Figure 4** below.



**Figure 4:** Preferred grid connection infrastructure alternative in relation to environmentally sensitive areas

## 7 APPLICANT 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 (see **Annexure B**) 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 namely the national Department of Environment, Forestry and Fisheries (DEFF) fourteen (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:

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## 8 PRE-APPROVED GENERIC EMPr TEMPLATE (PART B: SECTION 1 OF GENERIC EMPrs - ATTACHED IN APPENDIX B)

This section provides a pre-approved generic EMPr template with aspects that are common to the development of overhead electricity transmission and distribution infrastructure as well as substation infrastructure for the transmission and distribution of electricity. There is a list of aspects identified for the development or expansion of overhead electricity transmission and distribution infrastructure as well as substation infrastructure for the transmission and distribution of electricity, and for each aspect a set of prescribed impact management outcomes and associated impact management actions have been identified. Holders of EAs and or Project Developers 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 as well as substation infrastructure for the transmission and distribution of electricity.

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

Please refer to **SECTION 5: IMPACT MANAGEMENT OUTCOMES AND IMPACT MANAGEMENT ACTIONS** of the respective Generic EMPrs (provided in **Annexure B**) for the generic EMPr templates with aspects that are common to the development of overhead electricity transmission and distribution infrastructure as well as substation infrastructure for the transmission and distribution of electricity.

## 9 SITE SPECIFIC EMPr

### 9.1 Terrestrial Ecology / Biodiversity (Fauna and Flora)

#### 9.1.1 Fauna and Flora

<b>Impact Management Outcome:</b> Minimise or avoid impacts on fauna and flora (vegetation) and protected plant and animal species						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
<b>PLANNING AND DESIGN PHASE</b>						
Ensure that the design of the power line and substations takes cognisance of the sensitive and/or 'no-go' areas identified by the Ecologist / Biodiversity Specialist in order to minimise impacts on sensitive habitats and species	Project Developer and Ecologist / Biodiversity Specialist	<ul style="list-style-type: none"> <li>▪ Ensure that this is taken into consideration during planning and design phase</li> <li>▪ Ecologist / Biodiversity Specialist to undertake detailed pre-construction walk-through survey</li> <li>▪ Appoint Ecologist / Biodiversity Specialist to compile ecological management plan and implement plan</li> </ul>	During design phase and prior to construction	Project Developer and Ecologist / Biodiversity Specialist	During design phase and prior to construction	<ul style="list-style-type: none"> <li>▪ Final design to be signed off by Ecologist / Biodiversity Specialist</li> <li>▪ Records of findings of pre-construction walkthrough in place</li> <li>▪ Ecological management plan implemented</li> </ul>
Ensure that the design of the grid connections (power lines and substations) takes the sensitivity mapping of the specialists into account to avoid and/or reduce the impacts on Species and habitats of Conservation Concern						
Where large populations of affected species of high value are encountered, consideration should be given to shifting infrastructure to avoid such areas.						
No authorisation should be given that results in the loss of populations of threatened plants. Infrastructure must be relocated and a suitable buffer zone maintained around such populations. An ecological management plan must be compiled for such areas.						
Ensure lay-down and other temporary infrastructure is within low-sensitivity areas, preferably previously transformed areas if possible						
Wherever possible, locate infrastructure within areas that have been previously disturbed or in areas with lower sensitivity scores						



<b>Impact Management Outcome:</b> Minimise or avoid impacts on fauna and flora (vegetation) and protected plant and animal species						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
<p>Access and service roads must be kept to a minimum and routes must also be adjusted to avoid areas of high sensitivity as far as possible, as informed by a pre-construction walk-through surveys</p> <ul style="list-style-type: none"> <li>A pre-construction floral walk-through of the approved development footprint must be conducted to ensure that sensitive habitats and species are avoided</li> <li>It is a legal requirement to obtain permits for specimens that will be lost. A detailed pre-construction walk-through survey must be undertaken by the Terrestrial Ecologist during a favourable season to locate any additional individuals of protected plants. This survey must cover the footprint of all approved infrastructure, including internal access roads</li> </ul>						
<b>CONSTRUCTION PHASE</b>						
<p>If electric fences are to be constructed, these must be erected according to the standards of Nature Conservation authorities</p>	<p>Project Developer and Ecologist / Biodiversity Specialist</p>	<ul style="list-style-type: none"> <li>Approval for electric fencing to be obtained from Nature Conservation Authorities</li> <li>Approach Ecologist / Biodiversity to advise on electric fences</li> <li>ECO to inspect electric fences to ensure that these have been erected according to the standards of Nature</li> </ul>	<p>During construction, while fences are being erected</p>	<p>ECO / Ecologist / Biodiversity Specialist</p>	<p>During construction, while fences are being erected</p>	<ul style="list-style-type: none"> <li>Ecologist / Biodiversity Specialist to advise on electric fences</li> <li>Proof of approval for electric fences from Conservation Authorities</li> <li>Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>

**MOOI PLAATS SOLAR POWER (PTY) LTD**

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Version No. 1.0

8 August 2020

**prepared by: SiVEST Environmental**

<b>Impact Management Outcome:</b> Minimise or avoid impacts on fauna and flora (vegetation) and protected plant and animal species						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
		<ul style="list-style-type: none"> <li>Conservation authorities</li> <li>Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>				
<ul style="list-style-type: none"> <li>Vegetation to be removed as it becomes necessary rather than removal of all vegetation throughout the site in one step</li> <li>Minimise vegetation clearing and disturbance to footprint areas only</li> <li>Disturbance of vegetation and topsoil must be kept to a practical minimum</li> <li>Vegetation removal must be phased in order to reduce impact of construction</li> <li>All plants not interfering with the construction must be left undisturbed. Species of special concern must be clearly marked</li> </ul>		<ul style="list-style-type: none"> <li>Implement Erosion Management Plan</li> <li>ECO to monitor site clearing and staff activities on-site</li> <li>Ecologist / Biodiversity Specialist to undertake site walk-through survey of footprint areas in order to mark species of special concern and identify sensitive habitats</li> <li>Weekly and monthly reporting of activities, offences and remedial actions.</li> </ul>	<ul style="list-style-type: none"> <li>During construction, when site clearing is taking place</li> </ul>		Weekly	<ul style="list-style-type: none"> <li>Erosion Management Plan in place and being audited</li> <li>Records of findings of pre-construction walk-through in place</li> <li>Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>
Undertake a walk-through survey of footprint areas			Before construction commences		Before construction commences	
Avoid construction of infrastructure within sensitive habitats. Limit development within conservation zones, especially CBA1 areas			During construction		Weekly	

- Compile a rehabilitation programme and rehabilitate disturbed areas
- All natural areas impacted during construction must be rehabilitated with locally indigenous species typical of the representative botanical unit. Seeds from surrounding seed banks can be used for re-seeding
- Rehabilitation must take place in a phased approach, as soon as possible
- Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas

- Appoint Ecologist / Biodiversity Specialist to compile rehabilitation programme and implement programme
- Implement Re-vegetation and Habitat Rehabilitation Plan
- Implement Erosion Management Plan
- ECO to monitor site to ensure all natural areas impacted during construction / disturbed areas are being rehabilitated accordingly
- Weekly and monthly reporting of activities, offences and remedial actions

Monthly	<ul style="list-style-type: none"> <li>▪ Rehabilitation programme implemented and being audited</li> <li>▪ Re-vegetation and Habitat Rehabilitation Plan in place and being audited</li> <li>▪ Erosion Management Plan in place and being audited</li> <li>▪ Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>
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<b>Impact Management Outcome:</b> Minimise or avoid impacts on fauna and flora (vegetation) and protected plant and animal species						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
Compile an Alien Plant Management Plan, including monitoring, to ensure minimal impacts on surrounding areas and provides a programme for long-term control. Undertake monitoring to evaluate whether further measures would be required to manage impacts		<ul style="list-style-type: none"> <li>Appoint Ecologist / Biodiversity Specialist to compile Alien Plant Management Plan and implement plan</li> <li>ECO to monitor whether Alien Plant Management Plan is being adhered to</li> <li>Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>			Weekly	<ul style="list-style-type: none"> <li>Alien Plant Management Plan implemented and being audited</li> <li>Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>
Obtain all necessary permits. Relevant permits must be obtained for specimens that will be lost		<ul style="list-style-type: none"> <li>Obtain clearing and translocation permits from the relevant authorities</li> </ul>				<ul style="list-style-type: none"> <li>Relevant permits from authorities in place</li> </ul>
A Plant Rescue Plan must be compiled to be approved by the appropriate authorities.		<ul style="list-style-type: none"> <li>Appoint Ecologist / Biodiversity Specialist to compile Plant Rescue Plan</li> </ul>				<ul style="list-style-type: none"> <li>Proof of approval of Plant Rescue Plan</li> </ul>
Plants lost to the development can be rescued and planted in appropriate places in rehabilitation areas. This will reduce the irreplaceable loss of resources as well as the cumulative effect.		<ul style="list-style-type: none"> <li>Obtain approval of Plant Rescue Plan from appropriate authorities</li> </ul>				<ul style="list-style-type: none"> <li>Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>
Report any infringements to law enforcement						

Impact Management Outcome: Minimise or avoid impacts on fauna and flora (vegetation) and protected plant and animal species						
Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
		<ul style="list-style-type: none"> <li>Weekly and monthly reporting of activities, offences and remedial actions</li> <li>Implement mechanisms to report non-compliance / infringements</li> </ul>				<ul style="list-style-type: none"> <li>Report any non-compliance</li> </ul>
OPERATION PHASE						
Implement traffic control measures, including speed limits and 'no-go' zones	ESKOM / Owner of infrastructure	<ul style="list-style-type: none"> <li>Implement Traffic and Transportation Management Plans;</li> <li>Review the traffic control measures and monitor this on an on-going basis</li> <li>Follow-up remedial action where required to address problems identified</li> <li>Records of problems and actions taken</li> </ul>	During operation	ESKOM / Owner of infrastructure	Annually Annual or more frequent control actions	<ul style="list-style-type: none"> <li>Transportation and Traffic Management Plans in place and being audited</li> <li>Annual monitoring plans in place and being audited</li> <li>Report any non-compliance</li> </ul>
Environmental awareness education for staff and visitors		Compile and implement environmental				<ul style="list-style-type: none"> <li>Proof of environmental awareness</li> </ul>

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Impact Management Outcome: Minimise or avoid impacts on fauna and flora (vegetation) and protected plant and animal species						
Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
		awareness education programme				education for staff and visitors (such as attendance register) <ul style="list-style-type: none"> <li>Report any non-compliance</li> </ul>
Compile and implement Alien Invasive Management Plan		<ul style="list-style-type: none"> <li>Appoint Ecologist / Biodiversity Specialist to compile Alien Invasive Management Plan and implement plan</li> <li>Monitor whether Alien Plant Management Plan is being adhered to on-going basis</li> <li>Follow-up remedial action where required to address problems identified</li> <li>Records of problems and actions taken</li> </ul>				<ul style="list-style-type: none"> <li>Alien Invasive Management Plan implemented and being audited</li> <li>Reporting of activities, offences and remedial actions</li> <li>Report any non-compliance</li> </ul>
Rehabilitate disturbed areas		<ul style="list-style-type: none"> <li>Appoint Ecologist / Biodiversity Specialist to compile</li> </ul>				<ul style="list-style-type: none"> <li>Rehabilitation programme implemented and being audited</li> </ul>

Impact Management Outcome: Minimise or avoid impacts on fauna and flora (vegetation) and protected plant and animal species						
Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
		<ul style="list-style-type: none"> <li>rehabilitation programme and implement programme</li> <li>Implement Re-vegetation and Habitat Rehabilitation Plan</li> <li>On-going monitoring of site to ensure rehabilitation is being undertaken</li> <li>Reporting of activities, offences and remedial actions</li> </ul>				<ul style="list-style-type: none"> <li>Re-vegetation and Habitat Rehabilitation Plan in place and being audited</li> <li>Reporting of activities, offences and remedial actions</li> <li>Report any non-compliance</li> </ul>
Compile and implement a stormwater management plan, which highlights control priorities and areas and provides a programme for long-term control		<ul style="list-style-type: none"> <li>Appoint Ecologist / Biodiversity Specialist to compile and implement a stormwater management plan which highlights control priorities and areas and provides a programme for long-term control</li> <li>On-going monitoring of site to</li> </ul>				<ul style="list-style-type: none"> <li>Stormwater Management Plan implemented and being audited</li> <li>Reporting of activities, offences and remedial actions</li> <li>Report any non-compliance</li> </ul>

Impact Management Outcome: Minimise or avoid impacts on fauna and flora (vegetation) and protected plant and animal species						
Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
		<ul style="list-style-type: none"> <li>ensure stormwater management plan is being adhered to</li> <li>Reporting of activities, offences and remedial actions</li> </ul>				
Undertake regular monitoring to detect erosion features early so that they can be controlled		<ul style="list-style-type: none"> <li>Appoint relevant specialist to compile and implement erosion management plan and implement plan</li> </ul>				<ul style="list-style-type: none"> <li>Erosion Management Plan implemented and being audited</li> </ul>
Implement control measures		<ul style="list-style-type: none"> <li>On-going monitoring of site for erosion and to ensure erosion management plan is being adhered to</li> <li>Reporting of activities, offences and remedial actions</li> </ul>				<ul style="list-style-type: none"> <li>Reporting of activities, offences and remedial actions</li> <li>Report any non-compliance</li> </ul>
Avoid building on or near steep or unstable slopes. Construct proper culverts, bridges and/or crossings at drainage-line crossings, and other attenuation devices to limit overland flow		<ul style="list-style-type: none"> <li>Areas near steep or unstable slopes to be demarcated and avoided</li> <li>Drainage lines to be avoided, where possible</li> <li>Clear communication to</li> </ul>				<ul style="list-style-type: none"> <li>Proof of communication with operational staff regarding avoidance of drainage lines and use of proper culverts, bridges and/or crossings</li> </ul>



<b>Impact Management Outcome:</b> Minimise or avoid impacts on fauna and flora (vegetation) and protected plant and animal species						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
		operational staff to avoid drainage lines and only make use of proper culverts, bridges and/or crossings only				<ul style="list-style-type: none"> <li>▪ Reporting of activities, offences and remedial actions</li> <li>▪ Report any non-compliance</li> </ul>
<b>DECOMMISSIONING PHASE</b>						
No additional clearing of vegetation must take place without a proper assessment of the environmental impacts and authorisation from relevant authorities	ESKOM / Owner of infrastructure	<ul style="list-style-type: none"> <li>▪ Appoint Ecologist / Biodiversity Specialist to undertake proper assessment of environmental impacts</li> <li>▪ Obtain authorisation from relevant authorities for vegetation clearance (if required)</li> <li>▪ Site inspections to ensure no unauthorised additional clearing of vegetation has taken place</li> <li>▪ Follow-up remedial action where required to</li> </ul>	During Decommissioning	ESKOM / Owner of infrastructure	Annual monitoring for at least 5 years after decommissioning	<ul style="list-style-type: none"> <li>▪ Relevant monitoring / management plans in place and being audited</li> <li>▪ Relevant authorisations in place and being audited (if required)</li> <li>▪ Reporting of activities, offences and remedial actions</li> <li>▪ Report any non-compliance</li> </ul>

Impact Management Outcome: Minimise or avoid impacts on fauna and flora (vegetation) and protected plant and animal species						
Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
		<ul style="list-style-type: none"> <li>address problems identified</li> <li>Records of problems and actions taken</li> </ul>				
If any additional infrastructure needs to be constructed, for example overhead power lines, communication cables, etc., then these must be located next to existing infrastructure, and clustered to avoid dispersed impacts		Ensure additional infrastructure that needs to be constructed is located next to existing infrastructure	During Decommissioning, should any additional infrastructure needs to be constructed			
No driving of vehicles off-road		<ul style="list-style-type: none"> <li>Specific routes / roads to be designated for use during decommissioning</li> <li>Clear communication with decommissioning staff to stick to designated routes / roads and to not drive off-road</li> <li>Site inspections to ensure designated routes / roads are being used only and that no staff are driving off-road</li> </ul>	During decommissioning			

<b>Impact Management Outcome:</b> Minimise or avoid impacts on fauna and flora (vegetation) and protected plant and animal species						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
		<ul style="list-style-type: none"> <li>Follow-up remedial action where required to address problems identified</li> <li>Records of problems and actions taken</li> </ul>				
Implement Alien Plant Management Plan, including monitoring, to ensure minimal impacts on surrounding areas. This plan must highlight control priorities and areas and provide a programme for long-term control		<ul style="list-style-type: none"> <li>Implement Alien Plant Management Plan</li> </ul>				
Undertake regular monitoring to detect alien invasions early so that they can be controlled		<ul style="list-style-type: none"> <li>On-going monitoring to detect alien invasions and to confirm whether Alien Plant Management Plan is being adhered to</li> <li>Follow-up remedial action where required to address problems identified</li> <li>Records of problems and actions taken</li> </ul>				
Access to sensitive areas outside of development footprint should not be permitted during operation		<ul style="list-style-type: none"> <li>Decommissioning activities to be restricted to</li> </ul>				

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Version No. 1.0

8 August 2020

**prepared by: SiVEST Environmental**

Impact Management Outcome: Minimise or avoid impacts on fauna and flora (vegetation) and protected plant and animal species						
Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
		<ul style="list-style-type: none"> <li>development footprint</li> <li>Sensitive areas to be clearly demarcated and avoided</li> <li>Clear communication to decommissioning staff to avoid sensitive areas outside of development footprint</li> </ul>				
Surface runoff and erosion must be properly controlled and any issues addressed as quickly as possible		<ul style="list-style-type: none"> <li>Implement erosion management plan</li> <li>On-going monitoring of site for surface runoff and erosion and to ensure erosion management plan is being adhered to</li> <li>Follow-up remedial action where required to address problems identified</li> <li>Records of problems and actions taken</li> </ul>				
Post-decommissioning monitoring should continue for an appropriate length of time to ensure that future problems		Agree appropriate length of time for post-				

Impact Management Outcome: Minimise or avoid impacts on fauna and flora (vegetation) and protected plant and animal species						
Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
are avoided		decommissioning monitoring and ensure this is adhered to				
Do NOT use any alien plants during any rehabilitation that may be required		<ul style="list-style-type: none"> <li>▪ Implement Re-vegetation and Habitat Rehabilitation Plan</li> <li>▪ On-going monitoring of site to ensure Re-vegetation and Habitat Rehabilitation Plan is being adhered to</li> <li>▪ Follow-up remedial action where required to address problems identified</li> <li>▪ Records of problems and actions taken</li> </ul>				
Implement a stormwater management plan, which highlights control priorities and areas and provides a programme for long-term control		<ul style="list-style-type: none"> <li>▪ Implement a stormwater management plan, which highlights control priorities and areas and provides a programme for long-term control</li> <li>▪ On-going monitoring of site to</li> </ul>				

<b>Impact Management Outcome:</b> Minimise or avoid impacts on fauna and flora (vegetation) and protected plant and animal species						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
		<ul style="list-style-type: none"> <li>ensure stormwater management plan is being adhered to</li> <li>▪ Follow-up remedial action where required to address problems identified</li> <li>▪ Records of problems and actions taken</li> </ul>				
Following decommissioning, undertake regular monitoring for an appropriate length of time to detect erosion features early so that they can be controlled		<ul style="list-style-type: none"> <li>▪ Implement erosion management plan</li> <li>▪ On-going monitoring for erosion and to ensure erosion management plan is being adhered to</li> <li>▪ Follow-up remedial action where required to address problems identified</li> <li>▪ Records of problems and actions taken</li> </ul>				
Implement any control measures that may become necessary						
No speeding on access roads – install speed control measures, such as speed humps, if necessary		<ul style="list-style-type: none"> <li>▪ Implement Traffic Management Plan</li> <li>▪ Implement speed control measures on site</li> <li>▪ On-going</li> </ul>				

Impact Management Outcome: Minimise or avoid impacts on fauna and flora (vegetation) and protected plant and animal species						
Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
		<p>monitoring to ensure Traffic Management Plan is being adhered to and speed control measures have been put in place</p> <ul style="list-style-type: none"> <li>Follow-up remedial action where required to address problems identified</li> <li>Records of problems and actions taken</li> </ul>				
No illegal collecting of any individuals, particularly the Armadillo Girdled Liard		<ul style="list-style-type: none"> <li>Collecting of any individuals, particularly the Armadillo Girdled Liard, to be strictly prohibited and communicated to all personnel</li> </ul>				
No hunting of protected species or hunting of any other species without a valid permit.		<ul style="list-style-type: none"> <li>Valid permits to be obtained for hunting of protected species or hunting of any other species, if required</li> </ul>				
Personnel to be educated about protection status of species, including distinguishing features to be able to identify protected species.		<ul style="list-style-type: none"> <li>Implement</li> </ul>				
Report any sightings to conservation authorities.						

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Impact Management Outcome: Minimise or avoid impacts on fauna and flora (vegetation) and protected plant and animal species						
Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
		<ul style="list-style-type: none"> <li>education programme for personnel to be educated about protection status of species, including distinguishing features to be able to identify protected species</li> <li>▪ Implement appropriate measures to report sightings to conservation authorities and save proof of reports</li> <li>▪ Follow-up remedial action where required to address problems identified</li> <li>▪ Records of problems and actions taken</li> </ul>				
Avoid undertaking any activities on or near steep or unstable slopes		<ul style="list-style-type: none"> <li>▪ Areas near steep or unstable slopes to be demarcated and avoided</li> <li>▪ Sensitive areas to be avoided</li> </ul>				
Personnel and vehicles to avoid sensitive habitats						

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Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
		<ul style="list-style-type: none"> <li>▪ Clear communication to decommissioning phase staff to avoid steep or unstable slopes, as well as sensitive areas</li> <li>▪ Follow-up remedial action where required to address problems identified</li> <li>▪ Records of problems and actions taken</li> </ul>				
Prevent unauthorised access to the site – project roads provide access to remote areas that were not previously easily accessible for illegal collecting or hunting		<ul style="list-style-type: none"> <li>▪ Project site to be fenced off to prevent unauthorised access (if possible)</li> <li>▪ Appoint security guard / company to monitor site and prevent unauthorised access (if possible)</li> <li>▪ Designated Entry and Exit points to be established</li> <li>▪ Follow-up remedial action where required to address problems identified</li> </ul>				

<b>Impact Management Outcome:</b> Minimise or avoid impacts on fauna and flora (vegetation) and protected plant and animal species						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
		<ul style="list-style-type: none"> <li>Records of problems and actions taken</li> </ul>				

## 9.2 Avifauna

<b>Impact Management Outcome:</b> Avoid or minimise impacts to avifauna by reducing unnecessary destruction and degradation of the habitat of Red Data Species						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
<b>DESIGN PHASE</b>						
A site-specific Construction EMPr must be designed which gives an appropriate and detailed description of how construction activities must be conducted to reduce unnecessary destruction and degradation of habitat to avoid or reduce displacement of Red Data Species	Project Developer and Avifaunal Specialist	<ul style="list-style-type: none"> <li>▪ Site-specific Construction EMPr must be implemented and approved by Avifaunal Specialist</li> <li>▪ Final pole design to be signed off by bird specialist</li> </ul>	Once-off prior to construction	Project Developer and Avifaunal Specialist	Once-off prior to construction	<ul style="list-style-type: none"> <li>▪ Site specific Construction EMPr in place and signed off by avifaunal specialist</li> <li>▪ Proof that pole design was signed off by specialist to be kept</li> </ul>
The final pole design must be signed off by the bird specialist to ensure that a bird-friendly design is used						
<b>CONSTRUCTION PHASE</b>						

<b>Impact Management Outcome: Avoid or minimise impacts to avifauna by reducing unnecessary destruction and degradation of the habitat of Red Data Species</b>						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	<b>Responsible Person</b>	<b>Method of Implementation</b>	<b>Timeframe for Implementation</b>	<b>Responsible Person</b>	<b>Frequency</b>	<b>Evidence of Compliance</b>
A walk-through must be conducted by the avifaunal specialist to assess whether there are any Red Data species, and/or large raptors breeding in the vicinity of the power line, which could be displaced by the construction activities. Should this be the case, appropriate measures must be put in place to prevent the displacement of the breeding birds, through the timing of activities.	Project Developer, Avifauna Specialist and ECO	<ul style="list-style-type: none"> <li>Avifaunal Specialist to undertake pre-construction walk-through survey</li> <li>Appoint Avifaunal Specialist to compile appropriate measures to be put in place to prevent the displacement of breeding birds, through timing of activities</li> </ul>	Once-off before construction commences, for a pre-determined time period	Project Developer, Avifauna Specialist and ECO	Once-off before construction commences, for a pre-determined time period	<ul style="list-style-type: none"> <li>Final design to be signed off by Avifaunal Specialist</li> <li>Records of findings of pre-construction walk-through in place</li> <li>Appropriate measures in place to prevent the displacement of the breeding birds, through the timing of activities, and being audited</li> </ul>
Activity should be restricted to the immediate footprint of the infrastructure		<ul style="list-style-type: none"> <li>Ensure construction area is demarcated clearly and construction personnel are made aware of demarcations</li> <li>Monitor via site inspection and report non-</li> </ul>	During construction	ECO	Weekly	<ul style="list-style-type: none"> <li>Undertake site inspections to verify</li> <li>Report and record any non-compliance via site audits and inspections</li> </ul>

<b>Impact Management Outcome: Avoid or minimise impacts to avifauna by reducing unnecessary destruction and degradation of the habitat of Red Data Species</b>						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of avifauna	Project Developer	compliance				
Measures to control noise should be applied according to current best practice in the industry		Monitor implementation of noise control mechanisms via site inspections and record and report non-compliance				
Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum		<ul style="list-style-type: none"> <li>▪ Ensure construction personnel are made aware of impacts relating to off-road driving</li> <li>▪ Construction access roads must be demarcated clearly</li> <li>▪ Monitor via site inspections</li> </ul>				

<b>Impact Management Outcome: Avoid or minimise impacts to avifauna by reducing unnecessary destruction and degradation of the habitat of Red Data Species</b>						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
The recommendations of the ecological and botanical specialist studies must be strictly implemented		<ul style="list-style-type: none"> <li>▪ Copy of recommendations of the ecological / botanical specialist to be kept on site and adhered to</li> <li>▪ Ensure that construction personnel are made aware of these recommendations</li> <li>▪ Monitor via site inspections</li> </ul>				<ul style="list-style-type: none"> <li>▪ Proof that copy of recommendations of ecological / botanical specialist is kept on site and audited</li> <li>▪ Report and record any non-compliance via site audits and inspections</li> </ul>
<b>OPERATION PHASE</b>						
The 132kV grid connection should be marked with Bird Flappers, on the earthwire for the entire length of the line	Avifaunal specialist, project developer and Environmental	Mark 132kV grid connection with Bird Flappers, on the earthwire for the entire length of the line	During operational phase	Avifaunal specialist, Project developer and Environmental Manager	Monthly	Photo record of 132kV grid connection marked with flappers

<b>Impact Management Outcome: Avoid or minimise impacts to avifauna by reducing unnecessary destruction and degradation of the habitat of Red Data Species</b>						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
A 500m power line-free zone should be implemented around dams and agricultural areas	Manager	Implement 500m power line-free zones around dams and agricultural areas (as required). Cordon-off or demarcate these areas if possible				<ul style="list-style-type: none"> <li>Proof that power line-free zones have been implemented to be kept and are being adhered to</li> <li>Record and report any non-compliance</li> </ul>
The final pole design must be signed off by the bird specialist to ensure that a bird-friendly design is used	Project Developer and Avifaunal Specialist	Final pole design to be signed off by bird specialist	Once-off prior to operation	Project Developer and Avifaunal Specialist	Once-off prior to operation	Proof that pole design was signed off by specialist to be kept
With regards to the infrastructure within the substation yard, the hardware is too complex to warrant any mitigation for electrocution at this stage. It is rather recommended that if any impacts are recorded once operational, site specific mitigation be applied reactively	Avifaunal specialist, project developer and Environmental Manager	<ul style="list-style-type: none"> <li>Avifaunal specialist to be appointed to conduct on-site investigation</li> <li>Verify appointment of specialist and monitor the frequency of monitoring by auditing signed reports and minutes of meetings</li> </ul>	During operational phase	Avifaunal specialist, Project developer and Environmental Manager	As and when required	<ul style="list-style-type: none"> <li>Maintain photographic record of bird mortalities at power lines and substation site</li> <li>Record and report any non-compliance</li> </ul>
<b>DECOMMISSIONING PHASE</b>						

<b>Impact Management Outcome: Avoid or minimise impacts to avifauna by reducing unnecessary destruction and degradation of the habitat of Red Data Species</b>						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
A site-specific Decommissioning EMPr must be implemented, which gives appropriate and detailed description of how decommissioning activities must be conducted to reduce unnecessary destruction of habitat. All contractors are to adhere to the EMPr and should apply good environmental practice during decommissioning	ECO	<ul style="list-style-type: none"> <li>Implementation of a EMPr and oversee activities to ensure that the EMPr is implemented and enforced</li> <li>Conduct site audits and inspections</li> </ul>	During decommissioning	ECO	On a daily basis	<ul style="list-style-type: none"> <li>Undertake site audits and inspections</li> <li>Record and report any non-compliance</li> </ul>
A walk-through must be conducted by the avifaunal specialist to assess whether there are any Red Data species, and/or large raptors breeding in the vicinity of the power line, which could be displaced by the dismantling activities. Should this be the case, appropriate measures must be put in place to prevent the displacement of the breeding birds, through the timing of activities	Project Developer, Avifauna Specialist and ECO	<ul style="list-style-type: none"> <li>Avifaunal Specialist to undertake walk-through survey</li> <li>Appoint Avifaunal Specialist to compile appropriate measures to be put in place to prevent the displacement of breeding birds, through timing of activities</li> </ul>	Once-off before decommissioning commences, for a pre-determined time period	Project Developer, Avifauna Specialist and ECO	Once-off before decommissioning commences, for a pre-determined time period	<ul style="list-style-type: none"> <li>Records of findings of walk-through in place</li> <li>Appropriate measures in place to prevent the displacement of the breeding birds, through the timing of activities, and being audited</li> </ul>



<b>Impact Management Outcome: Avoid or minimise impacts to avifauna by reducing unnecessary destruction and degradation of the habitat of Red Data Species</b>						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
Activity should be restricted to the immediate footprint of the infrastructure	Project Developer and ECO	<ul style="list-style-type: none"> <li>Ensure construction area is demarcated clearly and construction personnel are made aware of demarcations</li> </ul>	During decommissioning	ECO	Weekly	<ul style="list-style-type: none"> <li>Undertake site inspections to verify</li> <li>Report and record any non-compliance via site audits and inspections</li> </ul>
Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of avifauna		<ul style="list-style-type: none"> <li>Monitor via site inspection and report non-compliance</li> </ul>				
Measures to control noise should be applied according to current best practice in the industry		<ul style="list-style-type: none"> <li>Monitor implementation of noise control mechanisms via site inspections and record and report non-compliance</li> </ul>				

<b>Impact Management Outcome: Avoid or minimise impacts to avifauna by reducing unnecessary destruction and degradation of the habitat of Red Data Species</b>						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum		<ul style="list-style-type: none"> <li>▪ Ensure construction personnel are made aware of impacts relating to off-road driving</li> <li>▪ Construction access roads must be demarcated clearly</li> <li>▪ Monitor via site inspections</li> </ul>				
The recommendations of the ecological and botanical specialist studies must be strictly implemented.		<ul style="list-style-type: none"> <li>▪ Copy of recommendations of the ecological / botanical specialist to be kept on-site and adhered to</li> <li>▪ Ensure that construction personnel are made aware of these recommendations</li> <li>▪ Monitor via site inspections</li> </ul>				

### 9.3 Surface Water

Impact Management Outcome: Avoid or reduce impacts on surface water features by avoiding or reducing disturbance to surface water features						
Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
<b>DESIGN PHASE</b>						
Ensure final layout of transmission line and substations avoids watercourses and recommended buffers as far as possible	Project Developer	<ul style="list-style-type: none"> <li>▪ Ensure that this is taken into consideration during the planning and design phase</li> <li>▪ Ensure approved layout map is adhered to</li> </ul>	During the design cycle and before construction commences	ECO	Once-off prior to construction	Documentary proof of recommended designs in place as well as minutes of meetings
<b>CONSTRUCTION PHASE</b>						

<b>Impact Management Outcome:</b> Avoid or reduce impacts on surface water features by avoiding or reducing disturbance to surface water features						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
<p>No vegetation trimming and/or pruning must take place along the existing access roads running through the extent of the watercourse. However, where nearby vegetation trimming and/or pruning is required outside the extent of the watercourse, this must take place in accordance with recommendations of the vegetation specialist</p> <p>Vegetation clearing must take place in a phased manner, only clearing areas where construction will take place and not in areas where construction will only take place in the future</p> <p>Provide sufficient facilities for litter disposal. Regular clean-ups are required to keep the construction area and adjacent watercourses clean</p>	Project Developer, Contactor and ECO	<ul style="list-style-type: none"> <li>▪ Copy of recommendations of vegetation specialist to be kept on-site and adhered to</li> <li>▪ On-going monitoring of implementation of method statements and recommended mitigation measures</li> <li>▪ Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>	On-going during construction	Project Developer, Contactor and ECO	Weekly	<ul style="list-style-type: none"> <li>▪ Erosion Management Plan in place and being audited</li> <li>▪ Stormwater Management Plan in place and being audited</li> <li>▪ Alien Invasive Management Plan in place and being audited</li> <li>▪ Carry out inspections and record and report any non-compliance</li> </ul>

<b>Impact Management Outcome:</b> Avoid or reduce impacts on surface water features by avoiding or reducing disturbance to surface water features						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
An Alien Eradication and Removal Programme is to be compiled prior to construction and implemented for the duration of the proposed development		<ul style="list-style-type: none"> <li>▪ Implement Alien Invasive Management Plan</li> <li>▪ On-going monitoring of invasive alien plants within site to be undertaken according to approved plan</li> </ul>				
Adequate structures, where necessary, must be put into place (temporary or permanent where necessary in extreme cases) to deal with increased/accelerated run-off and potential erosion. The use of silt fencing and potentially sandbags or hessian "sausage" nets or other appropriate measures along the boundaries of the PV panel and power line foundations and maintenance and operation buildings can be used where required to slow run-off entering the watercourses and the associated buffer zones, thereby preventing increase in flood peaks, run-off volumes and also the likelihood of erosion		<ul style="list-style-type: none"> <li>▪ Compile and Implement Erosion Management Plan</li> <li>▪ Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>				

<b>Impact Management Outcome:</b> Avoid or reduce impacts on surface water features by avoiding or reducing disturbance to surface water features						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
An appropriate construction stormwater management plan formulated by a suitably qualified professional must accompany the proposed development to deal with increased run-off and associated sedimentation and erosion		<ul style="list-style-type: none"> <li>▪ Appoint suitably qualified professional to compile Stormwater Management Plan</li> <li>▪ Implement Stormwater Management Plan</li> <li>▪ Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>				

<b>Impact Management Outcome:</b> Avoid or reduce impacts on surface water features by avoiding or reducing disturbance to surface water features						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
An ECO must be appointed during the construction phase to oversee construction activities undertaken by contractors. The ECO must also monitor increased run-off and associated erosion impacts. Where additional mitigation measures are stipulated by the ECO in order to control increased run-off and erosion, this is to be undertaken accordingly		<ul style="list-style-type: none"> <li>▪ Appoint ECO to oversee construction activities</li> <li>▪ Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>				
All oils, fuels and hazardous substances or liquids must not be stored within 100m from the full extent of the watercourse and the associated buffer zone, unless such storage is unavoidable and is approved by the ECO. Where these items are stored, the storage area must be adequately bunded to contain any spillage from containers. Emergency spill kits must be available to clean up and remove spills		<ul style="list-style-type: none"> <li>▪ On-going monitoring of implementation of method statements and recommended mitigation measures</li> </ul>				
All vehicles and machinery operating on the study site are to be checked for oil, fuel or any other fluid leaks before entering the construction areas. All vehicles and machinery must be regularly serviced and maintained before being allowed to enter the construction areas. No fuelling, re-fuelling, vehicle and machinery servicing or maintenance is to take place within 100m of the watercourse and the associated buffer zone		<ul style="list-style-type: none"> <li>▪ Weekly and monthly reporting of activities, offences and remedial</li> </ul>				

<b>Impact Management Outcome:</b> Avoid or reduce impacts on surface water features by avoiding or reducing disturbance to surface water features						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
The study site is to contain sufficient safety measures throughout the construction process. Safety measures include (but are not limited to) oil spill kits and the availability of fire extinguishers. Additionally, fuel, oil or hazardous substances storage areas must be bunded to 110 capacity to prevent oil or fuel contamination of the ground and / or nearby watercourses and the associated buffer zones		actions				
No cement mixing is to take place in the watercourse or the associated buffer zone. In general, any cement mixing should take place over a bin lined (impermeable) surface or alternatively in the load bin of a vehicle to prevent the mixing of cement with the ground. Cement / concrete can also be trucked in ready-mix vehicles. Importantly, no mixing of cement or concrete directly within the watercourse and associated buffer zone						
No "long drop" toilets are allowed on the study site. Suitable temporary chemical sanitation facilities are to be provided. Temporary chemical sanitation facilities must be placed at least 100 meters from the watercourse and the associated buffer zone where required. Temporary chemical sanitation facilities must be checked regularly for maintenance purposes and cleaned often to prevent spills						



<b>Impact Management Outcome:</b> Avoid or reduce impacts on surface water features by avoiding or reducing disturbance to surface water features						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
Adequate structures, where required, must be put into place (temporary or permanent where necessary in extreme cases) to deal with sedimentation. The use of silt fencing and potentially sandbags or hessian "sausage" nets or other appropriate measures along the boundaries of the PV panel and power line foundations, and maintenance and operation buildings can be used where required to prevent and / or reduce sediments entering the watercourse and the associated buffer zone		<ul style="list-style-type: none"> <li>▪ Compile and Implement Erosion Management Plan</li> <li>▪ Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>				
<b>OPERATION PHASE</b>						

<b>Impact Management Outcome:</b> Avoid or reduce impacts on surface water features by avoiding or reducing disturbance to surface water features						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
<p>The access roads, and maintenance and operation buildings must have energy dissipating structures where required to prevent increased run-off and sediments contained in the run-off entering adjacent areas or surface water resources. This will assist in erosion prevention as well. Structures can be in the form of hard concrete structures or soft engineering structures (such as grass blocks for example). It is also recommended that the area beneath the PV panels be maintained as grass (vegetation of some sort) if possible. A buffer strip of vegetation and rock reinforcement should be maintained downslope of the PV cells, as this will allow a reduction in erosion and sedimentation from increased overland flows from the hardened surfaces</p> <p>Alternatively, a suitable operational stormwater management design or plan can be compiled and implemented that accounts for the use of appropriate alternative structures or devices that will prevent increased run-off and sediment entering the watercourses thereby, also preventing erosion</p>	Project Developer / Contactor	<ul style="list-style-type: none"> <li>▪ Compile and Implement Erosion Management Plan</li> <li>▪ Implement Stormwater Management Plan</li> <li>▪ On-going monitoring of implementation of recommended mitigation measures</li> <li>▪ Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>	During operational phase	Project Developer / Contactor	Weekly	<ul style="list-style-type: none"> <li>▪ Erosion Management Plan in place and being audited</li> <li>▪ Carry out inspections and record and report any non-compliance</li> </ul>

<b>Impact Management Outcome:</b> Avoid or reduce impacts on surface water features by avoiding or reducing disturbance to surface water features						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
ECO monitoring is to take place during the post-construction rehabilitation phase. Monitoring is to take place for erosion as well as re-establishment of vegetation where trenching has taken place.		<ul style="list-style-type: none"> <li>▪ Appoint ECO to oversee post-construction rehabilitation phase</li> <li>▪ Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>				
<b>DECOMMISSIONING PHASE</b>						

<b>Impact Management Outcome:</b> Avoid or reduce impacts on surface water features by avoiding or reducing disturbance to surface water features						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
<p>No vegetation trimming and/or pruning must take place along the existing access roads running through the extent of the watercourse. However, where nearby vegetation trimming and/or pruning is required outside the extent of the watercourse, this must take place in accordance with recommendations of the vegetation specialist</p> <p>Vegetation clearing must take place in a phased manner, only clearing areas where construction will take place and not in areas where construction will only take place in the future</p> <p>Provide sufficient facilities for litter disposal. Regular clean-ups are required to keep the construction area and adjacent watercourses clean</p>	<p>Project Developer, Contactor and ECO</p>	<ul style="list-style-type: none"> <li>▪ Copy of recommendations of vegetation specialist to be kept on-site and adhered to</li> <li>▪ On-going monitoring of implementation of method statements and recommended mitigation measures</li> <li>▪ Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>	<p>Throughout decommissioning phase</p>	<p>Project Developer, Contactor and ECO</p>	<p>Weekly</p>	<ul style="list-style-type: none"> <li>▪ Erosion Management Plan in place and being audited</li> <li>▪ Stormwater Management Plan in place and being audited</li> <li>▪ Alien Invasive Management Plan in place and being audited</li> <li>▪ Re-Vegetation and Habitat Rehabilitation Plan in place and being audited</li> <li>▪ Carry out inspections and record and report any non-compliance</li> </ul>

<b>Impact Management Outcome:</b> Avoid or reduce impacts on surface water features by avoiding or reducing disturbance to surface water features						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
An Alien Eradication and Removal Programme is to be compiled prior to construction and implemented for the duration of the proposed development		<ul style="list-style-type: none"> <li>▪ Implement Alien Invasive Management Plan</li> <li>▪ On-going monitoring of invasive alien plants within site to be undertaken according to approved plan</li> </ul>				
Adequate structures, where necessary, must be put into place (temporary or permanent where necessary in extreme cases) to deal with increased/accelerated run-off and potential erosion. The use of silt fencing and potentially sandbags or hessian "sausage" nets or other appropriate measures along the boundaries of the PV panel and power line foundations and maintenance and operation buildings can be used where required to slow run-off entering the watercourses and the associated buffer zones, thereby preventing increase in flood peaks, run-off volumes and also the likelihood of erosion		<ul style="list-style-type: none"> <li>▪ Implement Erosion Management Plan</li> <li>▪ Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>				

<b>Impact Management Outcome:</b> Avoid or reduce impacts on surface water features by avoiding or reducing disturbance to surface water features						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
An appropriate construction stormwater management plan formulated by a suitably qualified professional must accompany the proposed development to deal with increased run-off and associated sedimentation and erosion		<ul style="list-style-type: none"> <li>▪ Implement Stormwater Management Plan</li> <li>▪ Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>				

<b>Impact Management Outcome:</b> Avoid or reduce impacts on surface water features by avoiding or reducing disturbance to surface water features						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
An ECO must be appointed to oversee activities undertaken by contractors during the post-construction rehabilitation phase. The ECO must also monitor increased run-off and associated erosion impacts. Where additional mitigation measures are stipulated by the ECO in order to control increased run-off and erosion, this is to be undertaken accordingly		<ul style="list-style-type: none"> <li>▪ Appoint ECO to oversee activities undertaken during post-construction rehabilitation phase</li> <li>▪ Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>				
All oils, fuels and hazardous substances or liquids must not be stored within 100m from the full extent of the watercourse and the associated buffer zone, unless such storage is unavoidable and is approved by the ECO. Where these items are stored, the storage area must be adequately bunded to contain any spillage from containers. Emergency spill kits must be available to clean up and remove spills		<ul style="list-style-type: none"> <li>▪ On-going monitoring of implementation of method statements and recommended</li> </ul>				

<b>Impact Management Outcome:</b> Avoid or reduce impacts on surface water features by avoiding or reducing disturbance to surface water features						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
All vehicles and machinery operating on the study site are to be checked for oil, fuel or any other fluid leaks before entering the construction areas. All vehicles and machinery must be regularly serviced and maintained before being allowed to enter the construction areas. No fuelling, re-fuelling, vehicle and machinery servicing or maintenance is to take place within 100m of the watercourse and the associated buffer zone		<ul style="list-style-type: none"> <li>mitigation measures</li> <li>Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>				
The study site is to contain sufficient safety measures throughout the construction process. Safety measures include (but are not limited) oil spill kits and the availability of fire extinguishers. Additionally, fuel, oil or hazardous substances storage areas must be bunded to 110 capacity to prevent oil or fuel contamination of the ground and / or nearby watercourses and the associated buffer zones						
No cement mixing is to take place in the watercourse or the associated buffer zone. In general, any cement mixing should take place over a bin lined (impermeable) surface or alternatively in the load bin of a vehicle to prevent the mixing of cement with the ground. Cement / concrete can also be trucked in ready-mix vehicles. Importantly, no mixing of cement or concrete directly within the watercourse and associated buffer zone						



<b>Impact Management Outcome:</b> Avoid or reduce impacts on surface water features by avoiding or reducing disturbance to surface water features						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
No "long drop" toilets are allowed on the study site. Suitable temporary chemical sanitation facilities are to be provided. Temporary chemical sanitation facilities must be placed at least 100 meters from the watercourse and the associated buffer zone where required. Temporary chemical sanitation facilities must be checked regularly for maintenance purposes and cleaned often to prevent spills						
Adequate structures, where required, must be put into place (temporary or permanent where necessary in extreme cases) to deal with sedimentation. The use of silt fencing and potentially sandbags or hessian "sausage" nets or other appropriate measures along the boundaries of the PV panel and power line foundations, and maintenance and operation buildings can be used where required to prevent and / or reduce sediments entering the watercourse and the associated buffer zone		<ul style="list-style-type: none"> <li>▪ Compile and Implement Erosion Management Plan</li> <li>▪ Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>				

## 9.4 Soils and Agricultural Potential

Impact Management Outcome: To avoid or reduce impact on agricultural land through effective storm water and erosion control						
Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
<b>DESIGN PHASE</b>						
Design an effective system of storm water run-off control, where it is required - that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all hardened surfaces and it must prevent any potential down slope erosion	Holder of EA	Ensure that the storm water run-off control is included in the engineering design	Once-off during the design phase	Holder of EA	Once-off during design phase	Effective system of storm water run-off control in place
<b>CONSTRUCTION PHASE</b>						
Control run-off	ECO	<ul style="list-style-type: none"> <li>▪ Undertake periodic site inspection to verify and inspect effectiveness and integrity of stormwater run-off control system and to specifically record the occurrence of any erosion on-site or downstream</li> <li>▪ Corrective action to be implemented to run-off control system in event</li> </ul>	During construction phase	ECO	Monthly	<ul style="list-style-type: none"> <li>▪ Carry out inspections and record and report any non-compliance</li> <li>▪ Records and findings of site inspection</li> <li>▪ Records of correction action must be in place</li> </ul>
Maintain vegetation cover						
Strip, stockpile and re-spread topsoil						

MOOI PLAATS SOLAR POWER (PTY) LTD

Proposed Development of the Mooi Plaats On-site Eskom Substation, Eskom Collector Substation and associated 132kV Power Line near Noupport in the Northern Cape Province - Draft Environmental Management Programme (EMPr)

Version No. 1.0

8 August 2020

prepared by: SiVEST Environmental

<b>Impact Management Outcome:</b> To avoid or reduce impact on agricultural land through effective storm water and erosion control						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
		<ul style="list-style-type: none"> <li>of any erosion occurring</li> <li>▪ On-going monitoring of implementation of method statements and recommended mitigation measures</li> <li>▪ Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>				
<b>OPERATION PHASE</b>						
N/A						
<b>DECOMMISSIONING PHASE</b>						

<b>Impact Management Outcome:</b> To avoid or reduce impact on agricultural land through effective storm water and erosion control						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
Control run-off	Project Developer	<ul style="list-style-type: none"> <li>▪ Undertake periodic site inspection to verify and inspect effectiveness and integrity of stormwater run-off control system and to specifically record the occurrence of any erosion on-site or downstream</li> <li>▪ Corrective action to be implemented to run-off control system in event of any erosion occurring</li> <li>▪ On-going monitoring of implementation of method statements and recommended mitigation</li> </ul>	During decommissioning phase	ECO	Monthly	<ul style="list-style-type: none"> <li>▪ Carry out inspections and record and report any non-compliance</li> <li>▪ Records and findings of site inspection</li> <li>▪ Records of correction action must be in place</li> </ul>
Maintain vegetation cover						
Strip, stockpile and re-spread topsoil						

<b>Impact Management Outcome:</b> To avoid or reduce impact on agricultural land through effective storm water and erosion control						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
		<ul style="list-style-type: none"> <li>measures</li> <li>▪ Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>				

## 9.5 Heritage

Impact Management Outcome: To minimise the impact on and risk to heritage features						
Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
<b>DESIGN PHASE</b>						
Appoint a qualified Heritage specialist to undertake a pre-construction walk-through of the final power line corridor	Project Developer and Heritage Specialist	Project Developer to appoint a suitably qualified Heritage specialist to undertake pre-construction walk-through of final power line corridor	During design phase, prior to commencement of construction	ECO	Once-off	Heritage specialist appointed, survey completed and report showing findings compiled
<b>CONSTRUCTION PHASE</b>						
Review layout to avoid the identified heritage sites	Project Developer and Heritage Specialist	Heritage specialist to review and approve layout	During construction phase	ECO	Once-off, prior to commencement of construction	Proof of review of layout by Heritage specialist to be kept and provided on request
Implementation of 30m buffer around identified heritage sites		Implement 30m buffer around identified heritage sites. Cordon-off or demarcate these areas if possible			ECO and Heritage specialist	Weekly

Impact Management Outcome: To minimise the impact on and risk to heritage features						
Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
Development of chance finds procedures to be included in the EMPr		<ul style="list-style-type: none"> <li>▪ Appoint qualified Heritage specialist to develop chance find procedures to be included in approved final EMPr</li> <li>▪ Ensure project team receives adequate training from specialist to be able to implement chance finds procedure</li> </ul>				<ul style="list-style-type: none"> <li>▪ Chance finds procedures in place and being audited</li> <li>▪ Proof of training of project team to be kept and made available on request</li> <li>▪ Carry out inspections and record and report any non-compliance</li> </ul>
Implement chance finds procedures						

<b>Impact Management Outcome:</b> To minimise the impact on and risk to heritage features						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
Implementation of mitigation measures such as buffering, documentation and excavations and request destruction permits from SAHRA		<ul style="list-style-type: none"> <li>▪ Implement buffering, documentation and excavations, as and when required</li> <li>▪ Appoint qualified Heritage specialist to request destruction permit from SAHRA, if required</li> </ul>			<ul style="list-style-type: none"> <li>▪ Weekly</li> <li>▪ As and when required for destruction permits</li> </ul>	<ul style="list-style-type: none"> <li>▪ Carry out inspections and record and report any non-compliance</li> <li>▪ Approved destruction permit from SAHRA to be kept and made available on request</li> </ul>



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 categories of heritage resources are found, SAHRA APM Unit (Natasha Higgitt / 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

- Ensure construction staff receives adequate training from Heritage specialist to be able to identify archaeological sites or remains, fossils or other categories of heritage resources
- Alert SAHRA APM Unit (using details provided) if evidence of archaeological sites or remains, fossils or other categories of heritage resources are found

During excavation work during the construction phase

- Proof of training of project team to be kept and made available on request
- Proof that SAHRA APM Unit was alerted to be kept and made available on request
- Carry out inspections and record and report any non-compliance

Impact Management Outcome: To minimise the impact on and risk to heritage features						
Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
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		<ul style="list-style-type: none"> <li>▪ Ensure construction staff receives adequate training from Heritage specialist to be able to identify unmarked human burials</li> <li>▪ Alert SAHRA Burial Grounds and Graves (BGG) Unit (using details provided) if unmarked human burials are uncovered</li> </ul>				<ul style="list-style-type: none"> <li>▪ Proof of training of project team to be kept and made available on request</li> <li>▪ Proof that SAHRA BGG Unit was alerted to be kept and made available on request</li> <li>▪ Carry out inspections and record and report any non-compliance</li> </ul>

If heritage resources are uncovered, 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

- Appoint professional archaeologist or palaeontologist, depending on the nature of the finds, as soon as possible to inspect heritage resource
- Appoint qualified specialist to implement Phase 2 rescue operation (if required)
- Obtain necessary permits from SAHRA (if required)

- Proof of appointment of professional archaeologist or palaeontologist to be kept and made available on request
- Proof of inspection of heritage resource (if required) to be kept and made available on request
- Proof that SAHRA BGG Unit was alerted to be kept and made available on request
- Carry out inspections and record and report any non-compliance

<b>Impact Management Outcome:</b> To minimise the impact on and risk to heritage features						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
<b>OPERATION PHASE</b>						
Development of chance finds procedures to be included in the EMPr	Project Developer	<ul style="list-style-type: none"> <li>Implement chance finds procedures</li> <li>Ensure project team receives adequate training from specialist to be able to implement chance finds procedures</li> </ul>	During operation	Project Developer / Contactor	Weekly	<ul style="list-style-type: none"> <li>Chance finds procedure in place and being audited, as and when required</li> <li>Proof of training of project team to be kept and made available on request</li> </ul>
Implementation of mitigation measures such as buffering, documentation and excavations and request destruction permits from SAHRA	Project Developer and Heritage Specialist	<ul style="list-style-type: none"> <li>Implement buffering, documentation and excavations, as and when required</li> <li>Appoint qualified Heritage specialist to request destruction permit from SAHRA, if required</li> </ul>			<ul style="list-style-type: none"> <li>Weekly</li> <li>As and when required for destruction permits</li> </ul>	<ul style="list-style-type: none"> <li>Destruction permits (if required) to be kept on record and made available on request</li> <li>Carry out inspections and record and report any non-compliance</li> </ul>

<b>Impact Management Outcome:</b> To minimise the impact on and risk to heritage features						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
<b>DECOMMISSIONING PHASE</b>						
Development of chance finds procedures to be included in the EMPr	Project Developer	<ul style="list-style-type: none"> <li>▪ Implement chance finds procedures</li> <li>▪ Ensure project team receives adequate training from specialist to be able to implement chance finds procedures</li> </ul>	During decommissioning	Project Developer / Contactor and ECO	Weekly	<ul style="list-style-type: none"> <li>▪ Chance finds procedures in place and being audited</li> <li>▪ Proof of training of project team to be kept and made available on request</li> <li>▪ Carry out inspections and record and report any non-compliance</li> </ul>

<b>Impact Management Outcome:</b> To minimise the impact on and risk to heritage features						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
Implementation of mitigation measures such as buffering, documentation and excavations and request destruction permits from SAHRA	Project Developer and Heritage Specialist	<ul style="list-style-type: none"> <li>▪ Implement buffering, documentation and excavations, as and when required</li> <li>▪ Appoint qualified Heritage specialist to request destruction permit from SAHRA, if required</li> </ul>			<ul style="list-style-type: none"> <li>▪ Weekly</li> <li>▪ As and when required for destruction permits</li> </ul>	<ul style="list-style-type: none"> <li>▪ Carry out inspections and record and report any non-compliance</li> <li>▪ Approved destruction permit from SAHRA to be kept and made available on request</li> </ul>

## 9.6 Palaeontology

Impact Management Outcome: To minimise the impact on and risk to palaeontological features						
Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
<b>DESIGN PHASE</b>						
Significant palaeontological and archaeological sites must be regarded as 'no-go' ones with buffers implemented around all associated features	Project Developer and Heritage Specialist	Project Developer to appoint a suitably qualified Heritage specialist to undertake pre-construction walk-through of final power line corridor	During design phase, prior to commencement of construction	ECO	Once-off	Heritage specialist appointed, survey completed and report showing findings compiled
<b>CONSTRUCTION PHASE</b>						
A palaeontologist must conduct a field visit after vegetation clearance	Project Developer and Palaeontologist	Appoint qualified Palaeontologist to conduct field visit after vegetation clearance	During construction, after vegetation clearance	ECO	After vegetation clearance	Palaeontologist appointed, field visit completed and report showing findings compiled

<b>Impact Management Outcome:</b> To minimise the impact on and risk to palaeontological features						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
Fossil Excavation will need a SAHRA permit. If an excavation is impossible, the fossil and locality could be protected and the development moved		<ul style="list-style-type: none"> <li>▪ Ensure project team receives adequate training from specialist to be able to identify potential fossils</li> <li>▪ Appoint qualified Palaeontologist to obtain SAHRA permit for SAHRA permit, should fossil excavation be required</li> <li>▪ If an excavation is impossible, protect the fossil and move the development</li> </ul>	During construction, should fossil excavation be required	ECO	During construction, should fossil excavation be required	<ul style="list-style-type: none"> <li>▪ Approved permit from SAHRA to be kept and made available on request</li> <li>▪ Carry out inspections and record and report any non-compliance</li> </ul>
<b>OPERATION PHASE</b>						
N/A						
<b>DECOMMISSIONING PHASE</b>						
N/A						



## 9.7 Visual

Impact Management Outcome: Reduce visual intrusion of project activities throughout the life cycle and prevent unnecessary visual intrusions							
Impact Management Actions	Implementation			Monitoring			
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance	
<b>DESIGN PHASE</b>							
Ensure plans are in place to rehabilitate temporary cleared areas as soon as possible	Project Developer and Specialist	Implement Re-Vegetation and Habitat Rehabilitation Plan	To be undertaken during design phase, ready for implementation prior to construction phase	ECO	Once-off	Documentary proof of the plans that have been compiled and implemented	
Ensure plans are in place to control and minimise erosion risks		Implement Erosion Management Plan					

<b>Impact Management Outcome:</b> Reduce visual intrusion of project activities throughout the life cycle and prevent unnecessary visual intrusions						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
<p><u>Power Line:</u></p> <ul style="list-style-type: none"> <li>▪ Locate pylons away from farmstead buildings and beyond the direct line of sight from these buildings as far as possible.</li> <li>▪ Locate pylons the maximum distance from watercourses as possible.</li> <li>▪ Install lattice structures (as the preferred pylon structure) as far as possible.</li> <li>▪ Do not illuminate pylons.</li> <li>▪ Rehabilitate areas affected by scarring and put measures in place to prevent erosion.</li> </ul> <p><u>Substation:</u></p> <ul style="list-style-type: none"> <li>▪ Be sensitive towards the use of glass or material with a high reflectivity, which may cause glare and increase visual impacts.</li> <li>▪ Use low-impact fencing of appropriate colour, such as diamond wire-mesh fencing which is less visually intrusive when viewed from a distance. Palisade fencing and other solid fence structures should be avoided.</li> <li>▪ Design buildings to be similar to the vernacular of the surrounding farmstead buildings.</li> </ul> <p>Structure style (e.g. power line pylons / towers) should be the same as for other similar developments along the same route where possible (taking into consideration other specialist recommendations and specifications)</p>	Project Developer	Ensure that this recommendation is considered during the engineering design. Hold discussions with the engineering team in this regard				Documentary proof of recommended designs in place as well as minutes of meetings
<b>CONSTRUCTION PHASE</b>						

<b>Impact Management Outcome:</b> Reduce visual intrusion of project activities throughout the life cycle and prevent unnecessary visual intrusions						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
Carefully plan to minimise the construction period and avoid construction delays	Project Developer and Contractor	Compile construction programme which minimises construction period and avoids construction delays	Construction phase, prior to construction commencing	ECO	Once-off	Construction programme to be kept on record and be made available on request
Inform receptors of the construction programme and schedules		Project Developer / Contractor to send receptors notification containing construction programme and schedules				Proof of notification to receptors to be kept on record and made available on request

<b>Impact Management Outcome:</b> Reduce visual intrusion of project activities throughout the life cycle and prevent unnecessary visual intrusions						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
Minimise vegetation clearing and rehabilitate cleared areas as soon as possible		<ul style="list-style-type: none"> <li>▪ ECO to monitor site clearing and staff activities on-site</li> <li>▪ Implement Re-Vegetation and Habitat Rehabilitation Plan</li> <li>▪ Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>	Throughout construction phase	ECO	Weekly	<ul style="list-style-type: none"> <li>▪ Re-Vegetation and Habitat Rehabilitation Plan in place and being audited</li> <li>▪ Report and record any non-compliance via site audits and inspections</li> </ul>

<b>Impact Management Outcome:</b> Reduce visual intrusion of project activities throughout the life cycle and prevent unnecessary visual intrusions						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
Maintain a neat construction site by removing rubble and waste materials regularly		Carry out visual inspections to ensure rubble and waste materials are being removed regularly				Report and record any non-compliance via site audits and inspections
Make use of existing gravel access roads where possible		<ul style="list-style-type: none"> <li>▪ Ensure project team are aware that use must be made of existing gravel access roads, where possible</li> <li>▪ Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>				
Limit the number of vehicles and trucks travelling to and from the construction site, where possible		Carry out visual inspections to ensure number of vehicles and trucks travelling to and from the construction site are being limited				

<b>Impact Management Outcome:</b> Reduce visual intrusion of project activities throughout the life cycle and prevent unnecessary visual intrusions						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
Unless there are water shortages, ensure that dust suppression techniques are implemented: <ul style="list-style-type: none"> <li>▪ on all access roads;</li> <li>▪ in all areas where vegetation clearing has taken place;</li> <li>▪ on all soil stockpiles.</li> </ul>		<ul style="list-style-type: none"> <li>▪ Compile and implement the Dust Control Plan</li> <li>▪ Carry out visual inspections to ensure dust suppression techniques are being implemented, as recommended</li> </ul>				
<b>OPERATION PHASE</b>						
Where possible, limit the number of maintenance vehicles using access roads	Project Developer and Contractor	Ensure number of maintenance vehicles using access roads is being limited	Operational Phase	Project Developer / Contractor	Weekly	Carry out visual inspections to ensure number of maintenance vehicles using access roads is being limited

<b>Impact Management Outcome:</b> Reduce visual intrusion of project activities throughout the life cycle and prevent unnecessary visual intrusions						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
Non-reflective surfaces should be utilised, where possible	Project Developer	Approval of materials to be used to ensure non-reflective surfaces are utilised, where possible			Monthly	<ul style="list-style-type: none"> <li>▪ Proof of approval of materials to be used to be kept and made available on request</li> <li>▪ Carry out visual inspections to ensure non-reflective surfaces are being utilised</li> </ul>
Where possible, limit the amount of security and operational lighting present at the on-site substation		Ensure security and operational lighting at on-site substation is limited			Weekly	Carry out visual inspections to ensure security and operational lighting at on-site substation is being limited
Light fittings for security at night should reflect the light toward the ground and prevent light spill		Regular monitoring / checking of light fittings to ensure light is reflected towards the ground to prevent light spill				Carry out visual inspections to ensure light is reflected towards the ground to prevent light spill

<b>Impact Management Outcome:</b> Reduce visual intrusion of project activities throughout the life cycle and prevent unnecessary visual intrusions						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
<b>DECOMMISSIONING PHASE</b>						
All infrastructure that is not required for post-decommissioning use should be removed	Project Developer and Contractor	Carry out visual inspections to ensure that all infrastructure not required for post-decommissioning use is being removed	During decommissioning phase	ECO	Weekly	Carry out inspections and record and report any non-compliance
Carefully plan to minimise the decommissioning period and avoid delays		Compile decommissioning programme which minimises decommissioning period and avoids construction delays	Decommissioning phase, prior to decommissioning commencing		Once-off	Construction programme to be kept on record and be made available on request
Maintain a neat decommissioning site by removing rubble and waste materials regularly		Carry out visual inspections to ensure rubble and waste materials are being removed regularly	During decommissioning phase Throughout construction phase		Weekly	Carry out inspections and record and report any non-compliance



<b>Impact Management Outcome:</b> Reduce visual intrusion of project activities throughout the life cycle and prevent unnecessary visual intrusions						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase		<ul style="list-style-type: none"> <li>▪ Implement Dust Control Plan</li> <li>▪ Carry out visual inspections to ensure dust suppression techniques are being implemented, as recommended</li> </ul>				
All cleared areas should be rehabilitated as soon as possible		<ul style="list-style-type: none"> <li>▪ ECO to monitor site clearing and staff activities on-site</li> <li>▪ Implement Re-Vegetation and Habitat Rehabilitation Plan</li> <li>▪ Carry out visual inspections to ensure cleared areas are being rehabilitated as soon as possible</li> </ul>				<ul style="list-style-type: none"> <li>▪ Re-Vegetation and Habitat Rehabilitation Plan in place and being audited</li> <li>▪ Carry out inspections and record and report any non-compliance</li> </ul>

<b>Impact Management Outcome:</b> Reduce visual intrusion of project activities throughout the life cycle and prevent unnecessary visual intrusions						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
Rehabilitated areas should be monitored post-decommissioning and remedial actions implemented as required	Project Developer	<ul style="list-style-type: none"> <li>▪ Implement Re-Vegetation and Habitat Rehabilitation Plan</li> <li>▪ Ensure rehabilitated areas are monitored</li> <li>▪ Implement remedial actions, if required</li> </ul>	Post-decommissioning phase		Weekly or monthly, as required	<ul style="list-style-type: none"> <li>▪ Re-Vegetation and Habitat Rehabilitation Plan in place and being audited</li> <li>▪ Carry out inspections and record and report any non-compliance</li> </ul>

## 9.8 Geotechnical

Impact Management Outcome: To minimise the impact on and risk to soils						
Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
<b>CONSTRUCTION PHASE</b>						
Correct engineering design of stream and water course crossings	Project Developer, Contractor and Geotechnical specialist	<ul style="list-style-type: none"> <li>Qualified Geotechnical specialist to review and approve engineering design of stream and water course crossings and any new access roads</li> <li>Carry out visual inspections to ensure the correct / approved stream and water course crossings are being used</li> <li>Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>	Prior to construction commencing	ECO and Geotechnical specialist	Weekly	<ul style="list-style-type: none"> <li>Proof of approval of engineering design of stream and water course crossings and any new access roads to be kept on record and made available on request</li> <li>Carry out inspections and record and report any non-compliance</li> <li>Records and findings of site inspection</li> <li>Records of correction action must be in place</li> </ul>
Correct engineering design of any new access roads						
Use of berms and drainage channels to direct water away from the construction areas where necessary	Project Developer and Contractor	<ul style="list-style-type: none"> <li>Carry out visual inspections to ensure berms and drainage channels are being used to direct water away from the</li> </ul>	During construction	ECO		<ul style="list-style-type: none"> <li>Carry out inspections and record and report any non-compliance</li> <li>Records and findings of site inspection</li> </ul>

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Impact Management Outcome: To minimise the impact on and risk to soils						
Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
		<ul style="list-style-type: none"> <li>construction areas, where necessary</li> <li>Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>				<ul style="list-style-type: none"> <li>Records of correction action must be in place</li> </ul>
Minimise earthworks and levelling		<ul style="list-style-type: none"> <li>Carry out visual inspections to ensure that earthworks and levelling are minimised</li> <li>Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>				
Use existing access roads wherever possible		<ul style="list-style-type: none"> <li>Ensure project team is made aware that existing access roads are to be used, wherever possible</li> <li>Carry out visual inspections to ensure existing access roads are being used, wherever possible</li> </ul>				

Impact Management Outcome: To minimise the impact on and risk to soils						
Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
		<ul style="list-style-type: none"> <li>Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>				
Rehabilitate disturbed areas as soon as possible after construction		<ul style="list-style-type: none"> <li>Implement Re-Vegetation and Habitat Rehabilitation Plan</li> <li>Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>	During the construction phase, as soon as possible after construction		As soon as possible after construction, as and when required	<ul style="list-style-type: none"> <li>Re-Vegetation and Habitat Rehabilitation Plan in place and being audited</li> <li>Carry out inspections and record and report any non-compliance</li> <li>Records and findings of site inspection</li> <li>Records of correction action must be in place</li> </ul>
Maintain vehicles and only undertake repairs and maintenance work in designated areas		<ul style="list-style-type: none"> <li>Request maintenance records on a regular basis to ensure all vehicles are being maintained</li> <li>Assign designated areas for repairs and maintenance</li> </ul>	During construction		Weekly or monthly, as is required	<ul style="list-style-type: none"> <li>Maintenance records of all vehicles to be kept on record and made available on request</li> <li>Carry out inspections and record and report any non-compliance</li> </ul>

Impact Management Outcome: To minimise the impact on and risk to soils						
Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
		work				<ul style="list-style-type: none"> <li>Records and findings of site inspection</li> <li>Records of correction action must be in place</li> </ul>
Implement groundcover measures to prevent erosion such as keeping as much natural vegetation as possible, straw mulch, erosion control mats etc.	Project Developer, Contractor and specialist	<ul style="list-style-type: none"> <li>Appoint qualified specialist to compile Erosion Management Plan</li> <li>Implement Erosion Management Plan</li> <li>Carry out visual inspections to ensure groundcover measures are being implemented to prevent erosion</li> <li>Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>	Prior to and during construction		Weekly	<ul style="list-style-type: none"> <li>Erosion Management Plan in place and being audited</li> <li>Carry out inspections and record and report any non-compliance</li> <li>Records and findings of site inspection</li> <li>Records of correction action must be in place</li> </ul>

<b>Impact Management Outcome:</b> To minimise the impact on and risk to soils						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
Contain and control stormwater flow	Project Developer and Contractor	<ul style="list-style-type: none"> <li>▪ Implement Stormwater Management Plan</li> <li>▪ Carry out visual inspections to ensure stormwater flow is being contained and controlled</li> <li>▪ Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>	During construction			<ul style="list-style-type: none"> <li>▪ Stormwater Management Plan in place and being audited</li> <li>▪ Carry out inspections and record and report any non-compliance</li> <li>▪ Records and findings of site inspection</li> <li>▪ Records of correction action must be in place</li> </ul>
<b>OPERATION PHASE</b>						
Use existing access roads wherever possible	Project Developer	<ul style="list-style-type: none"> <li>▪ Ensure project team is made aware that existing access roads are to be used, wherever possible</li> <li>▪ Carry out visual inspections to ensure existing access roads are being used, wherever possible</li> <li>▪ Weekly and monthly</li> </ul>	During operational phase	Project Developer	Weekly	<ul style="list-style-type: none"> <li>▪ Carry out inspections and record and report any non-compliance</li> <li>▪ Records and findings of site inspection</li> <li>▪ Records of correction action must be in place</li> </ul>

Impact Management Outcome: To minimise the impact on and risk to soils						
Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
Correct engineering design of stream and water course crossings	Project Developer and Geotechnical specialist	<ul style="list-style-type: none"> <li>qualified Geotechnical specialist to review and approve engineering design of stream and water course crossings and any new access roads</li> <li>Carry out visual inspections to ensure the correct / approved stream and water course crossings are being used</li> <li>Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>	Prior to the operational phase	Project Developer and Geotechnical specialist		<ul style="list-style-type: none"> <li>Proof of approval of engineering design of stream and water course crossings and any new access roads to be kept on record and made available on request</li> <li>Carry out inspections and record and report any non-compliance</li> <li>Records and findings of site inspection</li> <li>Records of correction action must be in place</li> </ul>
Correct engineering design of access roads		<ul style="list-style-type: none"> <li>Re-quest maintenance records on a regular basis to ensure all vehicles are being</li> </ul>				During operational phase
Maintain vehicles and only undertake repairs and maintenance work in designated areas	Project Developer	<ul style="list-style-type: none"> <li>Re-quest maintenance records on a regular basis to ensure all vehicles are being</li> </ul>	During operational phase	Project Developer	Weekly or monthly, as is required	<ul style="list-style-type: none"> <li>Maintenance records of all vehicles to be kept on record and made available on request</li> </ul>



Impact Management Outcome: To minimise the impact on and risk to soils						
Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
		<ul style="list-style-type: none"> <li>maintained</li> <li>Assign designated areas for repairs and maintenance work</li> </ul>				<ul style="list-style-type: none"> <li>Carry out inspections and record and report any non-compliance</li> <li>Records and findings of site inspection</li> <li>Records of correction action must be in place</li> </ul>
Implement groundcover measures to prevent erosion such as keeping as much natural vegetation as possible, straw mulch, erosion control mats etc.		<ul style="list-style-type: none"> <li>Implement Erosion Management Plan</li> <li>Carry out visual inspections to ensure groundcover measures are being implemented to prevent erosion</li> <li>Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>			Weekly	<ul style="list-style-type: none"> <li>Erosion Management Plan in place and being audited</li> <li>Carry out inspections and record and report any non-compliance</li> <li>Records and findings of site inspection</li> <li>Records of correction action must be in place</li> </ul>

<b>Impact Management Outcome:</b> To minimise the impact on and risk to soils						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
Contain and control stormwater flow		<ul style="list-style-type: none"> <li>▪ Implement Stormwater Management Plan</li> <li>▪ Carry out visual inspections to ensure stormwater flow is being contained and controlled</li> <li>▪ Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>	During operational phase			<ul style="list-style-type: none"> <li>▪ Stormwater Management Plan in place and being audited</li> <li>▪ Carry out inspections and record and report any non-compliance</li> <li>▪ Records and findings of site inspection</li> <li>▪ Records of correction action must be in place</li> </ul>
<b>DECOMMISSIONING PHASE</b>						
Use of berms and drainage channels to direct water away from the decommissioning/deconstruction areas where necessary	Project Developer and Contractor	<ul style="list-style-type: none"> <li>▪ Carry out visual inspections to ensure berms and drainage channels are being used to direct water away from the construction areas, where necessary</li> <li>▪ Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>	During decommissioning	ECO	Weekly	<ul style="list-style-type: none"> <li>▪ Carry out inspections and record and report any non-compliance</li> <li>▪ Records and findings of site inspection</li> <li>▪ Records of correction action must be in place</li> </ul>

<b>Impact Management Outcome:</b> To minimise the impact on and risk to soils						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
Minimise earthworks and levelling		<ul style="list-style-type: none"> <li>▪ Carry out visual inspections to ensure that earthworks and levelling are minimised</li> <li>▪ Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>				
Use existing access roads wherever possible		<ul style="list-style-type: none"> <li>▪ Ensure project team is made aware that existing access roads are to be used, wherever possible</li> <li>▪ Carry out visual inspections to ensure existing access roads are being used, wherever possible</li> <li>▪ Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>				
Rehabilitate disturbed areas as soon as possible		<ul style="list-style-type: none"> <li>▪ Implement Re-Vegetation and Habitat</li> </ul>	As soon as possible during		During decommissioning phase, as and	<ul style="list-style-type: none"> <li>▪ Re-Vegetation and Habitat Rehabilitation</li> </ul>

<b>Impact Management Outcome:</b> To minimise the impact on and risk to soils						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
		Rehabilitation Plan	decommissioning phase		when required	Plan in place and being audited
Add as much natural vegetation back as possible		<ul style="list-style-type: none"> <li>Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>	During decommissioning phase		Weekly	<ul style="list-style-type: none"> <li>Carry out inspections and record and report any non-compliance</li> <li>Records and findings of site inspection</li> <li>Records of correction action must be in place</li> </ul>
Try reinstate natural drainage patterns		<ul style="list-style-type: none"> <li>Appoint qualified specialist to advise on reinstatement of natural drainage patterns</li> <li>Implement measures provided by specialist</li> <li>Carry out visual inspections to ensure measures provided by specialist are being implemented and adhered to</li> <li>Weekly and monthly reporting of activities, offences and remedial</li> </ul>		ECO and qualified specialist		

<b>Impact Management Outcome:</b> To minimise the impact on and risk to soils						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
Have chemical spill kits on site and remove all spill material when decommissioning any substations.		<ul style="list-style-type: none"> <li>▪ Carry out visual inspections to ensure chemical spill kits are available on site and all spill material is being removed</li> <li>▪ Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>		ECO		<ul style="list-style-type: none"> <li>▪ Carry out inspections and record and report any non-compliance</li> <li>▪ Records and findings of site inspection</li> <li>▪ Records of correction action must be in place</li> </ul>
Maintain vehicles and only undertake repairs and maintenance work in designated areas		<ul style="list-style-type: none"> <li>▪ Request maintenance records on a regular basis to ensure all vehicles are being maintained</li> <li>▪ Assign designated areas for repairs and maintenance work</li> </ul>			Weekly or monthly, as is required	<ul style="list-style-type: none"> <li>▪ Maintenance records of all vehicles to be kept on record and made available on request</li> <li>▪ Carry out inspections and record and report any non-compliance</li> <li>▪ Records and findings of site inspection</li> <li>▪ Records of correction action must be in place</li> </ul>

<b>Impact Management Outcome:</b> To minimise the impact on and risk to soils						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
Contain and control stormwater flow		<ul style="list-style-type: none"> <li>▪ Implement Stormwater Management Plan</li> <li>▪ Carry out visual inspections to ensure stormwater flow is being contained and controlled</li> <li>▪ Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>			Weekly	<ul style="list-style-type: none"> <li>▪ Stormwater Management Plan in place and being audited</li> <li>▪ Carry out inspections and record and report any non-compliance</li> <li>▪ Records and findings of site inspection</li> <li>▪ Records of correction action must be in place</li> </ul>

## 9.9 Transportation

Impact Management Outcome: To minimise the impact caused by traffic associated with proposed development						
Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
<b>CONSTRUCTION PHASE</b>						
Approval from the respective road department	Project Developer	Ensure approval(s) from the respective road department is obtained	Prior to construction commencing	ECO	As and when required	Approvals from respective road department to be kept on record and made available on request
Implement a road maintenance programme under the auspices of the respective transport department	Project Developer and Contractor	<ul style="list-style-type: none"> <li>Compile and implement road maintenance programme</li> <li>Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>	During construction	ECO	Weekly	<ul style="list-style-type: none"> <li>Road maintenance programme in place and being audited</li> <li>Carry out inspections and record and report any non-compliance</li> <li>Records and findings of site inspection</li> <li>Records of correction action must be in place</li> </ul>
Implementation of pedestrian safety initiatives		<ul style="list-style-type: none"> <li>Implement Traffic Management and Transportation Management Plans</li> <li>Carry out inspections to ensure Traffic</li> </ul>	<ul style="list-style-type: none"> <li>Traffic Management and Transportation Management plans in place and being audited</li> <li>Carry out inspections and record and</li> </ul>			
Ensure a large portion of the vehicles travelling to and from the proposed development travels in the "off-peak" periods						

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Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
		<ul style="list-style-type: none"> <li>and Transportation Management Plans and being adhered to</li> <li>Carry out inspections to ensure pedestrian safety initiatives are being implemented and adhered to</li> <li>Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>				<ul style="list-style-type: none"> <li>report any non-compliance</li> <li>Records and findings of site inspection</li> <li>Records of correction action must be in place</li> </ul>
Adequate road signage according to the SARTSM		<ul style="list-style-type: none"> <li>Carry out inspections to ensure recommended mitigation measures have been implemented and are being adhered to</li> <li>Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>				
Construction of an on-site concrete batching plant to reduce trips						
Reduction in speed of vehicles						
Adequate enforcement of the law						
Enforce a maximum speed limit on the development						
Regular maintenance of farm fences, access cattle grids						
Use of dust suppression techniques						



<b>Impact Management Outcome:</b> To minimise the impact caused by traffic associated with proposed development						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
Adequate watering by means of water bowser		<ul style="list-style-type: none"> <li>Implement Dust Control Plan</li> <li>Carry out inspections to ensure Dust Control Plan has been implemented and is being adhered to</li> <li>Weekly and monthly reporting of activities, offences and remedial act</li> </ul>				<ul style="list-style-type: none"> <li>Dust Control Plan in place and being audited</li> <li>Carry out inspections and record and report any non-compliance</li> <li>Records and findings of site inspection</li> <li>Records of correction action must be in place</li> </ul>
<b>OPERATION PHASE</b>						
Ensure a large portion of the vehicles travelling to and from the proposed development travels in the "off-peak" periods	Project Developer	<ul style="list-style-type: none"> <li>Implement Traffic Management and Transportation Management Plans</li> <li>Carry out inspections to ensure Traffic and Transportation Management Plans and being adhered to</li> <li>Carry out inspections to ensure pedestrian</li> </ul>	During operational phase	Project Developer	Weekly	<ul style="list-style-type: none"> <li>Traffic Management and Transportation Management plans in place and being audited</li> <li>Carry out inspections and record and report any non-compliance</li> <li>Records and findings of site inspection</li> <li>Records of correction action must be in place</li> </ul>
Implementation of pedestrian safety initiatives						

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Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
		<ul style="list-style-type: none"> <li>safety initiatives are being implemented and adhered to</li> <li>Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>				
Implement a road maintenance programme under the auspices of the respective transport department		<ul style="list-style-type: none"> <li>Compile and implement road maintenance programme</li> <li>Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>			Monthly	<ul style="list-style-type: none"> <li>Road maintenance programme in place and being audited</li> <li>Carry out inspections and record and report any non-compliance</li> <li>Records and findings of site inspection</li> <li>Records of correction action must be in place</li> </ul>
Adopt road signage according to the SARTSM		<ul style="list-style-type: none"> <li>Carry out inspections to ensure recommended mitigation measures have been implemented and are being adhered to</li> </ul>			Weekly	<ul style="list-style-type: none"> <li>Traffic Management and Transportation Management plans in place and being audited</li> <li>Carry out inspections and record and</li> </ul>
Construction of an on-site concrete batching plant to reduce trips						
Reduction in speed of vehicles						
Adopt enforcement of the law						
Enforce a maximum speed limit on the development						
Regular maintenance of farm fences, access cattle grids						

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<b>Impact Management Outcome:</b> To minimise the impact caused by traffic associated with proposed development						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
		<ul style="list-style-type: none"> <li>Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>				<ul style="list-style-type: none"> <li>report any non-compliance</li> <li>Records and findings of site inspection</li> <li>Records of correction action must be in place</li> </ul>
Use of dust suppression techniques		<ul style="list-style-type: none"> <li>Implement Dust Control Plan</li> <li>Carry out inspections to ensure Dust Control Plan has been implemented and is being adhered to</li> <li>Weekly and monthly reporting of activities, offences and remedial act</li> </ul>				<ul style="list-style-type: none"> <li>Dust Control Plan in place and being audited</li> <li>Carry out inspections and record and report any non-compliance</li> <li>Records and findings of site inspection</li> <li>Records of correction action must be in place</li> </ul>
<b>DECOMMISSIONING PHASE</b>						
Approval from the respective road department	Project Developer	Ensure approval(s) from the respective road department is obtained	Prior to decommissioning commencing	ECO	As and when required	Approvals from respective road department to be kept on record and made available on request
Implement a road maintenance programme under the auspices of the respective transport department	Project Developer and Contractor	<ul style="list-style-type: none"> <li>Compile and implement road maintenance programme</li> </ul>	During decommissioning		Weekly	<ul style="list-style-type: none"> <li>Road maintenance programme in</li> </ul>

Impact Management Outcome: To minimise the impact caused by traffic associated with proposed development						
Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
		<ul style="list-style-type: none"> <li>Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>				<ul style="list-style-type: none"> <li>place and being audited</li> <li>Carry out inspections and record and report any non-compliance</li> <li>Records and findings of site inspection</li> <li>Records of correction action must be in place</li> </ul>
Implementation of pedestrian safety initiatives		<ul style="list-style-type: none"> <li>Implement Traffic Management and Transportation Management Plans</li> </ul>				<ul style="list-style-type: none"> <li>Traffic Management and Transportation Management plans in place and being audited</li> </ul>
Ensure a large portion of the vehicles travelling to and from the proposed development travels in the "off-peak" periods		<ul style="list-style-type: none"> <li>Carry out inspections to ensure Traffic and Transportation Management Plans and being adhered to</li> <li>Carry out inspections to ensure pedestrian safety initiatives are being implemented and adhered to</li> </ul>				<ul style="list-style-type: none"> <li>Carry out inspections and record and report any non-compliance</li> <li>Records and findings of site inspection</li> <li>Records of correction action must be in place</li> </ul>

Impact Management Outcome: To minimise the impact caused by traffic associated with proposed development						
Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
Adequate road signage according to the SARTSM		<ul style="list-style-type: none"> <li>Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>				
Construction of an on-site concrete batching plant to reduce trips		<ul style="list-style-type: none"> <li>Carry out inspections to ensure recommended mitigation measures have been implemented and are being adhered to</li> <li>Weekly and monthly reporting of activities, offences and remedial actions</li> </ul>				
Reduction in speed of vehicles						
Adequate enforcement of the law						
Enforce a maximum speed limit on the development						
Regular maintenance of farm fences, access cattle grids						
Use of dust suppression techniques		<ul style="list-style-type: none"> <li>Implement Dust Control Plan</li> <li>Carry out inspections to ensure Dust Control Plan has been implemented and is being adhered to</li> <li>Weekly and monthly reporting of activities,</li> </ul>				<ul style="list-style-type: none"> <li>Dust Control Plan in place and being audited</li> <li>Carry out inspections and record and report any non-compliance</li> <li>Records and findings of site inspection</li> <li>Records of correction</li> </ul>

<b>Impact Management Outcome:</b> To minimise the impact caused by traffic associated with proposed development						
<b>Impact Management Actions</b>	<b>Implementation</b>			<b>Monitoring</b>		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
		offences and remedial act				action must be in place

## 10 ADDITIONAL MANAGEMENT PLANS

### 10.1 High-level Alien Invasive Management Plan

#### Alien Invasive Management Plan

ALIEN INVASIVE MANAGEMENT PROGRAMME	
MITIGATION MEASURES	<ol style="list-style-type: none"><li>1. Stockpiles must be kept clear of weeds and alien vegetation growth by regular weeding.</li><li>2. Alien vegetation and the spread of exotic species on the site will need to be controlled.</li><li>3. The contractor must be responsible for implementing a programme of weed control (particularly in areas where soil has been disturbed); and grassing of any remaining stockpiles to prevent weed invasion.</li><li>4. Herbicide use must only be allowed according to contract specifications. The application must be according to set specifications and under supervision of a qualified technician. The possibility of leaching into the surrounding environment must be properly investigated and only environmentally friendly herbicides must be used.</li><li>5. The use of pesticides and herbicides must be discouraged as these can impact on important pollinator species of indigenous vegetation.</li><li>6. Six monthly checks of the area must take place for the emergence of invader species.</li><li>7. Mitigation measures mentioned for the construction phase above must be implemented for any maintenance of the development that must be undertaken during the operation phase.</li><li>8. Correct rehabilitation with locally indigenous species.</li><li>9. Monitoring programme to ensure that rehabilitation efforts are successful to ensure that risks such as erosion, spread of exotic species and the edge effect are avoided.</li><li>10. Constant maintenance of the area to ensure re-colonisation of floral species.</li><li>11. Regular removal of alien species which will jeopardise the proliferation of indigenous species.</li></ol>

The above High Level Alien invasive management plan will be updated by a vegetation specialist once the detailed design stages of the proposed development are complete and the floral walk-through study has been undertaken.

## 10.2 Plant Rescue and Protection Plan

### Plant Rescue and Protection Plan

PLANT RESCUE PROTECTION PLAN	
MITIGATION MEASURES	<ol style="list-style-type: none"> <li>1. The removal of protected plant species from the proposed development areas must take place prior to construction commencing. These plant species should be grown ex-situ and then relocated after construction has been completed.</li> <li>2. Where possible, preference be given to conservation organisations to remove seeds, cuttings and plants prior to construction commencing for conservation purposes.</li> <li>3. A large proportion of the impact of the development stems from the access roads and the number of roads must be reduced to the minimum possible and routes must also be adjusted to avoid areas of high sensitivity as far as possible, as informed by a preconstruction walk-through survey.</li> <li>4. Preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes topics such as no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas etc.</li> <li>5. A pre-construction walk-through survey by the biodiversity specialist will be required during a favourable season to locate any protected plants / trees and/or sensitive species and/or ecological feature. This survey must cover the footprint of all proposed infrastructure, including internal access roads. If necessary, shift infrastructure to avoid impacts on species or specific features.</li> <li>6. Vegetation clearing must only commence after the walk-through has been conducted and necessary permits obtained. The Northern Cape Nature Conservation Act permit conditions must also be complied with.</li> <li>7. Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared.</li> <li>8. Vegetation to be removed as it becomes necessary rather than removal of all vegetation throughout the site in one step.</li> <li>9. Materials must not be delivered to the site prematurely which could result in additional areas being cleared or affected.</li> <li>10. No vegetation to be used for firewood.</li> <li>11. Gathering of firewood, fruit, "muti" plants, or any other natural material onsite or in areas adjacent to the site is prohibited unless with prior approval of the ECO.</li> <li>12. Only vegetation within the footprint must be removed.</li> </ol>

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## PLANT RESCUE PROTECTION PLAN

13. Vegetation removal must be phased in order to reduce impact of construction.
14. Construction site office and laydown areas must be clearly demarcated and no encroachment must occur beyond demarcated areas.
15. All natural areas impacted during construction must be rehabilitated with locally indigenous plant species.
16. A buffer zone must be established in areas where construction will not take place to ensure that construction activities do not extend into these areas.
17. Construction areas must be well demarcated and these areas strictly adhered to.
18. The use of pesticides and herbicides in the study area must be discouraged as these impacts on important pollinator species of indigenous vegetation.
19. Soils must be kept free of petrochemical solutions that must be kept on site during construction. Spillage can result in a loss of soil functionality thus limiting the re-establishment of flora.
20. Soil stockpiles must not become contaminated with oil, diesel, petrol, garbage or any other material, which must inhibit the later growth of vegetation in the soil.

The above Plant Rescue and Protection Plan will be updated by a vegetation specialist once the detailed design stages of the proposed development are complete and the floral walk-through study has been undertaken.

### 10.3 Re-Vegetation and Habitat Rehabilitation Plan

#### Re-Vegetation and Habitat Rehabilitation Plan

##### RE-VEGETATION AND HABITAT REHABILITATION PLAN

MITIGATION MEASURES	<ol style="list-style-type: none"><li>1. Re-vegetation must aim to accelerate the natural succession processes so that the plant community develops in the desired way, i.e. promote rapid vegetation establishment.</li><li>2. Re-vegetation of disturbed surfaces must occur immediately after construction activities are completed. This must be done through seeding with indigenous grasses.</li><li>3. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction.</li></ol>
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## RE-VEGETATION AND HABITAT REHABILITATION PLAN

4. All natural areas impacted during construction must be rehabilitated with locally indigenous species typical of the representative botanical unit.
5. Rehabilitation must take place in a phased approach as soon as possible.
6. Rehabilitation process must make use of species indigenous to the area. Seeds from surrounding seed banks can be used for re-seeding.
7. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas.
8. Planting of indigenous tree species in areas not to be cultivated or built on must be encouraged.
9. Habitat destruction must be limited to what is absolutely necessary for the construction of the infrastructure, including the construction of new roads. In this respect, the recommendations from the Ecological Specialist Study must be applied strictly. Personnel must be adequately briefed on the need to restrict habitat destruction, and must be restricted to the actual construction area.
10. Monitoring programme to ensure that rehabilitation efforts are successful to ensure that risks such as erosion, spread of exotic species and the edge effect are avoided.

The above Re-Vegetation and Habitat Rehabilitation Plan will be updated by a vegetation specialist once the detailed design stages of the proposed development are complete and the floral walk-through study has been undertaken.

## 10.4 Erosion Management Plan

### Erosion Management Plan

#### EROSION MANAGEMENT PLAN

- |                     |   |
|---------------------|---|
| MITIGATION MEASURES | <ol style="list-style-type: none"><li>1. Contractor to provide method statement on erosion control, showing how storm water will be managed.</li><li>2. To prevent erosion, material stockpiled for long periods (2 weeks) must be retained in a bermed area.</li><li>3. Areas which are not to be constructed on within two months must not be cleared to reduce erosion risks.</li><li>4. The area to be cleared must be clearly demarcated and this footprint strictly maintained.</li><li>5. Wind screening and stormwater control must be undertaken to prevent soil loss from the site.</li><li>6. Other erosion control measures that can be implemented are as follows:</li></ol> |
|---------------------|---|

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## EROSION MANAGEMENT PLAN

- Brush packing with cleared vegetation
  - Mulch or chip packing
  - Planting of vegetation
  - Hydroseeding / hand sowing
7. Sensitive areas need to be identified prior to construction so that the necessary precautions can be implemented.
  8. All erosion control mechanisms need to be regularly maintained.
  9. Seeding of topsoil and subsoil stockpiles to prevent wind and water erosion of soil surfaces.
  10. Retention of vegetation where possible to avoid soil erosion.
  11. Vegetation clearance must be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time.
  12. Re-vegetation of disturbed surfaces must occur immediately after construction activities are completed. This must be done through seeding with indigenous grasses that were present on site prior to construction.
  13. No impediment to the natural water flow other than approved erosion control works is permitted.
  14. To prevent storm water damage, the increase in storm water run-off resulting from construction activities must be estimated and the drainage system assessed accordingly.
  15. Stockpiles not used in three (3) months after stripping must be seeded to prevent dust and erosion.

### 10.5 Stormwater Management Plan

A Stormwater Management Plan cannot be compiled until the detailed design stages of the proposed development are complete, which will only take place if the proposed development is authorised by the DEFF. It is however recommended that a Stormwater Management Plan must be compiled before any construction commences and be implemented during the construction phase.

## 10.6 Open Space Management Plan

**Table 9: Open Space Management Plan**

OPEN SPACE MANAGEMENT PLAN	
MITIGATION MEASURES	<ol style="list-style-type: none"> <li>1. A buffer zone must be established in areas where construction will not take place, to ensure that construction activities do not extend into these areas.</li> <li>2. Vehicle movement must be restricted to authorised access roads.</li> <li>3. Before construction begins, all areas to be developed must be clearly demarcated with fencing or orange construction barrier where applicable.</li> <li>4. All Construction Camps are to be fenced off in such a manner that unlawful entry is prevented and access is controlled. Signage must be erected at all access points in compliance with all applicable occupational health and safety requirements. All access points to the Construction Camp must be controlled by a guard or otherwise monitored, to prevent unlawful access.</li> <li>5. The contractor and ECO must ensure compliance with conditions described in the EA.</li> <li>6. Records of compliance/ non-compliance with the conditions of the authorisation must be kept and be available on request.</li> <li>7. Records of all environmental incidents must be maintained and a copy of these records be made available to the national and provincial departments on request throughout the project execution.</li> <li>8. Site establishment must take place in an orderly manner and all required amenities must be installed at camp sites before the main workforce move onto site.</li> <li>9. All construction equipment must be stored within this construction camp.</li> <li>10. An area for the storage of hazardous materials must be established that conforms to the relevant safety requirements and that provides for spillage prevention and containment.</li> <li>11. The Contractor must provide sufficient ablution facilities, in the form of portable / VIP toilets, at the Construction Camps, and must conform to all relevant health and safety standards and codes. No pit latrines, French drain systems or soak away systems must be allowed and toilets must not be situated within 100 meters of any surface water body or 1:100 year flood line. A sufficient number of toilets must be provided to accommodate the number of personnel working in the area.</li> <li>12. The Contractor must inform all site staff to make use of supplied ablution facilities and under no circumstances must indiscriminate sanitary activities be allowed.</li> </ol>

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## OPEN SPACE MANAGEMENT PLAN

13. No fires will be allowed and the Contractor must make alternative arrangements for heating. LP Gas must be used, provided that all required safety measures are in place. The Contractor must take specific measures to prevent the spread of veld fires, caused by activities at the campsites. These measures must include appropriate instruction of employees about fire.
14. Environmental awareness training for construction staff, concerning the prevention of accidental spillage of hazardous chemicals and oil; pollution of water resources (both surface and groundwater), air pollution and litter control and identification of archaeological artefacts.
15. Project manager must ensure that the training and capabilities of the Contractor's site staff are adequate to carry out the designated tasks.
16. Staff must be educated as to the need to refrain from indiscriminate waste disposal and/or pollution of local soil and water resources and receive the necessary safety training.
17. Staff must be trained in the hazards and required precautionary measures for dealing with these substances

## 10.7 Monitoring System

### Monitoring System

#### MONITORING SYSTEM

- |                     |   |
|---------------------|---|
| MITIGATION MEASURES | <ol style="list-style-type: none"><li>1. Monitoring must be undertaken to evaluate the success of mitigation measures. Monitoring methods must be in accordance with features that need to be monitored.</li><li>2. An area for the storage of hazardous materials must be established that conforms to the relevant safety requirements and provides for spillage prevention and containment.</li><li>3. Environmental awareness training for construction staff, concerning the prevention of accidental spillage of hazardous chemicals and oil; pollution of water resources (both surface and groundwater), air pollution and litter control.</li><li>4. Spillage packs must be available at construction areas.</li><li>5. Proper storage facilities for the storage of oils, paints, grease, fuels, chemicals and any hazardous materials to be used must be provided to prevent the migration of spillage into the ground and groundwater regime around the</li></ol> |
|---------------------|---|

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## MONITORING SYSTEM

temporary storage area(s). These pollution prevention measures for storage must include a bund wall high enough to contain at least 110% of any stored volume, and this must be sited away from drainage lines in a site with the approval of the Project Manager. The bund wall must be high enough to contain 110% of the total volume of the stored hazardous material with an additional allocation for potential storm water events.

6. These storage facilities (including any tanks) must be on an impermeable surface that is protected from the ingress of storm water from surrounding areas in order to ensure that accidental spillage does not pollute local soil or water resources.
7. An approved waste disposal contractor must be employed to remove and recycle waste oil, if practical. The contractor must ensure that its staff is made aware of the health risks associated with any hazardous substances used and has been provided with the appropriate protective clothing/equipment in case of spillages or accidents and have received the necessary training.
8. Where contamination of soil is expected, analysis must be done prior to disposal of soil to determine the appropriate disposal route. Proof from an approved waste disposal site where contaminated soils are dumped if and when a spillage / leakage occur must be attained and given to the project manager.
9. Topsoil and subsoil to be protected from contamination. This must be monitored on a monthly basis by a visual inspection of diesel/oil spillage and pollution prevention facilities.
10. Concrete and chemicals must be mixed on an impervious surface and provisions must be made to contain spillages or overflows into the soil.
11. Relevant departments and other emergency services must be contacted in order to deal with spillages and contamination of aquatic environments.
12. Soils must be kept free of petrochemical solutions that must be kept on site during construction. Spillage can result in a loss of soil functionality thus limiting the re-establishment of flora.

## 10.8 Traffic Management Plan

### Traffic Management Plan

TRAFFIC MANAGEMENT PLAN	
MITIGATION MEASURES	<ol style="list-style-type: none"> <li>1. A designated transport coordination manager must be appointed to oversee and manage the traffic safety officers. Additionally, the designated transport coordination manager must inform and keep up-to-date the interested and affected parties of all the activities taking place that will have a direct impact on them.</li> <li>2. A traffic safety officer must be nominated to make all the necessary arrangements to maintain the required traffic measures for the duration of the project. The safety officer must liaise daily with the transportation coordination manager to keep them apprised of the state of all the traffic arrangements.</li> <li>3. All construction traffic must comply with the legal load requirements as outlined in the National Road Traffic Act and National Road Traffic Regulations.</li> <li>4. During periods of high construction traffic entering and exiting the site, it is recommended that flagmen help direct the traffic. This will enable the safe movement of construction and public traffic at the entrance and reduce the number of potential conflicts.</li> <li>5. The South African Road Traffic Signs Manual (SARTSM), Volume 2, June 1999 is to be used for all traffic during the construction activities of the proposed project.</li> <li>6. Any damage caused by the construction vehicles to the existing road infrastructure must be repaired in kind, prior to the completion of the project.</li> <li>7. A dust suppression system for the gravel roads must be in place to prevent excessive dust from the traffic polluting the air.</li> <li>8. All abnormal loads must be transported under a permit.</li> <li>9. A route study be undertaken to confirm the most appropriate route to site.</li> <li>10. The appropriate load permits be obtained from the Western Cape Department of Transport prior to construction.</li> </ol>

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## 10.9 Transportation Management Plan

### Transportation Management Plan

TRANSPORTATION MANAGEMENT PLAN	
MITIGATION MEASURES	<ol style="list-style-type: none"> <li>1. For each convoy of abnormal vehicles/loads a designated safety officer must be nominated.</li> <li>2. All vehicles used during the transport of materials and in the construction activities are required to be roadworthy per the National Road Traffic Act (NRTA) and display all pertinent certificates as required.</li> <li>3. For any vehicles that operate under an exemption permit, a roadworthy certificate will not be required; however, the exemption permit will require that the vehicle is fit for operation on public roadways.</li> <li>4. All vehicles travelling to and from the site must adhere to all laws imposed by the law enforcement agencies, and must comply with any requests made by the law enforcement officials.</li> <li>5. All construction vehicles that are entering the site must also be available via radio or telephone communication to the transport coordination manager. So that in the event of an emergency, all vehicles can be accounted for.</li> <li>6. During the delivery of the power line and substation components, the person in charge must be in communication with transport coordination manager, so that he/she will keep track and document the progress of the vehicles to facilitate any issues that may arise during the transportation phase.</li> <li>7. All vehicles must comply with the posted speed limits on public roads as well as the speed limits within the development.</li> <li>8. All abnormal vehicles and loads to be transported are required to have a valid permit before any trip is begun.</li> <li>9. SANRAL Western &amp; Southern Region will need to be contacted in order to obtain consent for the abnormal load transport on their roadways.</li> <li>10. An escort is required to accompany the abnormal vehicle to warn the normal travelling public and to promote the safe flow of traffic if the normal flow of traffic is disrupted by the abnormal vehicle.</li> <li>11. Construction vehicles delivering raw materials to the site must be covered to prevent any debris along the roads.</li> <li>12. Ensure a large portion of vehicles traveling to and from the proposed development site travel in the 'off peak' periods.</li> <li>13. Implement pedestrian safety initiatives.</li> <li>14. Trucks must stop at regular intervals to allow queuing vehicles to pass.</li> </ol>



A consolidated Traffic and Transport Management Plan, taking into account the final route selection must be prepared once the Project advances to the preliminary phase. This plan must ensure that vehicles arrive in a dispersed manner throughout the day to reduce the impact to other road users. Methods to improve driver safety must also be outlined, e.g. the use of speed cameras or Average Speed Over Distance (ASOD). Furthermore, this plan must include measures to minimise the impact on local commuters so as not to disturb existing retail and commercial operations.

## 10.10 Heritage Management Plan

### Heritage Management Plan

THE HERITAGE MANAGEMENT PLAN	
MITIGATION MEASURES	<ol style="list-style-type: none"> <li>1. In the event that an area previously not included in an archaeological or cultural resources survey is to be disturbed, the SAHRA needs to be contacted. An enquiry must be lodged with them into the necessity for a Heritage Impact Assessment.</li> <li>2. In the event that a further heritage assessment is required it is advisable to utilise a qualified heritage practitioner, preferably registered with the Cultural Resources Management Section (CRM) of the Association of Southern African Professional Archaeologists (ASAPA).               <ol style="list-style-type: none"> <li>(a) This survey and evaluation must include:                   <ol style="list-style-type: none"> <li>(b) The identification and mapping of all heritage resources in the area affected;</li> <li>(c) An assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6 (2) or prescribed under section 7 of the National Heritage Resources Act;</li> <li>(d) An assessment of the impact of the development on such heritage resources;</li> <li>(e) An evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;</li> <li>(f) The results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;</li> <li>(g) If heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and</li> <li>(h) Plans for mitigation of any adverse effects during and after the completion of the proposed development.</li> </ol> </li> </ol> </li> <li>3. It is advisable that an information section on cultural resources be included in the SHE training given to contractors involved in surface earthmoving activities. These sections must include basic information on:               <ol style="list-style-type: none"> <li>(a) Heritage;</li> </ol> </li> </ol>

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## THE HERITAGE MANAGEMENT PLAN

- (b) Graves;
  - (c) Archaeological finds; and
  - (d) Historical Structures.
4. This module must be tailor made to include all possible finds that could be expected in that area of construction.  
Possible finds include:
    - (a) Open air Stone Age scatters, disturbed during vegetation clearing. This will include stone tools.
    - (b) Palaeontological deposits such as bone, and teeth in fluvial riverbank deposits.
  5. In the event that a possible find is discovered during construction, all activities must be halted in the area of the discovery and a qualified archaeologist contacted.
  6. The archaeologist needs to evaluate the finds on site and make recommendations towards possible mitigation measures.
  7. If mitigation is necessary, an application for a rescue permit must be lodged with SAHRA.
  8. After mitigation, an application must be lodged with SAHRA for a destruction permit. This application must be supported by the mitigation report generated during the rescue excavation. Only after the permit is issued will such a site be destroyed.
  9. If during the initial survey sites of cultural significance are discovered, it will be necessary to develop a management plan for the preservation, documentation or destruction of such a site. Such a program must include an archaeological/palaeontological monitoring programme, timeframe and agreed upon schedule of actions between the company and the archaeologist.
  10. In the event that human remains are uncovered, or previously unknown graves are discovered, a qualified archaeologist needs to be contacted and an evaluation of the finds made.
  11. If the remains are to be exhumed and relocated, the relocation procedures as accepted by SAHRA need to be followed. This includes an extensive social consultation process.

The above Heritage Plan will be updated by a heritage specialist once the detailed design stages of the proposed development are complete and the walk-through study has been undertaken.

## 10.11 Fire Management Plan (FMP)

The intent of a Fire Management Plan (FMP) is to provide fire safety requirements to ensure that the construction and operation of the proposed development, which are defensible from wildfire and, in turn, do not represent a significant threat of ignition source for the surrounding native habitat.

It must be noted that during extreme fire conditions, there are no guarantees that a given structure will not burn. Precautions and mitigating measures identified in this plan are designed to reduce the likelihood that fire would impinge upon the proposed structures as well as minimise the impact of fires if they do occur. This FMP does not guarantee that fire will not occur in the area or that fire will not damage property or cause harm to persons or their property.

The proposed development will rely heavily on the co-operation and proactive participation between managers, employees and contractors to maintain a high level of Fire safety awareness at all times.

This management plan is also a reflection of the proposed development's commitment towards the constant safeguarding of employees against Fire hazards, whilst complying with the requirements of the Fire Safety Act, 6 of 2002 and Occupational Health and Safety Act, 85 of 1993.

### 10.11.1 Fire and Maintenance of Access Roads for Power Line and Substations

- A primary access and escape route will be visible and known to all who visit the facility and will be controlled by a security gate.
- There will be other dedicated secondary gravel roads leading to/from the project site to/from the primary access.
- There will be more than one vehicular access gate leading into the project.
- An escape route map with safe gathering points needs to be visible at all the entrance gates/construction camps for anyone to familiarise themselves with upon entry (and will be provided prior to construction once the final facility layout and building plans have been approved by the appropriate department/authority).

### 10.11.2 Fire Safety Act, 6 of 2002

A copy of the fire safety act is to be available at the facility for everyone's easy access purposes.

### 10.11.3 Principles of Fire Safety

The aims of implementing measures to limit the incidences and spread of fire are:

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**MOOI PLAATS SOLAR POWER (PTY) LTD**

**prepared by: SiVEST Environmental**

Proposed Development of the Mooi Plaats On-site Eskom Substation, Eskom Collector Substation and associated 132kV Power Line near Noupoot in the Northern Cape Province - Draft Environmental Management Programme (EMPr)

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- To ensure the safety of people, minimising loss of life and injury.
- To minimise loss of and damage to property and possessions.
- To minimise the negative impact on the environment.
- To safely and effectively extinguish fire when needed

#### *10.11.4 Requirements in Terms of the South African Bureau of Standards (SABS)*

From a fire safety point of view, all buildings erected within the boundaries of South Africa must comply with the SABS 0400:1990- The application of the National Building Regulations. The following requirements are appropriate and can be adapted for planning and design of buildings. Any building must be so designed, constructed and equipped that in case of fire:

- The protection of occupants or users therein is ensured and that provision is made for the safe evacuation of such occupants or users.
- The spread and intensity of such fire within such buildings and the spread of fire to any other building will be minimised.
- Adequate means of access and equipment for detecting, fighting, controlling and extinguishing such fire are adopted.

#### *10.11.5 Management Commitment*

It will be the responsibility of managers to:

- Enforce such measures as may be necessary in the interest of the preservation of employee's safety including safety against fire.
- Permit employees to perform work only once the precautionary measures are put in place.
- Provide the necessary supervision to staff to ensure that precautionary measures are maintained.
- Ensure that the staff are adequately trained in fire procedures.
- Ensure that all staff are informed regarding their scope of authority.
- Ensure that the FMP is reviewed and updated regularly to meet the projects needs at that particular point in time.
- Ensure that the firefighting equipment is regularly serviced.
- Make sure that the FMP forms part of the facility induction which will be made compulsory for each new member to the facility to attend.

#### *10.11.6 Employees' Contribution to Fire Management*

The successful implementation of the FMP will require the full co-operation of every employee.

In this regard it will be expected of every employee to:

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- Take care of the fire detection and fire protection systems and equipment.
- Carry out any lawful order given to him/her and obey the fire procedures laid down, or authorised thereto, by Mainstream in the interest of health and fire safety.
- Report any situation which may cause fire to the supervisor and/or Health and Safety Representative.
- Be able to make recommendations to the relevant Health and Safety representative who will take the recommendation into consideration and if agreed upon then implemented.

Co-operation will be expected from any other Contractor or subcontractor to ensure that any duty or requirement imposed on Mainstream, as the employer, through legislation, is complied with.

#### *10.11.7 Fire Prevention/Control*

The following preliminary measures will be taken to try and prevent and/or control fires on-site:

- Smoking and open flames will be prohibited in areas near flammable and/or combustible materials.
- Fire Fighting equipment will be sufficiently available on site and must comply with the relevant legislation.
- All equipment will be serviced annually and pressure tested every five (5) years.

#### *10.11.8 Response*

- The facility must at all times have emergency numbers readily available to all employees and staff. These include the fire department as well as emergency care numbers to make sure that fires are quickly extinguished when they occur and that the victims (if any) are medically treated and taken to a nearby hospital or clinic if needs be.
- The staff will be trained to use the firefighting equipment for small fires that can be contained but alternatively if the fire cannot be contained, the appropriate authorities must be contacted to assist in extinguishing the fire.
- If the fire cannot be contained, workers must evacuate the site in an orderly manner led by a trained Health and Safety representative.
- During construction phase, fire protection measures like placing fire extinguishers on site are compulsory before any hot work can commence or where any flammable substances are present.
- During operation phase, Fire protection equipment like Fire Extinguishers will be situated at carefully selected locations for easy access during an emergency.

#### *10.11.9 Management Plan*

The following will form the key elements of the FMP:

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- Legal Compliance
  - A work place that is safe and without risk to the health and safety of employees in compliance with the requirements of the Occupational Health and Safety Act 85 of 1993 and its regulations as well as the Fire Safety Act, 6 of 2002.
- Fire hazard identification and risk assessment
  - Identify any fire hazards and risks and then determine the extent and impact.
  - Endeavour to eliminate fire hazards and develop control measures to contain the fires.
- Fire Safety, Health and Environmental Proficiency
  - Ensure that employees are conversant with the potential fire hazards and the precautionary measures required with respect to these hazards through regular awareness training.
  - Incorporate and discuss Fire Safety into the daily Toolbox talks.
- Written Safe Work Procedures
  - Develop written safe work procedures for all fire high risks and provide the necessary training to employees if needs be.
- Training and Education
  - Include the fire management plan in all Health and Safety training and assessments and provide the necessary training and awareness to all categories of employees.
  - Provide awareness and training to all new employees including temporary employees and contractors on site.
- Prevention
  - Suitable preventative measures against exposure to hazards are an integral part of daily activities.
  - Personnel protective equipment must be provided for the protection of employees when necessary.
  - Corrective and/or fire preventative measures must be put in place.
- Elimination of Fire Incidents
  - The elimination of fire incidents, including injuries on duty to which employees and the public can be exposed to will be achieved through the proper investigation of any fire incidents. Factors which cause any fire incidences will be determined and then corrective and preventative measures will be developed and implemented in liaison with all relevant stakeholders.
- First Aid Kit
  - A first aid kit will be available on site which will contain all the necessary medication (e.g. pain medication) and equipment to pre-treat any fire injury depending on the magnitude of

the injury. If the injury is too severe, the victim must be taken to the nearest hospital or clinic to be treated by professionals and not treated on site.

- There will be a sufficient number of employees trained in first aid medical assistance in case of small controllable fire incidents occurring on site.
  
- Machinery, Plant and Equipment
  - All mechanical equipment will be safeguarded in order to protect the health and safety of persons that must be exposed to such equipment.
  - Regular maintenance of all equipment (including firefighting equipment) and inspections will be recorded.
  - Only equipment that is safe and in working condition will be used by the employees. Equipment is to be inspected every day before use.
  
- Sub-Contractors
  - Sub-contractors will sign an agreement with the Developer to ensure their compliance with the FMP.
  - Sub-contractors will work according to the Health and Fire Safety standards.

## 10.12 Environmental Awareness Plan

Legislation requires that a company who prepares an EMP must develop an environmental awareness plan describing the manner in which the company intends to inform his or her employees of any environmental risks which must result from their work and the manner in which the risks must be dealt with in order to avoid pollution or the degradation of the environment. In recognition of the need to protect our environment, environmental management should not only be seen as a legal obligation but also as a moral obligation.

This Environmental Awareness Plan is intended to create the required awareness and culture with personnel and contractors / service providers on environmental safety and health issues associated with the development activities.

### 10.12.1 Policy on Environmental Awareness

This Environmental Awareness Plan must serve as the basis for the induction of all new employees (as well as contractors depending on the nature of their work on site) on matters as described herein and read in conjunction with the EMP. The Plan will also be used to hone awareness of all employees on a continuous basis.

Specific environmental awareness performance criteria will also form part of the job descriptions of employees, to ensure diligence and full responsibility at all levels of the organisational work force.

#### *10.12.2 Implementation of Environmental Awareness*

General environmental awareness will be fostered among the project's workforce to encourage the implementation of environmentally sound practices throughout the project's duration. This will ensure that environmental accidents are minimised and environmental compliance maximised.

Environmental awareness will be fostered in the following manner:

- Induction course for all workers on site, before commencing work on site.
- Refresher courses as and when required
- Daily toolbox talks with all workers on the site at the start of each day, where workers can be alerted to particular environmental concerns associated with their tasks for that day or the area/habitat in which they are working.
- Displaying of information posters and other environmental awareness material at the general assembly points.

#### *10.12.3 Training and awareness*

The MC is to take responsibility for the management of their staff and subcontractors on the project site during the construction phase and supervise them closely at all times. The onus is on the MC to make sure that all their staff and subcontractors fully comprehend the contents of the EMP. The MC must organise environmental awareness training programmes, which should be targeted at the two levels of employee: management and labour.

#### *10.12.4 Training of construction workers*

All construction staff must receive basic training in environmental awareness, including the storage and handling of hazardous substances, minimisation of disturbance to sensitive areas, management of waste, and prevention of water pollution. They must be informed of how to recognise historical / archaeological artefacts that may be uncovered. They must also be apprised of the EMP's requirements. Environmental awareness training programmes need to be formulated for these employee levels and must comprise:

- A record of all names, positions and duties of staff to be trained;
- A framework for the training programmes;
- A summarised version of the training course(s); and
- An agenda for the delivery of the training courses.



- Such programmes will set out the training requirements, which need to be conducted prior to any construction works occurring and will include:
  - Acceptable behaviour with regard to flora and fauna;
  - Management and minimising of waste, including waste separation;
  - Maintenance of equipment to prevent the accidental discharge or spill of fuel, oil, lubricants, cement, mortar and other chemicals;
  - Responsible handling of chemicals and spills;
  - Environmental emergency procedures and incident reporting; and
  - General code of conduct towards I&APs.
  
- The ECO may be requested to provide additional on-site training (in a first language) in respect of environmental aspects that are unclear to the construction personnel. A translator may be required to assist with this additional training. The cost for the translator will be borne by the MC.

## 11 CONCLUSION

The environmental and social impacts of the project were identified through the four project phases (pre-construction, construction, operation and decommissioning). Both positive and negative project impacts have been identified. The following section briefly describes some of the major impacts and proposed mitigation measures within each of the project phases.

### 11.1 Pre-Construction Phase

The first site activities before mobilisation of equipment will be a survey, required for final design of the power line and substation. There could be negative impacts on land associated with the construction of camps (temporary loss) and storage of construction materials. Expectations of improvement in livelihood among locals must be addressed through public participation. Construction contracts will include environmental monitoring and management procedures and requirements. These must be in place prior to the commencement of any construction activities.

### 11.2 Construction Phase

This phase of the activity will have both positive and negative impacts. The positive impacts are employment opportunities offered to the construction workers and any other labourer who will be hired to provide their services during the construction phase. The negative impacts would include waste generation, accidents, health and safety, air, dust and noise pollution, vegetation clearance, soil erosion, socio-environmental issues, loss of vegetation, and compaction of soil. Most of the negative impacts are minor and temporary

and the significance of the impacts can be greatly reduced by the implementation of mitigation measures, which are outlined in this EMP. The contractor must ensure that all staff have adequate protective clothing and are adequately trained.

### **11.3 Operational Phase**

The proposed project will have minimal negative effects which mainly relates to loss of aesthetic value and habitat. The habitat that will be lost is not regarded as pristine and therefore, is not viewed as significant. Most of the negative impacts are minor and the significance of the impacts can be greatly reduced by the implementation of mitigation measures, which are outlined in this EMP.

**Annexure A**  
Curriculum vitae



## SCIENTIFIC AQUATIC SERVICES (SAS) – SPECIALIST CONSULTANT INFORMATION

### CURRICULUM VITAE OF **STEPHEN VAN STADEN**

#### **PERSONAL DETAILS**

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Position in Company	Managing member, Ecologist, Aquatic Ecologist
Date of Birth	13 July 1979
Nationality	South African
Languages	English, Afrikaans
Joined SAS	2003 (year of establishment)
Other Business	Trustee of the Serenity Property Trust

#### **MEMBERSHIP IN PROFESSIONAL SOCIETIES**

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- Registered Professional Scientist at South African Council for Natural Scientific Professions (SACNASP)
- Accredited River Health practitioner by the South African River Health Program (RHP)
- Member of the South African Soil Surveyors Association (SASSO) Member of the Gauteng Wetland Forum
- Member of the Gauteng Wetland Forum;
- Member of International Association of Impact Assessors (IAIA) South Africa;
- Member of the Land Rehabilitation Society of South Africa (LaRSSA)

#### **EDUCATION**

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##### **Qualifications**

MSc (Environmental Management) (University of Johannesburg)	2003
BSc (Hons) Zoology (Aquatic Ecology) (University of Johannesburg)	2001
BSc (Zoology, Geography and Environmental Management) (University of Johannesburg)	2000
Tools for wetland Assessment short course Rhodes University	2016

#### **COUNTRIES OF WORK EXPERIENCE**

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South Africa – All Provinces

Southern Africa – Lesotho, Botswana, Mozambique, Zimbabwe Zambia

Eastern Africa – Tanzania Mauritius

West Africa – Ghana, Liberia, Angola, Guinea Bissau, Nigeria, Sierra Leona

Central Africa – Democratic Republic of the Congo

## SELECTED PROJECT EXAMPLES OUT OF OVER 2000 PROJECTS WORKED ON

- 1 Mining: Coal, Chrome, PGM's, Mineral Sands, Gold, Phosphate, river sand, clay, fluorspar
- 2 Linear developments
- 3 Energy Transmission, telecommunication, pipelines, roads
- 4 Minerals beneficiation
- 5 Renewable energy (wind and solar)
- 6 Commercial development
- 7 Residential development
- 8 Agriculture
- 9 Industrial/chemical

<u>Project</u>	<u>Project Description</u>	<u>Area</u>
<b>RESIDENTIAL</b>		
Bloemwater Knelpoort Project	Full ECO Assessment	Free State
Bongwini and Toekomsrus Project Gold 1	Environmental Sensitivity Analyses as part of the development of site Development Plans and Precinct Planning on the outskirts of Takoradi Ghana (2000 ha)	Randfontein
Skoenmaker River	Wetland, Aquatic & ECO Assessment	Somerset East
The Hills Eco Estate	Wetland delineation and ecological assessment, and rehabilitation plan	Midrand, Gauteng
<b>ROADS, PIPELINES, POWERLINES AND OTHER LINEAR DEVELOPMENTS</b>		
Lesotho Border Road Project	Soil & Land Capability Assessment, full wetland ecological assessment and aquatic assessment as part of the EIA process	Lesotho
Thabazimbi Waste Water Treatment Works; Upgrade of Sewer Pipeline	Freshwater resource ecological assessment and rehabilitation and management plan	Limpopo
N11 Ring Road	Freshwater Ecological Assessment	Limpopo
N7 Road Upgrade Cederberg & Kransvleikloof	Floral RDL scan and delineation of the wetland areas along the proposed N7 road upgrade between Clanwilliam and Citrusdal	Western Cape
N3TC De Beers Pass Route	Variation order for additional work on N3TC De Beers pass route and existing N3 route	Kwa-Zulu Natal
<b>MINING</b>		
Der Brochen Mine	Ongoing bi-annual seasonal aquatic biomonitoring from 2011 to present	Steelport Limpopo
Der Brochen Mine	Wetland Ecological Assessment (2014) Full terrestrial, wetland and aquatic ecological assessment, soil and land capability assessment (2018)	Steelpoort, Limpopo
Bokoni Platinum Mine	Annual Soil Monitoring & Soil Contamination	Free State

Rustenburg Bridges	Aquatic Biomonitoring Assessment	Rustenburg, North West
Assmang Chrome Machadodorp Works	Biomonitoring & Toxicological Monitoring for the 2015 period	Machadodorp, Mpumalanga
Sabie TGME Project	Freshwater Ecological Assessment as part of the environmental assessment and authorization process for the proposed development (gold mining project – pre-mined residue and hard rock mining near Sabie)	Mpumalanga
Ikwezi Doornkop Colliery	Develop freshwater resource rehabilitation and management plans, and conduct ecological biomonitoring in fulfillment of the water use licensing process for the Ikwezi Doornkop Colliery near Newcastle	Newcastle
Blesbokspruit Enstra Mill	Biomonitoring studies, whole effluent toxicity (WET) studies, bioaccumulation assessment and sediment heavy metal contaminant analyses	Johannesburg
Malati Opencast	Freshwater ecological assessment, risk assessment and freshwater rehabilitation and management plan and plant species plan as part of the water use authorization process for a proposed Malati opencast near Tzaneen	Limpopo
Heuningkranz Mine	Freshwater assessment, soil and land capability assessment done for Sishen Iron Ore Company (Pty) Ltd part of Kumba Iron Ore limited as part of the environmental management services for the Heuningkranz project	Northern Cape
Leslie Colliery	Project manager, freshwater ecological assessment as part of the environmental impact assessment process for the underground coal mine to determine the status of the freshwater resources within the proposed mining area	Mpumalanga
Commissiekraal Colliery	Full Ecological investigation, including a terrestrial fauna and flora assessment as well as an assessment of the wetland and aquatic PES and wetland ecoservices on the site.	Kwa-Zulu Natal
Leandra Colliery	Full Ecological Assessment, including a terrestrial fauna and flora assessment as well as an assessment of the wetland and aquatic PES and wetland ecoservices on the site.	Mpumalanga
Marula Platinum Mine	Freshwater resource ecological assessment. Development of a plant species plan in line with the project's rehabilitation objectives	Burgersfort
Donkerhoek Dam development	Full ecological assessment (Fauna, floral, wetland and aquatic assessment) as part of the EIA process	Mpumalanga
Evander Gold Mine Wetland Offset	Determination of the Wetland Offset Requirements for the proposed expansion of the Elikhulu Tailings Storage Facility	Mpumalanga
Canyon Coal - Witfontein mining project	Delineate and characterize the wetland and aquatic resources for the Witfontein mining project located by the farms Holfontein and Witrand near Bethal	Mpumalanga
The Sierra Rutile Mine	Specialist terrestrial ecology, aquatic ecology and wetland ecology studies	Moyamba District - Sierra Leona

**INFRASTRUCTURE**

Bronkhorstspuit Feeder Line	Monthly Aquatic Biomonitoring as part of the environmental assessment and authorization process for the proposed conversion of the Bronkhorstspuit plots feeder from 6.6kv to 22kv	Bronkhorstspuit
South Dunes Precinct Project	Full Ecological Assessment	Richards Bay
Braamfonteinspruit Rehabilitation	Terrestrial, Freshwater and Aquatic Ecological Assessment as part of the rehabilitation and management plan for the Braamfonsteinspruit, Johannesburg	Johannesburg
City of Johannesburg	Aquatic Ecological Assessment, monitoring and managing the ecological state of rivers in the City Of Johannesburg Metropolitan area	Johannesburg
Lethabo Pump Station	Aquatic present ecological state assessment of the Vaal river	Vereeniging
CTIA runway re-alignment project – Wetland Offset	Determination of the Wetland offset requirements for Cape Town international Airport runway realignment, identification of a suitable offset location and compilation of relevant baseline assessments (Wetland and faunal), Khayelitsha. (2017)	Cape Town
Musami Dam	Determination of the draft environmental water quality requirements for the project	Zimbabwe
uMkhomazi Water Project	Determination of the Wetland and Terrestrial Biodiversity Offset Requirements for the proposed uMkhomazi Water Project	Richmond - KZN

#### POWER GENERATION

Mzimvubu Dam	Full Terrestrial (Flora and Faunal), Wetland and Aquatic Baseline Ecological Assessment	Eastern Cape
HGA HAGA WEF	Hydrological Assessment	Eastern Cape
RPM Crossing	Wetland Delineation	Free State
Eskom Denova Powerline and sub-station	Freshwater assessment as part of the EIA process for the proposed Eskom powerline (1,75 km in length) and sub-station (132kV) near Denova, Western Cape. (2014)	Western Cape
Sutherland WEF	Freshwater Ecological Assessments	Northern Cape
Victoria West WEF	Freshwater Ecological Assessments	Northern Cape

#### INFRASTRUCTURE

GIBB (Pty) Ltd	Bronkhorstspuit Feeder Line	Monthly Aquatic Biomonitoring as part of the environmental assessment and authorization process for the proposed conversion of the Bronkhorstspuit plots feeder from 6.6kv to 22kv	Bronkhorstspuit
SRK Consulting (PTY) Ltd	South Dunes Precinct Project	Full Ecological Assessment	Richards Bay
SRK Consulting (PTY) Ltd	Braamfonteinspruit Rehabilitation	Terrestrial, Freshwater and Aquatic Ecological Assessment as part of the rehabilitation and management plan for the Braamfonsteinspruit, Johannesburg	Johannesburg

Iliso Consulting (Pty Ltd)	City of Johannesburg	Aquatic Ecological Assessment, monitoring and managing the ecological state of rivers in the City Of Johannesburg Metropolitan area	Johannesburg
Maanakana Projects and Consulting (Pty) Ltd	Lethabo Pump Station	Aquatic present ecological state assessment of the Vaal river	Vereeniging
SRK Consulting	CTIA runway re-alignment project – Wetland Offset	Determination of the Wetland offset requirements for Cape Town international Airport runway realignment, identification of a suitable offset location and compilation of relevant baseline assessments (Wetland and faunal), Khayelitsha. (2017)	Cape Town
GIBB (Pty) Ltd	Musami Dam	Determination of the draft environmental water quality requirements for the project	Zimbabwe
Nemai Consulting (PTY) Ltd	uMkhomazi Water Project	Determination of the Wetland and Terrestrial Biodiversity Offset Requirements for the proposed uMkhomazi Water Project	Richmond - KZN
<b>POWER GENERATION</b>			
Iliso Consulting	Mzimvubu Dam	Full Terrestrial (Flora and Faunal), Wetland and Aquatic Baseline Ecological Assessment	Eastern Cape
WKN-Wind current SA C/O Alan Wolfromm	HGA HAGA WEF	Hydrological Assessment	Eastern Cape
SRK Consulting (PTY) Ltd	RPM Crossing	Wetland Delineation	Free State
SRK Consulting (Pty) Ltd	Eskom Denova Powerline and sub-station	Freshwater assessment as part of the EIA process for the proposed Eskom powerline (1,75 km in length) and sub-station (132kV) near Denova, Western Cape. (2014)	Western Cape
CSIR Consulting & Analytical Services	Sutherland WEF	Freshwater Ecological Assessments	Northern Cape
CSIR Consulting & Analytical Services	Victoria West WEF	Freshwater Ecological Assessments	Northern Cape

## REFERENCES

- Terry Calmeyer  
Director: ILISO Consulting Environmental Management (Pty) Ltd  
Tel: +27 (0) 11 465 2163  
Email: terry@icem.co.za





## Curriculum vitae: Chris van Rooyen

Profession/Specialisation : Avifaunal Specialist  
Highest qualification : BA LLB  
Nationality : South African  
Years of experience : 22 years

### Key Experience

Chris van Rooyen has twenty-two years' experience in the assessment of avifaunal interactions with industrial infrastructure. He was employed by the Endangered Wildlife Trust as head of the Eskom-EWT Strategic Partnership from 1996 to 2007, which has received international acclaim as a model of co-operative management between industry and natural resource conservation. He is an acknowledged global expert in this field and has consulted in South Africa, Namibia, Botswana, Lesotho, New Zealand, Texas, New Mexico and Florida. He also has extensive project management experience and he has received several management awards from Eskom for his work in the Eskom-EWT Strategic Partnership. He is the author and/or co-author of 17 conference papers, co-author of two book chapters, several research reports and the current best practice guidelines for avifaunal monitoring at wind farm sites. He has completed around 130 power line assessments; and has to date been employed as specialist avifaunal consultant on more than 50 renewable energy generation projects. He has also conducted numerous risk assessments on existing power lines infrastructure. He also works outside the electricity industry and he has done a wide range of bird impact assessment studies associated with various residential and industrial developments. He serves on the Birds and Wind Energy Specialist Group which was formed in 2011 to serve as a liaison body between the ornithological community and the wind industry.

### Key Project Experience

#### **Bird Impact Assessment Studies and avifaunal monitoring for wind-powered generation facilities:**

1. Eskom Klipheuwel Experimental Wind Power Facility, Western Cape
2. Mainstream Wind Facility Jeffreys Bay, Eastern Cape (EIA and monitoring)
3. Biotherm, Swellendam, (Excelsior), Western Cape (EIA and monitoring)
4. Biotherm, Napier, (Matjieskloof), Western Cape (pre-feasibility)
5. Windcurrent SA, Jeffreys Bay, Eastern Cape (2 sites) (EIA and monitoring)
6. Caledon Wind, Caledon, Western Cape (EIA)
7. Innwind (4 sites), Western Cape (EIA)
8. Renewable Energy Systems (RES) Oyster Bay, Eastern Cape (EIA and monitoring)
9. Oelsner Group (Kerriefontein), Western Cape (EIA)
10. Oelsner Group (Langefontein), Western Cape (EIA)
11. InCa Energy, Vredendal Wind Energy Facility Western Cape (EIA)
12. Mainstream Loeriesfontein Wind Energy Facility (EIA and monitoring)
13. Mainstream Noupoort Wind Energy Facility (EIA and monitoring)
14. Biotherm Port Nolloth Wind Energy Facility (Monitoring)
15. Biotherm Laingsburg Wind Energy Facility (EIA and monitoring)
16. Langhoogte Wind Energy Facility (EIA)
17. Vleesbaai Wind Energy Facility (EIA and monitoring)
18. St. Helena Bay Wind Energy Facility (EIA and monitoring)
19. Electrawind, St Helena Bay Wind Energy Facility (EIA and monitoring)
20. Electrawind, Vredendal Wind Energy Facility (EIA)
21. SAGIT, Langhoogte and Wolseley Wind Energy facilities
22. Renosterberg Wind Energy Project – 12-month preconstruction avifaunal monitoring project
23. De Aar – North (Mulilo) Wind Energy Project – 12-month preconstruction avifaunal monitoring project
24. De Aar – South (Mulilo) Wind Energy Project – 12-month bird monitoring
25. Namies – Aggenys Wind Energy Project – 12-month bird monitoring
26. Pofadder - Wind Energy Project – 12-month bird monitoring
27. Dwarsrug Loeriesfontein - Wind Energy Project – 12-month bird monitoring
28. Waaihoek – Utrecht Wind Energy Project – 12-month bird monitoring
29. Amathole – Butterworth Utrecht Wind Energy Project – 12-month bird monitoring & EIA specialist
30. Phekomoya and San Kraal Wind Energy Projects 12-month bird monitoring & EIA specialist study (Innwind)
31. Beaufort West Wind Energy Facility 12-month bird monitoring & EIA specialist study (Mainstream)
32. Leeuwdraai Wind Energy Facility 12-month bird monitoring & EIA specialist study (Mainstream)
33. Sutherland Wind Energy Facility 12-month bird monitoring (Mainstream)
34. Maralla Wind Energy Facility 12-month bird monitoring & EIA specialist study (Biotherm)
35. Esiayo Wind Energy Facility 12-month bird monitoring & EIA specialist study (Biotherm)
36. Humansdorp Wind Energy Facility 12-month bird monitoring & EIA specialist study (Cennergi)
37. Aletta Wind Energy Facility 12-month bird monitoring & EIA specialist study (Biotherm)
38. Eureka Wind Energy Facility 12-month bird monitoring & EIA specialist study (Biotherm)
39. Makambako Wind Energy Facility (Tanania) 12-month bird monitoring & EIA specialist study (Windlab)
40. R355 Wind Energy Facility 12-month bird monitoring (Mainstream)
41. Groenekloof Wind Energy Facility 12-month bird monitoring & EIA specialist study (Mulilo)
42. Tsitsikamma Wind Energy Facility 24-months post-construction monitoring (Cennergi)
43. Noupoort Wind Energy Facility 24-months post-construction monitoring (Mainstream)
44. Kokerboom Wind Energy Facility 12-month bird monitoring & EIA specialist study (Business Venture Investments)
45. Kuruman Wind Energy Facility 12-month bird monitoring & EIA specialist study (Mulilo)
46. Dassieklop Wind Energy Facility 3 years post-construction monitoring (Biotherm)
47. Loeriesfontein 2 Wind Energy Facility 2 years post-construction monitoring (Mainstream)
48. Khobab Wind Energy Facility 2 years post-construction monitoring (Mainstream)
49. Excelsior Wind Energy Facility 18 months construction phase monitoring (Biotherm)
50. Boesmansberg Wind Energy Facility 12-months pre-construction bird monitoring (juwi)
51. Mahica Wind Energy Facility, Mombasa, 12-months pre-construction monitoring (Windlab)

#### **Bird Impact Assessment Studies for Solar Energy Plants:**

1. Concentrated Solar Power Plant, Upington, Northern Cape.
2. Globele De Aar and Droogfontein Solar PV Pre- and Post-construction avifaunal monitoring
3. UWI Kronos PV project, Copperton, Northern Cape
4. Sand Draai CSP project, Groblershoop, Northern Cape
5. Biotherm Helena PV Project, Copperton, Northern Cape
6. Biotherm Letsiao CSP Project, Aggeneys, Northern Cape
7. Biotherm Enamandla PV Project, Aggeneys, Northern Cape
8. Biotherm Sendawo PV Project, Vryburg, North-West
9. Biotherm Tlisitseng PV Project, Lichtenburg, North-West
10. UWI Hota el Solar Park Project, Hota el, Northern Cape
11. Veld Solar One Project, Aggeneys, Northern Cape
12. Brypaal Solar Power Project, Kakamas, Northern Cape
13. ABO Vryburg 1,2,3 Solar PV Project, Vryburg, North-West
14. NamPower CSP Facility near Arandis, Namibia

#### **Bird Impact Assessment Studies for the following overhead line projects:**

1. Chobe 33kV Distribution line
2. Athene - Umfolo i 400kV
3. Beta-Delphi 400kV
4. Cape Strengthening Scheme 765kV
5. Flurian-Louis-Trichardt 132kV
6. Ghan i 132kV (Botswana)
7. Ikaros 400kV
8. Matimba-Witkop 400kV
9. Naboomspruit 132kV
10. Tabor-Flurian 132kV
11. Windhoek - Walvisbaai 220 kV (Namibia)
12. Witkop-Overysse 132kV
13. Breyten 88kV
14. Adis-Phoebus 400kV
15. Dhuva- anus 400kV
16. Perseus-Mercury 400kV
17. Gravelotte 132kV
18. Ikaros 400 kV
19. Khanye 132kV (Botswana)
20. Moropule – Thamaga 220 kV (Botswana)
21. Parys 132kV
22. Simplon –Everest 132kV
23. Tutuka-Alpha 400kV
24. Simplon-Der Brochen 132kV
25. Big Tree 132kV
26. Mercury-Ferrum-Garona 400kV
27. eus-Perseus 765kV
28. Matimba B Integration Project
29. Caprivi 350kV DC (Namibia)
30. Gerus-Mururani Gate 350kV DC (Namibia)
31. Mmamabula 220kV (Botswana)
32. Steenberg-Der Brochen 132kV
33. Venetia-Paradise T 132kV
34. Burgersfort 132kV
35. Majuba-Umfolo i 765kV
36. Delta 765kV Substation
37. Braamhoek 22kV
38. Steelpoort Merensky 400kV
39. Mmamabula Delta 400kV
40. Delta Epsilon 765kV
41. Gerus- ambe i 350kV DC Interconnector: Review of proposed avian mitigation measures for the Okavango and Kwando River crossings
42. Giyani 22kV Distribution line
43. Li hobong-Kao 132/11kV distribution power line, Lesotho
44. 132kV Leslie – Wildebeest distribution line
45. A proposed new 50 kV Spoornet feeder line between Sishen and Saldanha
46. Cairns 132kv substation extension and associated power lines
47. Pimlico 132kv substation extension and associated power lines
48. Gyani 22kV
49. Matafin 132kV
50. Nkoma i Fig Tree 132kV
51. Pebble Rock 132kV
52. Reddersburg 132kV
53. Thaba Combine 132kV
54. Nkomati 132kV
55. Louis Trichardt – Musina 132kV

56. Endicot 44kV
57. Apollo Lepini 400kV
58. Tarlton-Spring Farms 132kV
59. Kuschke 132kV substation
60. Bendstore 66kV Substation and associated lines
61. Kuiseb 400kV (Namibia)
62. Gyani-Malamulele 132kV
63. Watershed 132kV
64. Bakone 132kV substation
65. Eerstegoud 132kV LILO lines
66. Kumba Iron Ore: SWEP - Relocation of Infrastructure
67. Kudu Gas Power Station: Associated power lines
68. Steenberg Booyseendal 132kV
69. Toulon Pumps 33kV
70. Thabatshipi 132kV
71. Witkop-Silica 132kV
72. Bakubung 132kV
73. Nelsriver 132kV
74. Rethabiseng 132kV
75. Tilburg 132kV
76. GaKgapanne 66kV
77. Knobel Gilead 132kV
78. Bochum Knobel 132kV
79. Madibeng 132kV
80. Witbank Railway Line and associated infrastructure
81. Spencer NDP phase 2 (5 lines)
82. Akanani 132kV
83. Hermes-Dominion Reefs 132kV
84. Cape Peninsula Strengthening Project 400kV
85. Magalakwena 132kV
86. Benficoso 132kV
87. Dithabaneng 132kV
88. Taunus Diepkloof 132kV
89. Taunus Doornkop 132kV
90. Tweedracht 132kV
91. ane Furse 132kV
92. Majeje Sub 132kV
93. Tabor Louis Trichardt 132kV
94. Riversong 88kV
95. Mamatsekele 132kV
96. Kabokweni 132kV
97. MDPP 400kV Botswana
98. Marble Hall NDP 132kV
99. Bokmakiere 132kV Substation and LILO lines
100. Styldrift 132kV
101. Taunus – Diepkloof 132kV
102. Bighorn NDP 132kV
103. Waterkloof 88kV
104. Camden – Theta 765kV
105. Dhuvu – Minerva 400kV Diversion
106. Lesedi –Grootpan 132kV
107. Waterberg NDP
108. Bulgerivier – Dorset 132kV
109. Bulgerivier – Toulon 132kV
110. Nokeng-Fluorspar 132kV
111. Mantsole 132kV
112. Tshilamba 132kV
113. Thabamoopo - Tshebela – Nhlovuko 132kV
114. Arthurseat 132kV
115. Borutho 132kV MTS
116. Volspruit - Potgietersrus 132kV
117. Neotel Optic Fibre Cable Installation Project: Western Cape
117. Matla-Glockner 400kV
118. Delmas North 44kV
119. Houwhoek 11kV Refurbishment
120. Clau-Clau 132kV
121. Ngwedi-Silwerkrans 134kV
122. Nieuwehoop 400kV walk-through
123. Booyseendal 132kV Switching Station
124. Tarlton 132kV
125. Medupi - Witkop 400kV walk-through
126. Germiston Industries Substation
127. Sekgame 132kV
128. Botswana – South Africa 400kV Transfrontier Interconnector
129. Syferkuil – Rampheri 132kV
130. ueens Substation and associated 132kV powerlines
131. Oranjemond 400kV Transmission line

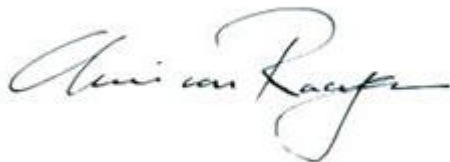
132. Aries – Helios – uno walk-down
133. Kuruman Phase 1 and 2 Wind Energy facilities 132kV Grid connection
134. Transnet

**Bird Impact Assessment Studies for the following residential and industrial developments:**

1. Liard Point Golf Estate
2. Lever Creek Estates
3. Leloko Lifestyle Estates
4. Vaaloewers Residential Development
5. Clearwater Estates Grass Owl Impact Study
6. Sommerset Ext. Grass Owl Study
7. Proposed Three Diamonds Trading Mining Project (Portion 9 and 15 of the Farm Blesbokfontein)
8. N17 Section: Springs To Leandra – “Borrow Pit 12 And Access Road On (Section 9, 6 And 28 Of The Farm Winterhoek 314 Ir)
9. South African Police Services Gauteng Radio Communication System: Portion 136 Of The Farm 528 , Lindley.
10. Report for the proposed upgrade and extension of the eekoegat Wastewater Treatment Works, Gauteng.
11. Bird Impact Assessment for Portion 265 (a portion of Portion 163) of the farm Rietfontein 189- R, Gauteng.
12. Bird Impact Assessment Study for Portions 54 and 55 of the Farm wartkop 525 , Gauteng.
13. Bird Impact Assessment Study Portions 8 and 36 of the Farm Nooitgedacht 534 , Gauteng.
14. Shumba’s Rest Bird Impact Assessment Study
15. Randfontein Golf Estate Bird Impact Assessment Study
16. ilkaatsnek Wildlife Estate
17. Regenstein Communications Tower (Namibia)
18. Avifaunal Input into Richards Bay Comparative Risk Assessment Study
19. Ma uasa West Open Cast Coal Mine
20. Glen Erasmia Residential Development, Kempton Park, Gauteng
21. Bird Impact Assessment Study, Weltevreden Mine, Mpumalanga
22. Bird Impact Assessment Study, Olifantsvlei Cemetery, Johannesburg
23. Camden Ash Disposal Facility, Mpumalanga
24. Lindley Estate, Lanseria, Gauteng
25. Proposed open cast iron ore mine on the farm Lylyveld 545, Northern Cape
26. Avifaunal monitoring for the Sishen Mine in the Northern Cape as part of the EMP requirements
27. Steelpoort CNC Bird Impact Assessment Study

Professional affiliations

I work under the supervision of and in association with Albert Froneman (MSc Conservation Biology) (SACNASP Zoological Science Registration number 400177/09) as stipulated by the Natural Scientific Professions Act 27 of 2003.



Chris van Rooyen  
06 May 2019

## CURRICULUM VITAE

Liandra Scott-Shaw

<b>Name</b>	Liandra Scott-Shaw (ne Bertolli)
<b>Profession</b>	Environmental Scientist
<b>Name of Firm</b>	SiVEST SA (Pty) Ltd
<b>Present Appointment</b>	Environmental Consultant
<b>Years with Firm</b>	5 Years
<b>Date of Birth</b>	08 March 1986
<b>Nationality</b>	South African
<b>ID No.</b>	8603080022083



### Education

- Matric Exemption (Natal Education Department) Durban Girls High School (2002-2003)

### Professional Qualifications

- Bachelor of Science (Biological Science): University of Kwa ulu-Natal, 2008
- Bachelor of Science (Honours) Ecological Science: University of Kwa ulu-Natal, 2009
- Pr.Sci.Nat. Registration No. 117442

### Membership to Professional Societies

- South African Council for Natural Scientific Professions (SACNASP)
- Royal Society of South Africa 2010-Present
- International Association for Impact Assessment South Africa (IAIASa)

### Employment Record

an 2014 - date	SiVEST SA (PTY) LTD – Environmental Division: Environmental Consultant
un 2013 - Dec 2013	ECO-PULSE Environmental Consulting Services - Internship
an 2010 - an 2013	University of the North West (Diatom collection, process and analysis)
an 2012 - Dec 2012	ohn Bews Herbarium, (Geo referencing specimen)
Feb 2006 - une 2013	University of Kwa ulu-Natal (Laboratory and field assistant for the School of Biological and Conservation Science, Demonstrating and Lecturing in Biology and Biogeography)

### Language Proficiency

LANGUAGE	SPEAK	READ	WRITE
English	Fluent	Fluent	Fluent
Afrikaans	Basic	Basic	Basic

**Years of Working Experience:**     6

### Countries of Work Experience

- South Africa

## Field of Specialisation

- Plant biodiversity assessments
- Alien plant identification/management
- Diatom diversity assessments
- Field identification
- Taxonomical background
- Report writing
- NEMA and NEM:BA regulations and policies

## Overview

Liandra has completed a Bachelor of Science Degree in Biological Science (University of Kwa ulu-Natal, PMB), a Bachelor of Science (Honours) in Ecological Science (University of Kwa ulu-Natal, PMB) and is completing her Master of Science Degree in Environmental Science (University of Kwa ulu-Natal, PMB), of which the focus is on Diatoms as indicators of wetland water quality in the K N Midlands.

Liandra has been involved in consulting since 2013, which included biodiversity assessments and analyses as well as report writing. Prior to that, Liandra had been involved in academic research and demonstrating/lecturing since 2008.

## Projects Experience (by Sector)

### VEGETATION ASSESSMENTS, REHABILITATION PLANS AND PERMIT APPLICATIONS

- Ntunjambili Bulk Water Supply Scheme
- Eshowe SSA1 Pipeline Project
- Bishopstowe Development Area
- Dube TradePort State of Environment Report
- Transnet Richards Bay Port Development Vegetation Assessment
- Transnet South Dune Vegetation Assessment
- Umsundu i Greater Edendale Environmental Management Framework
- Sumitomo Rubber Manufacturing Plant Vegetation Assessments, Alien Plant Management Plan And Plant Permits
- Umgeni Water Darvill Constructed Wetland Vegetation Assessment
- P75-2 Road Upgrade Vegetation Assessment
- Masinege Sewer Line Vegetation Permits
- Tongaat Hulett Cornubia North Development Vegetation Assessment
- Tongaat Hulett Lindokuhle Housing Development Vegetation Assessment
- Tongaat Hulett Simhlangentsha Pipeline Vegetation Assessment
- Tongaat Hulett Dudley Pringle Development Vegetation Assessment
- Tongaat Hulett Maidstone Mill Development Vegetation Assessment
- Arcelor Mittal Newcastle Works Alien Plant Management Plan
- Umgeni Water Umshawathi Pipeline Vegetation Assessment
- ACSA GCS Diatom Sampling
- Mandeni Cemetery Vegetation Assessment
- Fountain Hill Development Vegetation Assessment
- Salt Rock Development Vegetation Assessment
- Colenso Coal Project
- Strode Property Development Vegetation Assessment
- Tongaat Hulett Tinley Manor South Wetland Assessment (vegetation)
- Tongaat Hulett Tinley Manor North Wetland Assessment (vegetation)
- Umgeni Water South Coast Pipeline Vegetation Assessment, Plant Permits
- Swayimane Bulk Water Pipeline
- Westbrook Club Development Vegetation Assessment
- Eskom Candover – Mba wana Vegetation Assessment and Plant Permits

## CURRICULUM VITAE

Liandra Scott-Shaw

- Eskom Eshowe Electrification Vegetation Assessment and Plant permits
- Eskom Empangeni Electrification Vegetation Assessment and Plant permits
- Eskom o ini Electrification Vegetation Assessment and Plant permits
- Eskom Electrification Vegetation Assessment and Plant permits
- Eskom Nsele Godi Electrification Vegetation Assessment and Plant permits
- Eskom Makhatini Electrification Vegetation Assessment and Plant permits
- Eskom Esicaba eni Electrification Vegetation Assessment and Plant permits
- Ethekeeni Hammarisdale Electrification Vegetation Assessment
- Shemula Pipeline Vegetation Assessment and Plant permits
- E akheni Housing Vegetation Assessment
- Ashton College Vegetation Assessment
- eThekwini Metropolitan Marianridge Housing Development Vegetation Assessment
- Edendale Town Centre Development Vegetation Assessment
- N2 Pongola Ecological Studies Vegetation Assessment
- Sani Pass Hotel Upgrades Vegetation Assessment
- Eskom Lake Eland Vegetation Assessment and Plant permits
- Eskom Phungashe Phase 3 Vegetation Assessment and Plant permits
- Eskom Bhanbanani Vegetation Assessment and Plant permits
- Eskom Sundu a Vegetation Assessment and Plant permits
- Eskom TC umalo Vegetation Assessment and Plant permits
- Eskom Cwakeme Vegetation Assessment and Plant permits
- Eskom Mambane Vegetation Assessment and Plant permits
- Eskom Nkangala Vegetation Assessment and Plant permits
- Eskom Estcourt Permits Vegetation Assessment and Plant permits
- Eskom Emahusheni Permits Vegetation Assessment and Plant permits
- Eskom Mamfene Permits Vegetation Assessment and Plant permits
- Eskom wabe Permits Vegetation Assessment and Plant permits
- Eskom BA Khumalo Permits Vegetation Assessment and Plant permits
- Eskom ululand Melmoth Vegetation Assessment and Plant permits
- Eskom Muller Helgardt Permits Vegetation Assessment and Plant permits
- Eskom ama ama Permits Vegetation Assessment and Plant permits
- World Tomorrow Fund South Bank Permits Vegetation Assessment and Plant permits

### ENVIROMENTAL CONTROL OFFICER

- Eskom Candover-Mba wana Powerline
- Lombardskop Pipeline
- imbali Lakes Golf Course
- Fitty Park Water Pipeline
- Driefontein Phase 1 Water Pipeline
- Middledrift SSA5 Water Pipeline
- Lower Tugela Bulk Water Off-take 12
- Lower Tugela Bulk Water Off-take 10
- Lower Tugela Bulk Water Off-take 1
- Lower Tugela Bulk Water Off-take 11
- Mpumulanga Unit G Development
- Maphumulo (Invutshane Dam) Phase 2 Pipeline

### BASIC ASSESSMENTS / ENVIRONMENTAL IMPACT ASSESSMENTS

- La Mercy Integrated Human Settlement Development
- Waterval Prison Upgrade Project
- Greater Kokstad Bulk Raw Water Upgrade Project
- Dube TradePort Agri one 2
- D1562 Road Upgrade BA
- Mthandeni Irrigation Extension Project
- Shemula Bulk Raw Water Phases 2 - 6 BA
- I inga Phase 3 BA



- Imbali Estate Properties BA
- Cornubia Portion 14 Petrol Filling Station
- South Coast Pipeline BA
- Swayimane Bulk Water BA
- Mswhathi Pipeline (Amendment)
- Compensation Organic Waste Facility
- Sumitomo Rubber Manufacturing Plant
- Darvill Constructed Wetland
- Dube Tradeport Agriculture 2
- Chansbury Poultry Farm

### STRATEGIC PROJECTS

- Greater Edendale Area EMF
- Bishopstowe Development Area SEA
- Ray Nkonyeni Municipality SEA
- Dube TradePort State of Environment Report (SoER)

### MANAGEMENT PLANS

- Phinda Private Game Reserve Maintenance Management Plan

### **Academic Contributions**

Lang P, Taylor , Bertolli L, Lowe S, Dallas H, Kennedy MP, Gibbins C, Sichingabula H, Saili, Day , Willems F, Briggs A and Murphy K 2013. Proposed procedure for the sampling, preparation and analysis of benthic diatoms from African 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 , Dallas H, Taylor , Bertolli L, Gibbins C, Soulsby C, Day , 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 , Bertolli L, 2012. River diatom biodiversity assessments in African rivers: a SAFRASS conservation perspective. European Congress of Conservation Biology, Glasgow.

Martins S, Kennedy M, Lowe S, Lang P, Briggs , Dallas H, Taylor , Bertolli L, Gibbins C, Soulsby C, Day , Sichingabula H, Saili H, Kapungwe E, Willems F, Mbulwe F, Murphy K. 2012. SAFRASS Photographic guide to the Aquatic Macroinvertebrates of Africa. European Union Project Report.

Martins S, Kennedy M, Lowe S, Lang P, Briggs , Dallas H, Taylor , Bertolli L, Gibbins C, Soulsby C, Day , Sichingabula H, Saili H, Kapungwe E, Willems F, Mbulwe F, Murphy K. 2012. SAFRASS Guide to Common Diatoms. European Union Project Report.

Martins S, Kennedy M, Lowe S, Lang P, Briggs , Dallas H, Taylor , Bertolli L, Gibbins C, Soulsby C, Day , Sichingabula H, Saili H, Kapungwe E, Willems F, Mbulwe F, Murphy K. 2012. SAFRASS Macrophyte Identification Manual.

### **Conferences and workshops**

SAFRASS Diatom Genera Guide Workshop 2013

Programa de Avaliação de Rios no Sul de África (SAFRASS): estabelecimento de uma estrutura de investigação na construção de capacidade para promoção da saúde e biodiversidade dos rios africanos.

## CURRICULUM VITAE

Liandra Scott-Shaw

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Martins S, Kennedy M, Lowe S, Lang P, Briggs , Dallas H, Taylor , Bertolli L, Gibbins C, Soulsby C, Day , Sickingabula H, Sali H, Kapungwe E, Willems F, Mbulwe F, Murphy K. *14th Congr. Bras. Limnol., Bonito, Brasil*, Sept. 2013

SAFRASS biomonitoring scheme: general aspects, macrophytes ( MTR) and benthic macroinvertebrates ( ISS) protocols 2013

SAFRASS Training Introduction May 2012: Helen Dallas

SAFRASS Decision Support Scheme (DSS) to assist the use of river health biomonitoring protocols in ambia: general aspects, invertebrates ( ISS) and macrophytes ( MTR) components 2012

SAFRASS Training Macrophytes May 2012 Mike Kennedy 2012

SAFRASS Training Invertebrates May 2012 Steven Lowe

SAFRASS Training Diatoms May 2012 onathan Taylor

Shrader AM, Bell C, **Bertolli L** and Ward D 2011. Forest or the trees: at what scale do elephants make foraging decisions *Ezemvelo KZN Wildlife Contemporary Conservation Symposium*.

SAFRASS Proposed procedure for the sampling, preparation and analysis of benthic diatoms from ambian rivers: a bioassessment and decision support tool applicable to freshwater ecoregions in tropical southern 2011

SAFRASS Assessment of performance of the SAFRASS pilot river biomonitoring scheme 2011



**Dr Bruce Scott-Shaw**  
Hydrologist



**Carter High School**  
Pietermaritzburg, South Africa



**The University of KwaZulu-Natal**  
Pietermaritzburg, South Africa  
*BSc, BSc Honours, MSc, PhD Hydrology*

**REFERENCES**

**Prof. Roland Schulze**  
Emeritus Professor  
Phone: +2782 5727 937  
E-mail: SchulzeR@ukzn.ac.za

**Prof. Colin Everson**  
Professor  
Phone: +2783 320 9570  
E-mail: eversonc@ukzn.ac.za

**Nick Davis**  
Hydrologist/Director (Isikhungusethu Environmental Services)  
Phone: +27 79 490 6963  
Email: nick@isik.co.za

**CONTACT INFORMATION**

Phone: +2778 3999 139  
E-mail: bruce@naturestamp.com  
Linkedin: www.linkedin.com/in/bruce-scott-shaw-58b20231  
Address: 22 Hilton Ave, Hilton, 3245, South Africa

**ABOUT ME**

I am an experienced, motivated and dynamic hydrologist, with a passion for sustainable land-use management and global change issues. Throughout my academic and consulting career I have mastered numerous models and tools relating to hydrology, soil science and GIS. Some of these include ACRU, SWAT, HEC-RAS, ArcGIS, Idrisi, SEBAL, MatLab and Loggernet. I have basic programming skills on the Java and CR Basic platforms. I have vast experience in hydro-meteorological monitoring, including automatic weather stations, eddy covariance, heat pulse velocity, flow and ecological monitoring.

I completed my MSc under Prof Roland Schulze where I developed an agro-hydrological grassland biomass model for applications in management and climate change studies. Subsequently I completed my PhD at the School of Bioresources Engineering and Environmental Hydrology (BEEH) which focused on quantifying the water-use of alien invaded riparian forests and catchments for rehabilitation programmes. I have presented my research around the world, where I have gained a wide network of academic contacts and experience.

As a consultant, I am the director and principal hydrologist of NatureStamp (PTY) Ltd. In this capacity I undertake flood studies, calculate hydrological flows, perform general hydrological modelling, stormwater design, dam designs, wetland assessments, water quality assessments, groundwater studies and soil surveys.

I am affiliated to the University of KwaZulu-Natal where I am a part-time lecturer for undergraduate hydrology and dam design. I am also a post-doctoral student where I run and calibrate soil erosion models.


**SKILLS**

Hydrological Modelling	GIS	General Computing Skills
● ● ● ● ●	● ● ● ● ●	● ● ● ● ●
MS Office	Field Assessments	Soil Surveys
● ● ● ● ●	● ● ● ● ●	● ● ● ● ●
Communication Skills	Networking	Scientific Writing
● ● ● ● ●	● ● ● ● ●	● ● ● ● ●


**WORK EXPERIENCE**



**Director** March 2015 – Present  
*NatureStamp (PTY) Ltd.*  
Environmental consulting company, offering a range of services to promote sound natural resource management. We are a team of qualified, experienced and dedicated people, who take pride in producing a high quality of work and providing a personalized, professional service.



**Hydrology Lecturer** January 2016 – Present  
*University of KwaZulu-Natal*  
Part-time lecturer for Hydrology modules. This includes dam design, hydrology basics and modelling. I also run a Soil Water Assessment Toll (SWAT) workshop through ArcGIS to provide students with the skills to run the model for their research purposes.



**Post-doctoral Researcher** June 2018 – Present  
*University of KwaZulu-Natal*  
Assess the impact of erosion and sediment yield from different land uses in farming and forestry systems and their effect on water resources in selected catchments of South Africa. This is done by measuring and modelling soil erosion losses under different land uses and management practices.

## PUBLICATIONS

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1. Paper for the 14th SANCHIAS symposium, 2009. Development and Verification of a Dynamic Grassland Biomass Model for Agrohydrological Applications under Different Scenarios of Climate and Management. B.C. Scott-Shaw and R.E. Schulze.
2. Water-Use Dynamics of a Peat Swamp Forest and a Dune Forest in Maputaland, South Africa. A.D. Clulow, C.S. Everson, J.S. Price, G.P.W. Jewitt, and B.C. Scott-Shaw. *Hydrol. Earth Syst. Sci.* -2013-31.
3. Use of an Agrohydrological Model for Applications in Management Studies Related to Tall and Short Grassveld in South Africa. B.C. Scott-Shaw and R.E. Schulze (In Press).
4. Water-Use Dynamics of An Alien Invaded Riparian Forest Within the Mediterranean Climate Zone of the Western Cape, South Africa, *Hydrol. Earth Syst. Sci.*, 21, 4551–4562, 2017. Scott-Shaw, B.C., Everson, C. S., and Clulow, A. D.
5. Handbook on Adaptation to Climate Change for Farmers, Officials and Others in the Agriculture Sector of South Africa (Released 2018): Short and Tall Natural Grasslands in South Africa and Climate Change. B.C. Scott-Shaw and R. E. Schulze.
6. Water-use dynamics of an alien invaded riparian forest within the summer rainfall zone of South Africa. *Hydrol. Earth Syst. Sci., Discussion*, 2018. Scott-Shaw, B.C., Everson, C. S.
7. Rehabilitation of alien invaded riparian zones and catchments using indigenous trees: an assessment of indigenous tree water-use. Scott-Shaw B.C, Everson C.S, Geldenhuys C.J, Starke, A, Atsame-Edda A, Schutte S, R, Mupemba Mwamba. Water Research Commission Report K5/2081. 2016.
8. Water-efficient production methods and systems in agroforestry, woodlands and forestry plantations. Everson C.S, Scott-Shaw B.C, Kelbe, B.E, Starke, A, Pearton T, Geldenhuys, C, Vather, T, Maguire, M. Water Research Commission Report K5/2554. 2018.
9. Assessing the impact of erosion and sediment yield from different land uses in farming and forestry systems and their effect on water resources in selected catchments of South Africa. This is done by measuring and modelling soil erosion losses under different land uses and management practices. Hill, T.R, Scott-Shaw B.C, Gillham, J.S, Dickey, M, Duncan, G.E, Everson, C.S, Everson, T.M, Zuma, K, Birkett, C.K. Water Research Commission Report K5/2402. 2019.
10. Assessment of soil erosion under rainfed sugarcane in KwaZulu-Natal, South Africa" by Abdalla, Khatab; Dickey, Matthew; Hill, Trevor; Scott-Shaw, Bruce. *Natural Resources Forum*. Under Review.

## Research and Training

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- o Hydro-pedological characterization of degraded soils with the Institute de recherche pour le developement (IRD)
- o Advanced international training programme on Climate Change: Mitigation and Adaptation in Norrkoping, Sweden at the Swedish Meteorological and Hydrological Institute (SMHI)
- o Advanced international training programme on Climate Change: Mitigation and Adaptation in Kasane, Botswana. Regional follow up course. Swedish Meteorological and Hydrological Institute (SMHI)
- o Advanced MatLab @ course: Model building, inference and hypothesis testing in hydrology. Gabriel Lippmann, Luxembourg. April 2013.
- o Advanced training course on Eddy Covariance. Mike Savage, Pietermaritzburg, 2018.
- o Advanced training course on Surface Renewal. Mike Savage, Pietermaritzburg, 2018.
- o Environmental Law training: 2014 E+EIA Regulations in Context. Shepstone & Wylie, Umhlanga. 2016.
- o KZN Wetlands Forum Buffers workshop. Umngeni Valley, September, 2014.

## Presentations/Showcase/Awards

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- o European Science Foundation (Amsterdam, 2010),
- o COP17 (Durban, 2011),
- o World Water Forum (Marseille, 2012),
- o MatLab advanced modelling (Luxembourg, 2013),
- o World Water Week (Singapore, 2014),
- o Forests & Water, British Colombia, (Canada, 2015),
- o World Forestry Congress (Durban, 2015),
- o Society for Ecological Restoration (Brazil, 2017).
- o Conservation Symposium (Howick, South Africa, 2018)
- o Roland Schulze award for the top third year hydrology student.
- o Golden Key award for obtaining marks in the top 15 % of the University of KwaZulu-Natal.
- o NRF scholarship for being a top achiever.

## Personal Information

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Date of Birth	7th January 1986
Place of Birth	Pietermaritzburg, South Africa
Citizenship	South African, UK Ancestry, Italian citizen pending (through marriage)
Language	English
Sex	Male
Marital Status	Married
Children	Two
Hobbies	All sports & outdoors, tree species, geology

<b>Name</b>	Kerry Lianne Schwart
<b>Profession</b>	GIS Specialist
<b>Name of Firm</b>	SiVEST SA (Pty) Ltd
<b>Present Appointment</b>	Senior GIS Consultant: Environmental Division
<b>Years with Firm</b>	30 Years
<b>Date of Birth</b>	21 October 1960
<b>ID No.</b>	6010210231083
<b>Nationality</b>	South African



### Professional Qualifications

BA (Geography), University of Leeds 1982

### Membership to Professional Societies

South African Geomatics Council – GTc GISc 1187

### Employment Record

1994 – Present	SiVEST SA (Pty) Ltd - Environmental Division: GIS/Database Specialist.
1988 - 1994	SiVEST (formerly Scott Wilson Kirkpatrick): Town Planning Technician.
1984 – 1988	Development and Services Board, Pietermarit burg: Town Planning Technician.

### Language Proficiency

LANGUAGE	SPEAK	READ	WRITE
English	Fluent	Fluent	Fluent

### Key Experience

Kerry is a GIS specialist with more than 20 years' experience in the application of GIS technology in various environmental, regional planning and infrastructural projects undertaken by SiVEST.

Kerry's GIS skills have been extensively utilised in projects throughout South Africa in other Southern African Countries. These projects have involved a range of GIS work, including:

- Design, compilation and management of a demographic, socio-economic, land use, environmental and infrastructural databases.
- Collection, collation and integration of data from a variety of sources for use on specific projects.
- Manipulation and interpretation of both spatial and alphanumeric data to provide meaningful inputs for a variety of projects.
- Production of thematic maps and graphics.
- Spatial analysis and 3D modelling, including visual and landscape assessments.

## Projects Experience

### STRATEGIC PLANNING PROJECTS

Provision of database, analysis and GIS mapping support for the following:

- Water Plan 2025: Socio-economic, Land Use and Demographic Update – Umgeni Water (Kwa ulu-Natal).
- Eskom Strategic Plan – Eskom (Kwa ulu-Natal).
- Umgeni Water Quality Management Plan – Department of Water Affairs and Umgeni Water (Kwa ulu-Natal).
- Kwa ulu-Natal Development Perspective – Department of Economic Affairs (Kwa ulu-Natal).
- Indlovu Regional Integrated Plan – Department of Local Government and Housing (Kwa ulu-Natal).
- Umgeni Water and Sanitation Needs Analysis – Umgeni Water (Kwa ulu-Natal).
- Metro Waste Water Management Plan – Durban Waste Water management, City of Durban (Kwa ulu-Natal).
- Kwa ulu-Natal Electrification Prioritisation Model – Eskom (Kwa ulu-Natal).
- Uminyathi Regional Development Plan – Uminyathi Regional Council (Kwa ulu-Natal).
- GIS driven model to assess future population growth in watery catchments under different growth scenarios – Umgeni Water (Kwa ulu-Natal).
- Ubombo Master Water Plan Study – Mhlathu e Water Board (Kwa ulu-Natal).
- Development strategy for local economic development and social reconstruction of the Germiston-Daveyton Activity Corridor – Eastern Gauteng Services Council (Gauteng).
- Land identification study for low cost housing in the Indlovu Region – Indlovu Regional Council (Kwa ulu-Natal).
- Local Development Plan for Manini – Manini Town Council (Swaziland).
- Database development for socio-economic and health indicators arising from Social Impact Assessments conducted for the Lesotho Highlands Development Association – Lesotho.
- Development Plan for the adjacent towns of Kasane and Kaungula - Ministry of Local Government, Land and Housing (Botswana).
- Development Plan for the rural village of Hukuntsi - Ministry of Local Government, Land and Housing (Botswana).
- Integrated Development Plans for various District and Local Municipalities including:
  - Nuthu Local Municipality (Kwa ulu-Natal)
  - Newcastle Local Municipality (Kwa ulu-Natal)
  - Amajuba District Municipality (Kwa ulu-Natal)
  - Moini Local Municipality (Kwa ulu-Natal)
  - Umhlabuyalingana Local Municipality (Kwa ulu-Natal)
- uMhlathu e Rural Development Initiative – uMhlathu e Local Municipality (Kwa ulu-Natal).
- Rural roads identification – uMhlathu e Local Municipality (Kwa ulu-Natal).
- Mapungubwe Tourism Initiative – Development Bank (Limpopo Province).
- Northern Cape Tourism Master Plan – Department of Economic Affairs and Tourism (Northern Cape Province).
- Spatial Development Framework for Gert Sibande District Municipality (Mpumalanga) in conjunction with more detailed spatial development frameworks for the 7 Local Municipalities in the District, namely:
  - Albert Luthuli Local Municipality
  - Msukaligwa Local Municipality
  - Mkhondo Local Municipality

- Pixley Ka Seme Local Municipality
- Dipaleseng Local Municipality
- Govan Mbeki Local Municipality
- Lekwa Local Municipality
- Land Use Management Plans/Systems (LUMS) for various Local Municipalities including:
  - Nkandla Local Municipality (Kwa ulu-Natal)
  - Hlabisa Local Municipality (Kwa ulu-Natal)
  - uPhongolo Local Municipality (Kwa ulu-Natal)
  - uMshwathi Local Municipality
- Spatial Development Framework for uMhlathu e Local Municipality (Kwa ulu-Natal).
- Spatial Development Framework for Greater Clarens – Maloti-Drakensberg Transfrontier Park (Free State).
- Land use study for the Johannesburg Inner City Summit and Charter – City of Johannesburg (Gauteng).
- Port of Richards Bay Due Diligence Investigation – Transnet
- oini Sustainable Development Plan – oini Local Municipality (Kwa ulu-Natal)
- Spatial Development Framework for Umhlabuyalingana Local Municipality (Kwa ulu-Natal)

#### BUILT INFRASTRUCTURE

- EIA and EMP for a 9km railway line and water pipeline for manganese mine – Kalagadi Manganese (Northern Cape Province).
- EIA and EMP for 5x 440kV Transmission Lines between Thyspunt (proposed nuclear power station site) and several substations in the Port Elizabeth area – Eskom (Eastern Cape Province).
- Initial Scoping for the proposed 750km multi petroleum products pipeline from Durban to Gauteng/Mpumalanga – Transnet Pipelines.
- Detailed EIA for multi petroleum products pipeline from Kendall Waltloo, and from Ameson Park to Langlaagte Tanks farms –Transnet Pipelines.
- Environmental Management Plan for copper and cobalt mine (Democratic Republic of Congo).
- EIA and Agricultural Feasibility study for Miwani Sugar Mill (Kenya).
- EIAs for Concentrated Solar and Photovoltaic power plants and associated infrastructure (Northern Cape, Free State, Limpopo and North West Province).
- EIAs for Wind Farms and associated infrastructure (Northern Cape and Western Cape).
- Basic Assessments for 132kV Distribution Lines (Free State, Kwa ulu-Natal, Mpumalanga and North West Province).
- Environmental Assessment for the proposed Moloto Development Corridor (Limpopo).
- Environmental Advisory Services for the Gauteng Rapid Rail Extensions Feasibility Project.
- Environmental Screening for the Strategic Logistics and Industrial Corridor Plan for Strategic Infrastructure Project 2, Durban-Free State-Gauteng Development Region.

#### STATE OF THE ENVIRONMENT REPORTING

- 2008 State of the Environment Report for City of Johannesburg.
- Biodiversity Assessment – City of Johannesburg.

#### STRATEGIC ENVIRONMENTAL ASSESSMENTS AND ENVIRONMENTAL MANAGEMENT FRAMEWORKS

- SEA for Greater Clarens – Maloti-Drakensberg Transfrontier Park (Free State).

- SEA for the Marula Region of the Kruger National Park, SANParks.
- SEA for Thanda Private Game Reserve (Kwa ulu-Natal).
- SEA for KwaDuku a Local Municipality (Kwa ulu-Natal).
- EMF for proposed Renishaw Estate (Kwa ulu-Natal).
- EMF for Mogale City Local Municipality, Mogale City Local Municipality (Gauteng).
- SEA for Molemole Local Municipality, Capricorn District Municipality (Limpopo).
- SEA for Blouberg Local Municipality, Capricorn District Municipality (Limpopo).
- SEA for the Bishopstowe study area in the Msundu i Local Municipality (Kwa ulu-Natal).

#### WETLAND STUDIES

- Rehabilitation Planning for the Upper Klip River and Klipspruit Catchments, City of Johannesburg (Gauteng).
- Wetland assessments for various Concentrated Solar and Photovoltaic power plants and associated infrastructure (Limpopo, Northern Cape, North West Province and Western Cape).
- Wetland assessments for Wind Farms and associated infrastructure (Northern Cape and Western Cape).
- Wetland assessments for various 132kV Distribution Lines (Free State, Kwa ulu-Natal, Mpumalanga and North West Province).

#### VISUAL IMPACT ASSESSMENTS

- VIA for the Thyspunt Transmission Lines Integration Project (Eastern Cape).
- VIA s for various Solar Power Plants and associated grid connection infrastructure (Northern Cape, Free State, Limpopo and North West Province).
- VIAs for various Wind Farms and associated grid connection infrastructure (Northern Cape and Western Cape), the most recent projects including:
  - Graskoppies, Hartebeest Leegte, Ithemba and ha Boom Wind Farms near Loeriesfontein (Northern Cape);
  - Kuruman 1 and 2 WEFs near Kuruman (Northern Cape);
  - San Kraal and Phe ukomoya WEFs near Noupoort (Northern Cape);
  - Paulputs WEF near Pofadder (Northern Cape)
  - Kudusberg WEF near Matjiesfontein (Western Cape);
  - Tooverberg WEF, near Touws River (Western Cape);
  - Rondekop WEF, near Sutherland (Northern Cape).
- VIAs for various 132kV Distribution Lines (Free State, Kwa ulu-Natal, Mpumalanga and North West Province).
- VIA for the proposed Ror ual Estate Development near Park Rynie on the South-Coast of Kwa ulu-Natal Province.
- VIA for the proposed Assagay Valley Mixed Use Development (Kwa ulu-Natal).
- VIA for the proposed Kassier Road North Mixed Use Development (Kwa ulu-Natal).
- VIA for the proposed Tinley Manor South Banks Development (Kwa ulu-Natal).
- VIA for the proposed Tinley Manor South Banks Beach Enhancement Solution, (Kwa ulu-Natal).
- VIAs for the proposed Mlon i Hotel and Golf Estate Development (Eastern Cape Province).
- Visual sensitivity mapping exercise for the proposed Mogale's Gate Lodge Expansion (Gauteng).
- Analysis phase visual assessment for the proposed Renishaw Estate Environmental Management Framework in the Scottburgh Area (Kwa ulu-Natal).
- Landscape Character Assessment for Mogale City Environmental Management Framework (Gauteng).



**Name** Hlengiwe Innocentia Ntuli

**Profession** PPP Support and Administrator

**Name of Firm** SiVEST SA (PTY) LTD

**Present Appointment** Projects Secretary /  
Support and PPP Administrator

**Years with Firm** 7 Years

**Date of Birth** 27 September 1989

**ID Number** 890927 02300 83

**Nationality** South African



### Education

- Minerva High School (2002 - 2006)
- College Campus (2007-2009)

### Professional Qualifications

- Certificate in Contact Centre Support N F2 (2010)
- Diploma in IT Programming (2007 – 2009)

### Employment Record

from 2012 – to date SiVEST SA (Pty) Ltd: Divisional Secretary / PPP Support and Administrator

May 2009 – May 2012 DSG (PTY) LTD: Contact Centre Agent

### Language Proficiency

LANGUAGE	SPEAK	READ	WRITE
Isi ulu	Fluent	Fluent	Fluent
English	Fluent	Fluent	Fluent

**Years of Working Experience:** 7

### Countries of Work Experience

- South Africa

### Field of Specialisation

- Office and Project Administration
  - PPP Administration and use of Maximiser
  - Filing electronically and paper copies
  - Faxing, scanning, emailing, phoning, printing and typing
  - Collecting of HR documents (timesheets, leave forms, expense, travel)
  - Reception and switchboard reliever
  - Document distribution
  - Travel arrangements
  - Purchasing and outsourcing

## Overview

Hlengiwe joined SiVEST in 2012 and holds the position of Projects Secretary in the Johannesburg Office of SiVEST and assists in the general day to day administration of the organisation.

She has taken on the role of public participation process administrator which includes maintaining project database, arranging and coordinating public meetings as well as following up with organs of states to get comments on projects.

## Project Experience (By Sector)

### LINEAR PROJECTS

- Public Participation Process for the Proposed Construction of the Graskoppies On-site Eskom Substation, Linking Substation and Associated 132kV Power Line near Loeriesfontein, Northern Cape Province.
- Public Participation Process for the Proposed Construction of the Hartebeest Leegte On-site Eskom Substation, Linking Substation and Associated 132kV Power Line near Loeriesfontein, Northern Cape Province.
- Public Participation Process for the Proposed Construction of the Ithemba On-site Eskom Substation, Linking Substation and Associated 132kV Power Line near Loeriesfontein, Northern Cape Province.
- Public Participation Process for the Proposed Construction of the Kwa Boom On-site Eskom Substation, Linking Substation and Associated 132kV Power Line near Loeriesfontein, Northern Cape Province.
- Public Participation Process for the Proposed Refurbishment of the Swartberg Repeater Road near Ladismith, Western Cape Province
- Basic Assessment (BA) for Proposed Refurbishment of the Swartberg Repeater Road near Ladismith, Western Cape Province.

### RENEWABLE ENERGY

- Basic Assessment (BA) for Proposed Development of the Tooverberg Wind Energy Facility (WEF) near Touws River, Western Cape Province.
- Public Participation Process for the Proposed Construction of the 325MW Rondekop Wind Energy Facility between Matjiesfontein and Sutherland, Northern Cape Province.
- Public Participation Process for the Proposed Development of the Mooi Plaats Solar Photovoltaic (PV) Energy Facility and Associated Infrastructure near Noupoot in the Northern Cape Province
- Public Participation Process for the Proposed Development of the Wonderheuvel Solar Photovoltaic (PV) Energy Facility and Associated Infrastructure near Noupoot in the Northern Cape Province
- Public Participation Process for the Proposed Development of the Paarde Valley Solar Photovoltaic (PV) Energy Facility and Associated Infrastructure near Middelburg in the Eastern Cape Province.
- EA Amendment Application for the Proposed Construction of a 132kV Power Line, the proposed Droogfontein Photovoltaic (PV) 3 Substation and the Extension to the Homestead Substation within the Sol Plaatje Local Municipality in the Northern Cape Province.
- EA Amendment Application for the Proposed Development of the Aletta 140MW Wind Energy Facility (WEF) and Associated Infrastructure near Copperton, Northern Cape Province.
- EA Amendment Application for the Proposed Construction of the Dwarsrug Wind Farm near Loeriesfontein, Northern Cape Province
- EA Amendment Application for the Proposed Development of the Beaufort West 140MW Wind Farm within the Prince Albert Local Municipality, Western Cape Province.
- EA Amendment Application for the Proposed Development of the Trakas 140MW Wind Farm within the Prince Albert Local Municipality, Western Cape Province



SUB-STATIONS

- EA Amendment Application for the Proposed Construction of the Graskoppies On-site Eskom Substation, Linking Substation and Associated 132kV Power Line near Loeriesfontein, Northern Cape Province.
- EA Amendment Application for the Proposed Construction of the Hartebeest Leegte On-site Eskom Substation, Linking Substation and Associated 132kV Power Line near Loeriesfontein, Northern Cape Province.
- EA Amendment Application for the Proposed Construction of the Ithemba On-site Eskom Substation, Linking Substation and Associated 132kV Power Line near Loeriesfontein, Northern Cape Province.
- EA Amendment Application for the Proposed Construction of the ha Boom On-site Eskom Substation, Linking Substation and Associated 132kV Power Line near Loeriesfontein, Northern Cape Province.

# Johann Lanz

## Curriculum Vitae

### Education

- M.Sc. (Environmental Geochemistry) University of Cape Town 1996 - June 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 am registered as a Professional Natural Scientist (Pri.Sci.Nat.) in the field of soil science, registration number 400268/12.

- **Soil Science Consultant** **Self employed** **2002 - present**  
I run a soil science consulting business, servicing clients in both the environmental and agricultural industries. Typical consulting projects involve:
  - Soil specialist study inputs to EIA's, SEA's and EMPR's. These have focused on impact assessments and rehabilitation on agricultural land, rehabilitation and re-vegetation of mining and industrially disturbed and contaminated soils, as well as more general aspects of soil resource management. Recent clients include: CSIR; SRK Consulting; Aurecon; Mainstream Renewable Power; SiVEST; Savannah Environmental; Subsolar; Red Cap Investments; MBB Consulting Engineers; Enviroworks; Sharples Environmental Services; Haw & Inglis; BioTherm Energy; Tiptrans.
  - Soil resource evaluations and mapping for agricultural land use planning and management. Recent clients include: Cederberg Wines; Unit for Technical Assistance - Western Cape Department of Agriculture; Wedderwill Estate; Goedgedacht Olives; Zewenwacht Wine Estate, Lourensford Fruit Company; Kaarsten Boerdery; Thelema Mountain Vineyards; Rudera Wines; Flagstone Wines; Solms Delta Wines; Dornier Wines.
  - I have conducted several research projects focused on conservation farming, soil health and carbon sequestration.
- **Soil Science Consultant** **Agricultural Consultants International (Tinie du Preez)** **1998 - end 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 make recommendations on 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*.

**Name** Stephan Hendrik acobs

**Profession** Environmentalist

**Name of Firm** SiVEST SA (Pty) Ltd

**Present Appointment** Environmental Consultant

**Years with Firm** 5 years

**Date of Birth** 28 May 1991, Pretoria, South Africa

**ID Number** 910528 5065 080

**Nationality** South African



### Education

- Pretoria Boys High, Pretoria, South Africa, Matriculated 2009.

### Professional Qualification

- B.Sc. Hons Environmental Management and Analysis, (Post Graduate) University of Pretoria Honours (2014).
- B.Sc. Environmental Sciences (Undergraduate) University Of Pretoria (2012-2013)

### Employment Record

Jan 2019 – Current SiVEST SA (Pty) Ltd - Environmental Consultant

Aug 2018 – Dec 2018 Marang Environmental and Associates (Pty) Ltd – Environmental Consultant

May 2015 – Aug 2018 SiVEST SA (Pty) Ltd – Graduate Environmental Consultant

Nov 2014 – Feb 2015 Sodwana Bay Fishing Charters – Assistant Manager

Oct 2014 – Mar 2015 Ufudu Turtle Tours – Tour Guide

### Language Proficiency

LANGUAGE	SPEAK	READ	WRITE
English	Excellent	Excellent	Excellent
Afrikaans	Good	Good	Good

**Years of Working Experience:** 5 Years

### Countries of Working Experience

- South Africa

### Fields of Specialisation

- Environmental Management

### Overview

Stephan originally joined SiVEST in May 2015 and held the position of Graduate Environmental Consultant in the Johannesburg office. After leaving SiVEST in August 2018, and being employed for a brief period at another environmental consulting company, Stephan re-joined SiVEST in January 2019 and currently holds the position of Environmental Consultant in the Gauteng region (Pretoria and Johannesburg).

Stephan has been extensively involved in Environmental Impact Assessment (EIA) and Basic Assessment (BA) processes for various types of projects / developments, in particular renewable energy projects / developments which form part of South Africa's Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). As such, Stephan has vast experience with regards to the compilation of Environmental Impact Assessments (EIAs) and Basic Assessments (BAs). Additionally, Stephan has extensive experience in undertaking public participation and stakeholder engagement processes. Stephan has also assisted extensively in the undertaking of field work and the compilation of reports for specialist studies such as Surface Water and Visual Impact Assessments. Stephan also has considerable experience in Environmental Compliance and Auditing and has acted as an Environmental Control Officer (ECO) for several infrastructure projects.

#### Skills:

- Strong computer skills (Word, excel, PowerPoint etc.);
- Strong Proposal and report writing skills;
- Report compilation skills for Environmental Impact Assessments (EIAs) and Basic Assessments (BAs);
- Report compilation skills for Environmental Management Plans/Programmes (EMPr);
- Compilation and conducting Visual Impact Assessments;
- Assisting in Surface Water / Wetland Delineations and Assessments.

#### Key experience:

- Environmental Impact Assessment (EIA) of small, medium and large-scale infrastructure projects,
- Basic Assessment (BA), of small, medium and large-scale infrastructure projects,
- Environmental Management Plans (EMPr), of small, medium and large-scale infrastructure projects,
- Undertaking of Public Participation and Stakeholder Engagement Processes
- Proposal and tender compilation,
- Environmental Compliance and Auditing (ECO);
- Various site inspections, and
- Visual Impact Assessments (Field work and report compilation).

### **Projects Experience (by Sector)**

Stephan is responsible for the following activities: report writing, proposal writing, assisting in specialist surface water delineation and functional assessments, assisting in visual impact assessments and environmental compliance and auditing procedures. Current and completed projects / activities, along with a description of the role played in each project / activity, are outlined in detail below:

#### ENVIRONMENTAL CONTROL OFFICER (ECO) MONITORING / AUDITING PROJECTS: -

- Environmental Control Officer (ECO) for the Polokwane Integrated Rapid Public Transport System (IRPTS), Limpopo Province.
- Environmental Control Officer (ECO) for Phase 1 and Phase 2 of the Newmarket Retail Development, Gauteng Province.
- Environmental Control Officer (ECO) for the proposed NuPay Office Block development at the Newmarket Retail Development, Gauteng Province.
- Environmental Control Officer (ECO) for the proposed Construction of the Decathlon Building at the Newmarket Retail Development, Gauteng Province.
- Environmental Control Officer (ECO) for the External Road Upgrades at the Newmarket Retail Development, Gauteng Province.

- Environmental Control Officer (ECO) for the Netcare Alberton Hospital Development as part of the Greater Newmarket Development, Gauteng Province.

#### BASIC ASSESSMENTS (BAS) FOR INFRASTRUCTURE PROJECTS:

- Basic Assessment (BA) for the construction of a Non-Motorised Transport (NMT) Training and Recreational Park adjacent to the Peter Mokaba Stadium in Polokwane, Limpopo Province.
- Basic Assessment (BA) for the Proposed Expansion of the Tissue Manufacturing Capacity at the Twinsaver Kliprivier Operations Base, Gauteng Province.
- Basic Assessment (BA) for the Proposed Construction of a New SPAR Distribution Centre on Erf 1092 at Redhouse in Port Elizabeth, Eastern Cape Province.

#### BASIC ASSESSMENTS (BAs) FOR RENEWABLE ENERGY PROJECTS:

- Basic Assessment (BA) for the Proposed Construction of the Graskoppies Substation, Linking Substation and Associated 132kV Power Line near Loeriesfontein, Northern Cape Province.
- Basic Assessment (BA) for the Proposed Construction of the Hartebeest Leegte Substation, Linking Substation and Associated 132kV Power Line near Loeriesfontein, Northern Cape Province.
- Basic Assessment (BA) for the Proposed Construction of the Ithemba Substation, Linking Substation and Associated 132kV Power Line near Loeriesfontein, Northern Cape Province.
- Basic Assessment (BA) for the Proposed Construction of the 100 ha Boom Substation, Linking Substation and Associated 132kV Power Line near Loeriesfontein, Northern Cape Province.
- Basic Assessment (BA) for the Proposed Development of the Tooverberg Wind Energy Facility (WEF) near Touws River, Western Cape Province.
- Basic Assessment (BA) for the Proposed Development of the Tooverberg On-site Eskom Substation and 132kV Power Line for the proposed Tooverberg Wind Energy Facility (WEF) near Touws River, Western Cape Province.

#### ENVIRONMENTAL IMPACT ASSESSMENTS (EIAs) FOR RENEWABLE ENERGY PROJECTS: -

- Environmental Impact Assessment (EIA) for the Proposed Construction of the Graskoppies Wind Farm near Loeriesfontein, Northern Cape Province.
- Environmental Impact Assessment (EIA) for the Proposed Construction of the Hartebeest Leegte Wind Farm near Loeriesfontein, Northern Cape Province.
- Environmental Impact Assessment (EIA) for the Proposed Construction of the Ithemba Wind Farm near Loeriesfontein, Northern Cape Province.
- Environmental Impact Assessment (EIA) for the Proposed Construction of the 100 ha Boom Wind Farm near Loeriesfontein, Northern Cape Province.
- Environmental Impact Assessment (EIA) for the Proposed Construction of the 325MW Rondekop Wind Energy Facility between Matjiesfontein and Sutherland, Northern Cape Province.
- Environmental Impact Assessment (EIA) for the Proposed Construction of the Mooi Plaats Solar Photovoltaic (PV) Energy Facility near Noupoort, Northern Cape Province.

- Environmental Impact Assessment (EIA) for the Proposed Construction of the Wonderheuvel Solar Photovoltaic (PV) Energy Facility near Noupoot, Northern Cape Province.
- Environmental Impact Assessment (EIA) for the Proposed Construction of the Paarde Valley Solar Photovoltaic (PV) Energy Facility near Middelburg, Eastern Cape Province.

#### PART 2 ENVIRONMENTAL AUTHORISATION (EA) AMENDMENT PROCESSES FOR RENEWABLE ENERGY PROJECTS:

- Part 2 Environmental Authorisation (EA) Amendment Process for the Proposed Development of the Aletta 140MW Wind Energy Facility (WEF) and Associated Infrastructure near Copperton, Northern Cape Province.
- Part 2 Environmental Authorisation (EA) Amendment Process for the Proposed Development of the 140 MW Beaufort West Wind Farm in the Prince Albert Local Municipality, Western Cape Province.
- Part 2 Environmental Authorisation (EA) Amendment Process for the Proposed Development of the 140MW Trakas West Wind Farm in the Prince Albert Local Municipality, Western Cape Province.
- Part 2 Environmental Authorisation (EA) Amendment Process for the Proposed Construction of the Dwarsrug Wind Farm near Loeriesfontein, Northern Cape Province.
- Part 2 Environmental Authorisation (EA) Amendment Process for the Proposed Construction of the 235MW Graskoppies Wind Farm near Loeriefontein, Northern Cape Province.
- Part 2 Environmental Authorisation (EA) Amendment Process for the Proposed Construction of the 235MW Hartebeest Leegte Wind Farm near Loeriefontein, Northern Cape Province.
- Part 2 Environmental Authorisation (EA) Amendment Process for the Proposed Construction of the 235MW Ithemba Wind Farm near Loeriefontein, Northern Cape Province.
- Part 2 Environmental Authorisation (EA) Amendment Process for the Proposed Construction of the 235MW Iha Boom Wind Farm near Loeriefontein, Northern Cape Province.

#### VISUAL IMPACT ASSESSMENTS (VIAs) FOR INFRASTRUCTURE PROJECTS

- Visual Impact Assessment for the Nsoko Msele Integrated Sugar Project, Swaziland.
- Visual Impact Assessment for the Proposed Tinley Manor South Banks Beach Enhancement Solution, KwaZulu-Natal Province.
- Visual Impact Assessment for the Proposed Tinley Manor South Banks Beach Enhancement Solution, KwaZulu-Natal Province.
- Visual Impact Assessment for the proposed Mlonzi Hotel and Golf Estate Development, Near Lusikisiki, Eastern Cape Province
- Visual Impact Assessment for the Proposed Assagay Valley Development, KwaZulu-Natal Province.
- Visual Impact Assessment for the Proposed Kassier Road North Development, KwaZulu-Natal Province.



VISUAL IMPACT ASSESSMENTS (VIAs) FOR RENEWABLE ENERGY PROJECTS: -

- Visual Impact Assessment for the Helena Solar PV Plant, Northern Cape Province.
- Visual Impact Assessments for the proposed construction of the Sendawo Solar 1, Sendawo Solar 2 and Sendawo Solar 3 Photovoltaic (PV) Energy Facilities near Vryburg, North West Province.
- Visual Impact Assessments for the proposed construction of the Sendawo Substation and Associated 400kV Power Line near Vryburg, North West Province.
- Visual Impact Assessments for the proposed construction of the Tlisitseng Solar 1 and Tlisitseng Solar 2 Photovoltaic (PV) Energy Facilities near Lichtenburg, North West Province.
- Visual Impact Assessment for the proposed construction of the Tlisitseng 1 132kV Substation and associated 132kV Power Line near Lichtenburg, North West Province.
- Visual Impact Assessment for the proposed construction of the Tlisitseng 2 132kV Substation and associated 132kV Power Line near Lichtenburg, North West Province.
- Visual Impact Assessment for the proposed construction of the 3000MW PhilCo Green Energy Wind Farm and Associated Infrastructure near Richmond, Northern Cape Province.
- Visual Impact Assessment for the proposed construction of the Aletta 140MW Wind Energy Facility near Copperton, Northern Cape Province.
- Visual Impact Assessment for the proposed construction of the Aletta 132kV Substation and associated 132kV Power Line near Copperton, Northern Cape Province.
- Visual Impact Assessment for the proposed construction of the Eureka 140MW Wind Energy Facility and associated Infrastructure near Copperton, Northern Cape Province.
- Visual Impact Assessment for the proposed construction of the Eureka 400kV Substation and 400kV Power Line near Copperton, Northern Cape Province.
- Visual Impact Assessment for the Proposed Construction of the Graskoppies Wind Farm near Loeriesfontein, Northern Cape Province.
- Basic Visual Impact Assessment for the Proposed Construction of the Graskoppies Substation, Linking Substation and Associated 132kV Power Line near Loeriesfontein, Northern Cape Province.
- Visual Impact Assessment for the Proposed Construction of the Hartebeest Leegte Wind Farm near Loeriesfontein, Northern Cape Province.
- Basic Visual Impact Assessment for the Proposed Construction of the Hartebeest Leegte Substation, Linking Substation and Associated 132kV Power Line near Loeriesfontein, Northern Cape Province.
- Visual Impact Assessment for the Proposed Construction of the Ithemba Wind Farm near Loeriesfontein, Northern Cape Province.
- Basic Visual Impact Assessment for the Proposed Construction of the Ithemba Substation, Linking Substation and Associated 132kV Power Line near Loeriesfontein, Northern Cape Province.
- Visual Impact Assessment for the Proposed Construction of the Ithemba Wind Farm near Loeriesfontein, Northern Cape Province.

- Basic Visual Impact Assessment for the Proposed Construction of the 100ha Boom Substation, Linking Substation and Associated 132kV Power Line near Loeriesfontein, Northern Cape Province.
- Visual Impact Assessment for the Proposed Construction of the 315MW Phe ukomoya Wind Energy Facility near Noupoort, Northern Cape Province.
- Visual Impact Assessment for the Proposed Construction of the 390MW Sankraal Wind Energy Facility near Noupoort, Northern Cape Province.
- Visual Impact Assessment for the proposed development of the Phase 1 Kuruman Wind Energy Facility, Kuruman, Northern Cape Province.
- Visual Impact Assessment for the proposed development of the Phase 2 Kuruman Wind Energy Facility, Kuruman, Northern Cape Province.
- Basic Visual Impact Assessment for the proposed development of Supporting Electrical Infrastructure to the Phase 1 and Phase 2 Kuruman Wind Energy Facilities, Kuruman, Northern Cape Province.
- Visual Impact Assessment for the proposed development of the 325MW Kudusberg Wind Energy Facility (WEF) located between Matjiesfontein and Sutherland in the Northern and Western Cape Provinces.
- Basic Visual Impact Assessment for the proposed construction of up to a 132kV Power Line and Associated Infrastructure for the Rooipunt Solar Thermal Power Plant near Upington, Northern Cape Province.
- Basic Visual 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 Kimberly, Free State and Northern Cape Provinces.

#### ENVIRONMENTAL SCREENING / ENVIRONMENTAL REVIEW / ENVIRONMENTAL DUE DILIGENCE PROJECTS

- Environmental Review of the Mankwa Coal Operations, adjacent to the proposed Eastside Junction Development.
- Environmental Due Diligence for the Woodlands and Harrowdene Office Parks in Woodmead, Gauteng Province.

#### SURFACE WATER ASSESSMENTS FOR INFRASTRUCTURE PROJECTS

- Surface Water Assessment for the Steve Thswete Local Municipality, Mpumalanga Province.
- Surface Water Delineation and Assessment for the proposed coal Railway Siding at the Welgedacht Marshalling Yard and associated Milner Road Upgrade near Springs, Ekurhuleni Metropolitan Municipality.

## CURRICULUM VITAE

### Dr. David Barry Hoare

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

#### Contact details

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Private Bag X025, Lynnwood Ridge, 0040  
Tel.: (012) 804 2281  
Fax: 086 550 2053  
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E-mail: [dhoare@lantic.net](mailto: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.  
1 January 2009 – 30 June 2009, Lecturer, University of Pretoria, Botany Dept.  
1 January 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.** & BREDEKAMP, 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, BREDEKAMP, 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.** & BREDEKAMP, 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., MASTERTON, 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., BREDEKAMP, 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., BREDEKAMP, 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 palaeontological hypotheses on vegetation distributions*; Paper presentation, Randse Afrikaanse Universiteit postgraduate symposium, 1997
- HOARE, D.B., VICTOR, J.E. & BREDENKAMP, G.J. *Historical and ecological links between grassy fynbos and afro-montane 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 34<sup>th</sup> 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, 46<sup>th</sup> 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 VII<sup>th</sup> 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.
- 28<sup>th</sup> International Symposium on Remote Sensing of Environment, Somerset West, 27-31 March 2000.
- Workshop on Vegetation Structural Characterisation: Tree Cover, Height and Biomass, 28<sup>th</sup> 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.
- 34<sup>th</sup> 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](mailto:r.lubke@ru.ac.za)
- Prof. Richard Cowling, Botany Department, Nelson Mandela Metropolitan University, Tel (042) 298 0259 E-mail: [rmc@kingsley.co.za](mailto: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](mailto:M.Pfab@sanbi.org.za)

**PROFESSIONAL CURRICULUM  
FOR WOUTER FOURIE**



**Name:** Wouter Fourie  
**Profession:** Archaeologist  
**Date of birth:** 1974-04-30  
**Parent Firm:** PGS Heritage (Pty) Ltd  
**Position at Firm:** Director  
**Years with firm:** 15  
**Years of experience:** 21  
**Nationality:** South African  
**HDI Status:** White

**EDUCATION:**

**Name of University or Institution** : University of Pretoria  
**Degree obtained** : BA  
**Major subjects** : Archaeology, Geography and Anthropology  
**Year** : 1996

**Name of University or Institution** : University of Pretoria  
**Degree obtained** : BA [Hons] (Cum laude)  
**Major subjects** : Archaeology and Geography  
**Year** : 1997

**Name of University or Institution** : National Nuclear Regulator  
**Certificate obtained** : Radiation Protection Officer Certificate  
**Year** : 1999

**Name of University or Institution** : University of Cape Town  
**Certificate obtained** : Project Management Foundations short course  
**Year** : 2015

**Name of University or Institution** : University of Cape Town  
**Certificate obtained** : MPhil – Conservation of Built Environment  
**Year** : 2016-Current

**Professional Qualifications:**

Professional Heritage Practitioner – Association of Professional Heritage Practitioners (APHP)  
Professional Archaeologist - Association of Southern African Professional Archaeologists -  
Professional Member – No 043

**CRM Accreditation**

Principal Investigator - Grave Relocations  
Field Director – Iron Age  
Field Supervisor – Colonial Period and Stone Age  
Accredited with Amafa KZN

**Languages:**

Afrikaans  
English – Speaking (Good) Reading (Good), Writing (Good)

## KEY QUALIFICATIONS

- More than 18 consecutive years of work in the heritage consulting field;
- In depth knowledge of heritage management principles;
- 15 years working experience in the protection of cultural heritage sites and archaeological excavations;
- Proven experience in report writing and report deliverables;
- 15 years experience in management of the cultural heritage consultancy teams;
- 10 years of experience in institutional, multinational company interaction and project implementation;
- Proven experience in project scheduling and programming;
- Experience in development and implementation of quality, environmental and environmental health management systems for projects and companies;
- Experience in the development of policies and guidelines related to heritage management.
- Experience in planning and implementation of workshops and conferences.

## CONFERENCE PAPERS AND PUBLICATIONS

- 2016 - Implementing Responsible Grave Relocation – The case for Comprehensive Grave Relocation Action Plan for Integrated Project Management. 21st annual IAIAAsa conference, Port Elizabeth, Eastern Cape.
- 2012 - Heritage management: compliance or just a nuisance during the Environmental Management Programme implementation. 17th annual IAIAAsa conference, Somerset West, Western Cape.
- 2011 – POSTER – W. Fourie and J. van der Walt. Sterkspruit: Micro-layout of Late Iron Age stone walling, Lydenburg, Mpumalanga. . Association of Southern African Professional Archaeologists – Conference, Swazi Land
- 2011 – POSTER – P.D. Birkholtz, W. Fourie and W.C. Nienaber. Onverwacht: Archaeological and Historical Analysis of Swazi settlement layout. Association of Southern African Professional Archaeologists – Conference, Swazi Land
- 2011 – POSTER – H.S. Steyn, W. Fourie and M. Hutten. Kappa Omega Transmission Line: Findings from an Archaeological Walk Down. Association of Southern African Professional Archaeologists – Conference, Swazi Land
- 2011 - Archaeology, Physical Anthropology and DNA analysis – The case of Queen Thomo Jezangani Ndwandwe. *Association of Southern African Professional Archaeologists – Conference, Swaziland*
- 2008 – Probabilistic Modeling of archaeological sites, Pilanesberg National Park. Paper delivered at the *Association of Southern African Professional Archaeologists – Conference, Cape Town*
- 2008 - Archaeological Impact Assessments within South African legislation. *South African Archaeological Bulletin 63 (187): 77–85, 2008*
- 2006 - *Paper delivered at ASAPA conference, Pretoria. Tavistock: Good grave relocation practice.*
- 2005 - Paper delivered at the Three Universities Seminar, University of Pretoria: The repatriation of King Michael Tjiseseta.
- 2005 - 'The Return of a King' - The repatriation of King Michael Tjiseseta, *Paper delivered at the conference of the Pan-African Archaeological Association for Prehistory and Related Studies in Gaborone, Botswana, in July 2005.*
- 2004 - Research poster, Probabilistic Modeling of Archaeological Sites, Pilanesberg National Park. *South African Association of Archaeologist Conference, Kimberley*

## INTERNATIONAL PROJECTS

- 2018 – current: **Position:** Heritage Specialist and Project Manager – Sovereign Metals –



Malingunde Graphite Project, Malawi – Heritage Impact Assessment – **Project Value:** R 400 000

- 2017 – current: **Position:** Heritage Specialist and Project Manager – Lesotho Highland Development Authority – Polihali Dam Project - Heritage Management Plan development and Implementation. Mokhotlong, Kingdom of Lesotho – **Project Value:** R 35,5 mil
- 2017 - **Position:** Heritage Specialist and Project Manager – Aurcon Singapore for the Government for Mauritius – Heritage Assessment for the proposed Rapid Rail Link, Port Louis, Mauritius – **Project Value:** R 100, 000
- 2016 – current – **Position:** Heritage Specialist and Project Manager - Anadarko International – Grave Relocation Action Plan and implementation for the Afungi Liquid Natural Gas Project, Palma, Northern Mozambique – **Project Value:** R 2,5 mil
- 2013 – 2016 - **Position:** Heritage Specialist and Project Manager - SLR Consulting - Heritage Impact Assessment, Manica Gold Project, Manica Province, Mozambique - **Project Value:** R 80 000
- 2012 - **Position:** Heritage Specialist and Project Manager - SLR Consulting - Heritage Impact Assessment, Namoya SALR – Gold Mine, Maniema Province in the eastern Democratic Republic of Congo (DRC) - **Project Value:** R 120 000
- 2012 - **Position:** Heritage Specialist and Project Manager - Consolidated Contractors Group S.A.L. -Mitigation and Grave Relocation at Site 37-A3-16 on the Mahalpye to Kudumatse Road Construction Project Central District, Botswana - **Project Value:** R 90 000
- 2010 - **Position:** Heritage Specialist and Project Manager - Digby Wells & Associates - Grave Relocation Procedures and Consultation – RAP Process, Kibali Gold Mine, Watsa, Oriental Province, Democratic Republic of the Congo - **Project Value:** R 85 000
- 2010 - **Position:** Heritage Specialist and Project Manager - Digby Wells & Associates - Archaeological Study, Kibali Gold Mine, Watsa, Oriental Province, Democratic Republic of the Congo - **Project Value:** R 50 000
- 2008 - **Position:** Heritage Specialist and Project Manager - Digby Wells & Associates - Mmamabula Mining Project CIC, Botswana - **Project Value:** R 60 000

## HERITAGE IMPACT ASSESSMENTS

### *South African*

Below a selected list of over 400 heritage studies completed

#### 2017

- Manungu Colliery, Heritage Impact Assessment. Carolina, Mpumalanga. – **Position:** Heritage Specialist. **Project Value:** R 65 000.
- Ilima Colliery, Heritage Impact Assessment. Carolina, Mpumalanga. – **Position:** Heritage Specialist. **Project Value:** R 110 000.
- Clanwilliam Dam Heritage Project (2014-2017). Clanwilliam, Western Cape. Department of Water and Sanitation – **Position:** Heritage Specialist. **Project Value:** R 7,5 mil
- Leeuwborg Wind Energy Project. Loeriesfontein, Northern Cape. SiVEST. – **Position:** Heritage Specialist. **Project Value:** R 120 000.
- Leeudoringstad Solar Energy Project. North West Province. SiVEST. – **Position:** Heritage Specialist. **Project Value:** R 50 000.
- Lephalale Combined Power Project, Limpopo Province. Kongiwe Environmental. – **Position:** Heritage Specialist. **Project Value:** R 100 000.
- Lebone Emergency College Upgrade, Pretoria. Department of Infrastructure Development. **Position:** Heritage Specialist. **Project Value:** R 100 000.

#### 2016

- Gautrain Management Agency (SiVEST Environmental) – Gautrain Rapid Rail Link – Feasibility Study – **Position:** Heritage Specialist

- Pilgrim's Rest Housing Development – Heritage Impact Assessment, Mpumalanga. Aurecon. – **Position:** Heritage Specialist. **Project Value:** R 60 000.
- Era Brickworks, Delmas, Mpumalanga. Heritage Impact Assessment. Jones and Wagerner. – **Position:** Heritage Specialist. **Project Value:** R 40 000.
- Daggaskaal Road Upgrade, Mpumalanga. Heritage Impact Assessment. NCC Environmental. – **Position:** Heritage Specialist. **Project Value:** R40 000.
- Eureka and Aletta Wind Energy Projects. Copperton, Northern Cape. – **Position:** Heritage Specialist. **Project Value:** R 95 000.
- Sendawo Solar Project, Vryburg, Northern Cape. Heritage Impact Assessment. SiVEST – **Position:** Heritage Specialist. **Project Value:** R 90 000.
- Tlisitseng Solar Project, Lichtenburg, North West Province. Heritage Impact Assessment. – **Position:** Heritage Specialist. **Project Value:** R 80 000.
- Kuruman 66kV Project. Kuruman, Northern Cape. Zitholele. – **Position:** Heritage Specialist. **Project Value:** R 85 000.
- Goodwood Housing Scheme, WC – Heritage Scoping – **Position:** Heritage Specialist
- Vereeniging Gymnasium, Heritage assessment and Guidelines, Meyerton, Gauteng. – **Position:** Heritage Specialist
- Victoria West, Wind Energy Project. CSIR. – **Position:** Heritage Specialist. **Project Value:** R 120 000.
- Kloof and Driefontein Sibanye Gold. Heritage Management Plan. Carletonville, Gauteng. – **Position:** Heritage Specialist and Project Manager. **Project Value:** R 430 000.

## 2015

- AEL Detonator Campus, Heritage Impact Assessment. Modderfontein, Gauteng. – **Position:** Heritage Specialist and Project Manager. **Project Value:** R 240 000.
- Solar Reserve (Worley Parson RSA), Heritage Impact Assessment, Humansrus Solar Park, Daniëlskuil, Northern Cape – **Position:** Heritage Specialist
- Kappa-Sterrekus 765kV Project. ACER Africa. Heritage Walkdown. Western Cape. – **Position:** Heritage Specialist. **Project Value:** R 140 000.
- Solar Reserve (Worley Parson RSA), Heritage Impact Assessment, Rooipunt Solar Park, Upington, Northern Cape – **Position:** Heritage Specialist
- Solar Reserve (Worley Parson RSA), Heritage Impact Assessment, Arriesfontein Solar Park, Daniëlskuil, Northern Cape – **Position:** Heritage Specialist
- Solar Reserve (Worley Parson RSA), Heritage Impact Assessment, Slypklip Solar Park, Kimberley, Northern Cape – **Position:** Heritage Specialist
- Mainstream Renewable Power South Africa (SiVest), Heritage Impact Assessment, Loeriesfontein Solar Park, Northern Cape – **Position:** Heritage Specialist
- Mainstream Renewable Power South Africa (SiVest), Heritage Impact Assessment, De Aar Solar Park, Northern Cape – **Position:** Heritage Specialist
- Mainstream Renewable Power South Africa (SiVest), Heritage Impact Assessment, Droogfontein
- GRAP103 – Heritage Register for the Ekurhuleni Metropolitan Municipality, Aurecon – **Position:** Heritage Specialist
- Fleurhof Hostel Redevelopment. Florida, Gauteng. Heritage Impact Assessment. **Position:** Heritage Specialist and Project Manager. **Project Value:** R 430 000.
- Mkuze Biomassa Incinerator. Mkuze, KZN. Heritage Impact Assessment. CSIR. **Position:** Heritage Specialist and Project Manager. **Project Value:** R 50 000.
- Transnet Overvaal Tunnel, Ermelo, Mpumalanga. EIMS. **Position:** Heritage Specialist and Project Manager. **Project Value:** R 60 000.
- De Aar 132kv Powerline. De Aar, Northern Cape. Heritage Impact Assessment. Holland and Associates. **Position:** Heritage Specialist and Project Manager. **Project Value:** R 60 000.

## 2014

- Solar Park, Kimberley, Northern Cape – **Position:** Heritage Specialist
- Kumba Iron Ore (Synergistics), Heritage Impact Assessment, Shishen Relocation Project, Northern Cape - – **Position:** Heritage Specialist
- Kappa-Sterrekus 765kV Project. ACER Africa. Heritage Walkdown. Western Cape. – **Position:** Heritage Specialist. **Project Value:** R 140 000.
- Strategic Environmental Assessment for Independent Energy. CSIR. – **Position:** Heritage Specialist. **Project Value:** R 150 000.
- New Kathu Cemetery. Kathu, Northern Cape. Heritage Impact Assessment. SLR Consulting. – **Position:** Heritage Specialist. **Project Value:** R 50 000.

## GRAVE RELOCATIONS

- 2015-7 - Optimum Coal Phase 2 – Relocation of 100 graves, Glencore. Pullenshope, Mpumalanga
- 2014 – Bigen Africa. Lufhereng Grave Investigation, Soweto, Gauteng. Principal Investigator.
- 2014 – Basil Read. Savanna City Residential Development. Relocation of 55 graves. Orange Farm, Gauteng. Principal Investigator.
- 2013-6 – Kalgold Project Harmony Gold. Relocation of 20 graves. Kraaipan, North West Province. Principal Investigator.
- 2013-4 – Ivanhoe Mining. Relocation of graves for the Platreef project. Mokopane, Limpopo Province. Principal Investigator.
- 2013-4 – Eskom SOC, Eskom Mookodi Substation grave relocation of 6 graves. Vryburg, North West Province. Principal Investigator.
- 2013 – Ntshovelo Coal. Relocation of 8 graves. Arbor, Mpumalanga.
- 2013 – Msobo Coal. Relocation of 9 graves for the Msobo Coal Lilliput project. Breyten, Mpumalanga. Principal Investigator.
- 2012-4 - Likweti Holdings, Likweti Grave Project, 1 Grave. Nelspruit, Mpumalanga. Principal Investigator
- 2012-3 - Fleurhof Holdings, Fleurhof rescue and grave relocation of 70 graves. Florida, Gauteng. Principal Investigator
- 2012 – 4 - Calgro/M3, Fleurhof grave rescue and relocation, 100 graves Florida, Gauteng. Principal Investigator
- 2012 - Department of Arts and Culture. J.L. Dube memorial site restoration. Ohlange Institute, Inanda, KwaZulu-Natal. Principal Investigator.
- 2012 - Delmas Super Centre. Delmas grave relocation of 1 grave. Delmas, Mpumalanga.
- 2012 - Anglo Coal, New Largo Colliery. 170 Graves. Ogies, Mpumalanga. Principal Investigator
- 2011-3 - Mashala Resources, Ferreiras Colliery, Ermelo. Relocation of 11 graves. Principal Investigator.
- 2011 - Xtsrata, ATCOM. Bierman cemetery. 14 graves. Principal Investigator Relocation of 8 graves, Kudumatse Road Upgrade, Botswana. Principal Investigator
- 2011 - Seaton Thompson, Kameeldoorn grave relocation. Single grave. Zeerust. Principal Investigator
- 2011 - SAHRA, Relocation of the remains of Queen Thomo KaNdwandwe, Durban, KZN. Principal Investigator
- 2011 - Roadcrete, Lanseria-Randburg Road Upgrade 6 graves, Randburg. Principal Investigator.
- 2011 - New Clydesdale Coal, Relocation of 7 graves from coal project, Witbank. Field Director, under WC Nienaber as PI
- 2011 - Kudumatse Road works. Removal of 11 Iron Age graves. Kudumatse, Botswana. Principal Investigator

- 2010-3 - Optimum Colliery, Hendrina, Mpumalanga. Relocation of 65 graves. Field Director, under WC Nienaber as PI
- 2010 - Investigation on the relocation of 3000 graves, Kibali, DRC. Principal Investigator
- 2010 - Eyethu Coal, Relocation of 7 graves from coal project, Delmas. Field Director, under WC Nienaber as PI
- 2008 - WBHO, Relocation of 5 graves from South Deep tailings project, Fochville Gauteng Province. Field Director, under WC Nienaber as PI
- 2006 - Highland Gate Development. Dullstroom. Gate Developments. Relocation of 39 Graves. Field Director.
- 2006 - Cosmo City Development, Johannesburg. Basil Read Pty Ltd. Relocation of 135 graves. Field Director.
- 2003 - Tselentis Colliery, Duiker Mining. Relocation of 80 graves. Field Director
- 2003 - Alveda Park Development, NewHco. Relocation of 114 graves. Field Director
- 2002 - V3, Brakfontein, Centurion. Reconnaissance excavation on possible grave in new development area. Field Director
- 2002 - Kriel Collieries, Kriel. Investigation into the position of relocated graves on Kriel Golf Course. Principal Investigator
- 2002 - Gardener Ross Golf and Country Estate, DEVCO. Reconnaissance Excavation on possible graves. Field Director
- 2001-2 - iMpunzi Division of Duiker Mining, Witbank, Grave Relocation of 907 graves. Field Director

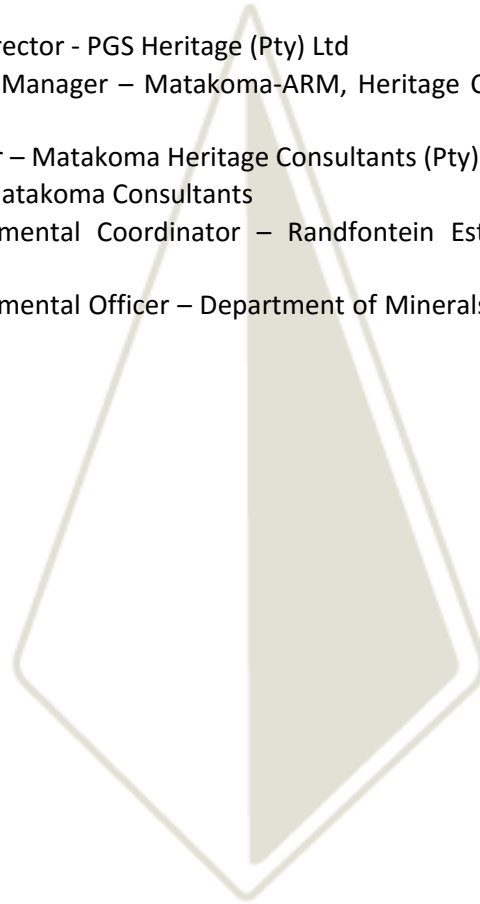
#### MITIGATION WORK

1. 2017 – Current - Lesotho Highland Development Authority – Polihali Dam Project - Heritage Management Plan development and Implementation. Mokhotlong, Kingdom of Lesotho  
**Project Manager**
2. 2014-2017 - Raising of the Clanwilliam Dam – Heritage Mitigation, Clanwilliam, Western Cape. **Project Manager**
3. 2013 - Kappa Gamma, MSA Mitigation, Touws Rivier, Western Cape. **Field Director, Dr M.M. van der Ryst, PI**
4. 2012 - Misgund N1 Interchange upgrade, Iron Age Phase 2 excavation, Johannesburg, Gauteng Province. **Field Director, under Prof. JCA Boeyens, PI**
5. 2011 – Eskom 400kV – Dinaledi Spitskop – Phase 2 Historical Site, Mitigation - **Field Director, J.P Behrens, PI**
6. 2011 – Eskom 400 kV – Dinaledi Marang – Phase 2 Middel Stone Age Site, Mitigation **Field Director, Dr M.M. van der Ryst, PI**
7. 2011 – Eskom 400 kV – Dinaledi Marang – Phase 2 Late Iron Age, Mitigation - **Field Director, under Prof. JCA Boeyens, PI**
8. 2011 – Eskom 400 kV – Dinaledi Marang – Phase 2 Early Stone Age Site, Mitigation - **Field Director, under Dr K. Kumann, PI**
9. 2011 - Eskom 400kV – Dinaledi-Spitskop – Phase 2 Middel Stone Age Site, Mitigation - **Field Director, under Dr M.M van der Ryst, PI**
10. 2009 - Nkomati Mine, Onverwacht Phase 2 excavations, Badplaas, Mpumalanga. **Field Director, under Prof. TN Huffman, PI**
11. 2008 - TWP, Wesizwe Platinum Phase 2 excavations, Pilanesberg, North West Province. **Field Director, under Prof. TN Huffman, PI**
12. 2008 - The Heads Trust, Heritage Assessment and phase 2 documentation, and monitoring for Lydenburg Ext 38 housing development, Lydenburg, Mpumalanga. **Field Director, under Prof. JCA Boeyens, PI**
13. 2008 - Stonehenge x16, Phase 2 test excavations, Nelspruit, Mpumalanga. **Field Director, under Prof. TN Huffman, PI**

14. 2007 - Phase 2 mitigation of archaeological terrain. Hammanskraal West Proper. Ditsala Construction. Hammanskraal, Gauteng Province. **Field Director, under Prof. JCA Boeyens, PI**
15. 2007 - Phase 2 mitigation of archaeological terrain. Bokfontein Mining Project. Henric Ferrochrome, Brits North West Province. **Field Director, under Prof. JCA Boeyens, PI**
16. 2006 - Phase 2 mitigation of archaeological terrain. Gardener Ross Golf and Country Estate. **Field Director, under Prof. JCA Boeyens, PI**

#### **POSITIONS HELD**

- **2003 – current:** Director - PGS Heritage (Pty) Ltd
- **2006 – 2008:** Project Manager – Matakoma-ARM, Heritage Contracts Unit, University of the Witwatersrand
- **2005-2007:** Director – Matakoma Heritage Consultants (Pty) Ltd
- **2000-2004:** CEO– Matakoma Consultants
- **1998-2000:** Environmental Coordinator – Randfontein Estates Limited. Randfontein, Gauteng
- **1997-1998:** Environmental Officer – Department of Minerals and Energy. Johannesburg, Gauteng



**PGS**  
HERITAGE

**CECILIA CANAHAI**



<b>Profession</b>	<i>Engineering Geologist / Scientist</i>
<b>Position in Firm</b>	<i>Technical Director</i>
<b>Area of Specialisation</b>	<i>Geotechnical, Environmental, Waste Management</i>
<b>Qualifications</b>	<i>Pr.Sci.Nat., MSc (Eng Geol), BSc (Eng Geology)</i>
<b>Years of Experience</b>	<i>31 Years</i>
<b>Years with Firm</b>	<i>20 Years</i>

**SUMMARY OF EXPERIENCE**

Cecilia Canahai gained her first site experience working as a site geologist for oil and gas exploration, in Romania, in 1988. She completed drilling supervision, sampling, gas chromatography, borehole logging and interpretation, report writing and made recommendations for drilling parameters.

Cecilia joined Moore Spence Jones (Pty) Ltd in 1997 as an engineering geologist, where she completed numerous geotechnical investigations for township and industrial development, sports facility developments, private residential properties and pipeline investigations. She has completed slope stability analyses with recommendations for rehabilitation. Other aspects of her experience include dam and tunnel geotechnical investigations. She acquired her first experience as an environmentalist while carrying out groundwater pollution monitoring, at SAPREF.

All projects have included fieldwork, on site testing, site supervision of works, material sampling, interpretation of laboratory results, client liaison, and reporting.

Cecilia joined JG Afrika (Pty) Ltd in 1999 as an environmentalist / engineering geologist.

As an engineering geologist she has worked on various projects, inter alia, geotechnical investigations for rural water supply schemes, housing developments, roads investigations, materials investigations, lateral support design and geotechnical investigations for dams and tunnels.

As an environmental practitioner she has successfully completed numerous Environmental Impact Assessment Scoping and EIA reports, Solid Waste Management, Environmental Management Programme Reports and Closure Reports for various mines/ borrow pits and Environmental Audits. She was also involved in other aspects of the environmental field such as scoping and public participation, impact assessment, mitigation and monitoring and preparation of environmental management plans (EMP).

Cecilia was the Pietermaritzburg Branch Quality System Manager, involved in the maintaining the office' quality standard in terms of ISO 9001 (JG Afrika is ISO 9001 certified) between 2002 and 2007, when work commitments required her to hand over this particular task to someone else.

Cecilia became a shareholder in 2010 and a partner in 2012. Since 2010 her duties are business development and marketing in the fields of engineering geology geotechnical engineering; waste management; environmental science, aquatic health and water resources management, as well as managing various multi- disciplinary projects.

## PROFESSIONAL REGISTRATIONS & INSTITUTE MEMBERSHIPS

- Pr.Sci.Nat.** - Registered with the South African Council for Natural Scientific Professions -  
Registration No 400011/00: Environmental Science & Geological Science
- SAIEG** - Member of the South African Institute for Engineering and Environmental Geologists -  
Membership No 03/211
- IAIA** - Member of the International Association of Impact Assessment; Membership No 1686

## EDUCATION

- 1983 – Certificate of Baccalaureate** – Pitesti, Romania
- 1987 – BSc (Hons) (Eng Geol)** – University of Bucharest, Romania
- 1988 – MSc (Eng Geol)** – University of Bucharest, Romania

## SPECIFIC EXPERIENCE

### JG Afrika (Pty) Ltd (Previously Jeffares & Green (Pty) Ltd)

**2010 - 2019**

**Position – Technical Director**

**Sicello Bulk Water Main:** EIA & EMPR for water main at Sicello

**Kumba Iron Ore** Biomonitoring Programme for aquatic health

**Kriel Power Station** – Geotechnical Investigation for ash dam complex stability and stability monitoring for a period of 11 months

**New Ash Facility** at Tutuka Power Station for Eskom detail design for water return dams and appurtenant structure and infrastructure as part of an ADF team

**New Ash Facility** at Kusile Power Station for Eskom detail design for water return dams and appurtenant structure and infrastructure as part of an ADF team

**Camden New Ash Dam Facility** detail design, encompassing geotechnical investigation for the new ADF, water return dams and appurtenant structure and infrastructure

**New Ash Facility** at Kendal Power Station for Eskom

**Hendrina Step-In and Go-Higher Ash Dam Facility** detail design, encompassing geotechnical investigation for the extension of the existing ADF

**Mathjabeng Solar Park**

**Atlas Substation EIA** for Closure and Risk Assessment and Due Diligence

**Gauteng Department of Roads and Transportation:** Environmental assessment for 15 Intersection upgrades

Geotechnical Investigation in support of the Feasibility Study for a **5 GW power Solar Park** in the Northern Cape Province of South Africa (presidential project)

Feasibility Study for the potential sources of water for the **Tikwa Wind Farm**

**N11 Sections 6 & 7 Borrow Pit Closure**

Various **Water Use Licence Applications**

Basic Assessment for the installation of **Fibre Optic Cable between Aliwal North and George**

**Baseline study for Eskom WTW and WWTW** for readiness for Blue Drop / Green Drop Certification

Basic Assessment for the installation of **Fibre Optic Cable between Johannesburg and Cape Town**

Various Geotechnical Investigations for Rand Water Pipelines

Various **Environmental Basic Assessments** for Rand Water Pipelines

Various **Geotechnical Investigations** for various Eskom towers (3 year Contract)

**2009 – 2010**

**Position –Executive Associate**

**N4 Rustenburg to Swartruggens:** Geotechnical investigation for N4 road rehabilitation

**Pikitup OSH** Legal Audits

**Dumbe Coalline Geotechnical investigation** for Transnet (stability of proposed cuttings)

Various **Geotechnical Investigations** for Rand Water Pipelines

Various **Environmental Basic Assessments** for Rand Water Pipelines

Various **Geotechnical Investigations** for various Eskom towers (3 year Contract)

Basic Assessment for the installation of **Fibre Optic Cable** between Pretoria and Rustenburg

Materials recovery facility in **Ekandustria Waste Licence Application** and Basic assessment

**2008 – 2009**

**Position – Associate**

**Pikitup Environmental Compliance**

**Rand Water G25 Pipeline Basic Assessment** study downgraded to and Environmental Management Plan; Saved the Client R100 000,00 in fees.

**Pikitup Garden sites and Depot sites** Application for Waste Licences & Basic Assessment studies

**Pretoria North Modal Interchange:** full Environmental Impact Assessment for intermodal facility

**N11 Section 4: Environmental services** for obtaining Authorization for road rehabilitation and borrow pits

Various Geotechnical Investigations for Eskom towers (3 year Contract)

**N6:** Environmental services and Applications for Borrow Pits Closures

**N12 Section 12:** Environmental Auditing for road construction

**2007 – 2008**

**Position – Associate**

**N6 Section 8 Closure Documentation** for quarry and borrow pits for Road Rehabilitation

**Lesotho Lowlands Water Supply Scheme:** Geotechnical Investigation

**Lusikisiki Police Station** Geotechnical Investigation

**Toscana Ridge Geotechnical Investigation** for Housing development

**Phinda Game Reserve:** Geotechnical investigation for Housing development

**Lusikisiki Police Station:** Geotechnical Investigation.



**Pretoria North Station Modal Interchange:** full Environmental Impact Assessment for various road realignments, modal interchange and railway refurbishment in Pretoria.

**N1 Section 14:** Full Environmental Impact Assessment for the N1 rehabilitation.

**Mt Ayliff & Mt Frere Access Roads** – Environmental services for obtaining authorization from DEAET and DME for 12 access roads and associated borrow pits.

**N2 Pongola Borrow pits:** Application for borrow pits Closure

**N2 Section 32:** environmental services for obtaining Authorization for road rehabilitation and borrow pits

**Umzimkhulu Municipality:** Various environmental services for the upgrade of roads in Umzimkhulu

**Environmental Management Plan** for the rehabilitation of Dorpspruit River, Pietermaritzburg

**Kwamashu Police Station** Basic Assessment Report

**2006 – 2007**

**Position – Associate**

**Elliottdale Landfill Site** Classification and Permitting

**Impendle Housing Development** (1500 units): Geotechnical Investigation.

**Lesotho Lowlands Bulk Water Supply Scheme:** Geotechnical Investigation

**Environmental Impact Assessment** for various access roads in the Mt Frere and Mt Ayliff areas for the Umzimvubu Municipality.

**Bubu Access Road** : Geotechnical and materials investigation

**Erf 3 Bishopstowe:** Geotechnical Investigation for housing development

**Willowton Proposed Shopping Centre:** Geotechnical Investigation

**Black Umfolozi River Bridge:** Basic Assessment for environmental authorization

**Mtwalume River sand mining Environmental Management Plan**

**Vulindlela Access Road:** Environmental Management Plan for construction

**Inhlazuka CWSS Environmental Management** Plan for construction

**Ladysmith Development:** Preliminary Geotechnical & Environmental assessments

**Black Umfolozi River Bridge** - Basic Assessment Report as per NEMA Regulations 386.

**Erf 3 Bishopstowe Geotechnical investigation** for housing development

**Vulindlela Access Roads** – Environmental services for road rehabilitation.

**2005 – 2006**

**Position – Engineering & Environmental Geologist**

**Closure of Landfill Site Hluhluwe & Identification** of new Landfill Site to replace the old Landfill Site

**N11 Sections 6 and 7 Borrow Pits and Quarry Permitting:** environmental services (EIA & EMPR's) 10 borrow pits and one quarry

**N12 Section 12 Borrow Pits & Quarry Permitting:** environmental services (EIA & EMPR's) for 8 borrow pits and one quarry

**Impendle Community Water Supply Schemes** – Environmental services for obtaining authorization from DAEA for the construction of a community pipeline and associated structures.

**Masomonco Community Water Supply Scheme** - Environmental services for obtaining authorization from DAEA for the construction of a community pipeline and associated structure.

**KwaNovuka Community Water Supply Scheme** - Environmental services for obtaining authorization from DAEA for the construction of a community pipeline and associated structure.

**Umtshezi Municipality Land Use Management System** – Broad Environmental Scan

**Vryheid Housing Development** – Geotechnical Investigation

**Illovo River Mining Right** – environmental services for a sand mining operation on the Illovo River

**Kwa Gqugquma Community Water Supply Scheme** - Environmental services for obtaining authorization from DAEA for the construction of a community pipeline and associated structure.

**2004 – 2005**

**Position – Engineering & Environmental Geologist**

**Georgedale development** – environmental services for sand mining

**God’s Haven Housing Development** – Geotechnical Investigation

**Kwa Senge Clinic** – Geotechnical Investigation

**Umdoni Municipality Cemetery** – Geotechnical & Environmental Assessments

**N6 Borrow Pits and Quarry Permitting: environmental services** (EIA & EMPR’s) 10 borrow pits and one quarry

**Umkomaas River Mining Right** – environmental services for sand mining operations on the Umkomaas River

**Umkomaas River Footbridge** – Geotechnical Investigation

**Marburg Prison** – Geotechnical Investigation

**Enkanyezini Community Water Supply Scheme** - Environmental services for obtaining authorization from DAEA for the construction of a community pipeline and associated structures.

**Shemula Community Water Supply Scheme** - Environmental services for obtaining authorization from DAEA for the construction of a community pipeline and associated structures.

**Mtwalume River Mining Permit** – environmental services for sand mining operation on the Mtwalume River.

**Umzimkulu River Mining Right** – environmental services for sand mining operations on the Umzimkulu River

**Umvoti River Mining Rights and Permits** – environmental services for various sand mining operations on the Umvoti River

**N2 Pongola quarry** – Geotechnical Investigation

**Rugged Glen** - Environmental services for upgrading and construction of new structures.

**2003 – 2004**

**Position – Engineering & Environmental Geologist**

**Kwa Mpande Geotechnical Investigation** for school

**St Ives Environmental Scoping** for tourism development on the Midlands Meander

**Ladysmith Petrol Station** – Geotechnical Investigation and Scoping report

**Kwa Ngwanase Community Water Supply Scheme** – Geotechnical investigation for pipeline and associated structures.

**Kwa Ngwanase Community Water Supply Scheme** Environmental Scoping for proposed pipeline and associated structures.

**Emkhuzeni & Mhlangana Community Water Supply Schemes** – Geotechnical investigation for pipelines and associated structures.

**Emkhuzeni & Mhlangana Community Water Supply Schemes** Environmental Scoping for proposed pipelines and associated structures.

**Inanda Dam Mining Permit** – environmental services for a sand mining operation on the Inanda Dam.

**Mdloti River Mining Conversion** of old right to Mining Right.

**Edwin Swales** – Environmental Management Plan compilation and Auditing.

**Estcourt Prison** – Geotechnical Investigation

**Kombuzi Environmental Management Programme** report for mining

**Umhlumayo Community Water Supply Scheme** – Geotechnical Investigation

**2002 – 2003**

**Position – Engineering & Environmental Geologist**

**Dumbe Housing Development** – Geotechnical Investigation.

**Clouds oh Hope** – Children’s Home – Geotechnical Investigation

**C4 Water Pipeline** – Johannesburg – Geotechnical Investigation.

**Kombuzi Community Water Supply Scheme** – Geotechnical investigation for pipeline and associated structures.

**Hlahlindlela Community Water Supply Scheme** – Geotechnical investigation for pipeline and associated structures.

**Shemula Community Water Supply Scheme** – Geotechnical investigation for pipeline and associated structures.

**Mt Frere rehabilitation of 3 roads** – Geotechnical Investigation

**Mbono Community Water Supply Scheme** – Geotechnical investigation for pipeline and associated structures.

**Camperdown Spar** - Geotechnical Investigation for failed pavement.

**Thokoza Community Water Supply Scheme** – Geotechnical investigation for pipeline and associated structures.

**Nqutu Community Water Supply Scheme** – Geotechnical investigation for pipeline and associated structures.

**Taxi Rank at Lusikisiki** – Geotechnical Investigation

**Kwa Hlope Community Water Supply Scheme** – Geotechnical investigation for pipeline and associated structures.

**Mbazwane Community Water Supply Scheme** – Geotechnical investigation for pipeline and associated structures.

**2001 – 2002**

**Position – Engineering & Environmental Geologist**

**Amangwe Community Water supply Scheme** Environmental Scoping for Pipeline and associated structure

**Black Umfolozi River Bridge** - Basic Assessment Report as per NEMA Regulations 386.

**Mt Ayliff & Mt Frere Access Roads** – Environmental services for obtaining authorization from DEAET and DME for access roads and associated borrow pits.

**Erf 3 Bishopstowe Geotechnical investigation** for housing development

**2000 – 2001**

**Position – Engineering & Environmental Geologist**

**Black Umfolozi River Bridge** - Basic Assessment Report as per NEMA Regulations 386.

**Mt Ayliff & Mt Frere Access Roads** – Environmental services for obtaining authorization from DEAET and DME for access roads and associated borrow pits.

**Erf 3 Bishopstowe Geotechnical investigation** for housing development

**1999 – 2000**

**Position – Engineering & Environmental Geologist**

**Nzinga and Langkloof CWSS:** Geotechnical Investigation for pipeline and reservoirs, Environmental Scoping: & Environmental Management Programme reports for mining

**Mbazwana CWSS: Geotechnical Investigation** for pipeline and reservoirs, & Environmental Scoping

**Nhlangano to Sicunusa Road:** Geotechnical & Materials Investigation

**Edendale Hospital New Wing:** Geotechnical Investigation

**Spandikroon, Dival & Mhlabathini CWSS:** Geotechnical Investigations for pipeline and reservoirs, Environmental Scoping: reports

**Tugela Estates CWSS:** Geotechnical Investigations for pipeline and reservoirs

**Debep Quarry Drilling Investigation** for materials for road Construction

**N2 Road Rehabilitation** at Kei River Geotechnical investigation for road rehabilitation

**Moore Spence Jones (Pty) Ltd**

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**1998 – 1999**

**Position – Engineering & Environmental Geologist**

**Indian Ocean Fertilizers (Richards Bay):** Geotechnical Investigation for new plant

**Housing Development at Hammarsdale:** Geotechnical investigation for foundations, earthworks, suitability of materials for road construction, etc.

**Zimbali Housing Development:** Geotechnical investigation for foundations, earthworks, suitability of materials for road construction, etc.

**Cato Manor:** Stability Investigation of platform cuttings

**Mpophomeni Housing Development:** Geotechnical investigation for foundations, earthworks, suitability of materials for road construction, etc.

**Fleetguard Pmb:** Geotechnical investigation for warehouse foundations, earthworks, suitability of materials for road construction, etc.

**Stukenberg Water Pipeline:** Geotechnical investigation for slope stability, pipeline re-routing and tunnel investigation, etc.

**Booth Road Housing Development:** Geotechnical investigation for foundations, earthworks, suitability of materials for road construction, etc.

**1996 – 1998**

**Position – Engineering & Environmental Geologist**

**Gateway Development:** Geotechnical Investigation for founding conditions, Assessment of waste, Site stability, etc.

**Azalea Housing Development** Geotechnical investigation for foundations, earthworks, suitability of materials for road construction, etc.

**Matatiele Housing Development** Geotechnical investigation for foundations, earthworks, suitability of materials for road construction, etc.

**Kwa Dabeka Housing Development** Geotechnical investigation for foundations, earthworks, suitability of materials for road construction, etc.

**Newlands West: Geotechnical Investigation** at cracked houses

**AECI:** Geotechnical Investigation into the stability of the slimes dams at AECI

**SAPREF:** Groundwater Pollution monitoring

**Craiova Drilling Company Romania**

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**1988 – 1992**

**Position – Site Geologist**

Site geologist - Responsible for Drilling supervision at various oil & gas exploration & exploitation boreholes. Main duties included sample and core analysis and description, data logging and interpretation, down-the-hole logging and on site interpretation, gas chromatography and geo-service logging, compilation of reports and recommendations for drilling parameters.

A major project Mrs Canahai was involved in, was the drilling supervision of a 6000 m deep exploration hole. Responsibilities included liaison with design engineers and contractors, gas chromatography and geo-service logging, compilation of reports and recommendations for drilling parameters.

## CONTINUED PROFESSIONAL DEVELOPMENT

### Courses

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**2000** - Integrated Environmental Management Course – (University of KwaZulu Natal)

**2001** - Environmental Auditing Course - (University of KwaZulu Natal)

**2003** - ISO 9001:2000; Registered Internal and Suppliers Auditors Course - (Wynleigh International)

**2003** - Waste Management Course – (University of Pretoria)

**2005** SHEQMAN Course – (Advance A.C.T.)

- 2017** Resource Efficiency Cleaner Production - 2-Day End User Training CSIR Pretoria  
**2018** Energy Management Systems Implementation - End User Training CSIR Pretoria

### Published Papers

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- 1988** - “Mineralogical Study of Devonian Deposits of the Hercinic Orogen, Dobrogea”, *MSc Thesis*, University of Bucharest (Engineering Geology), 1988.

### PERSONAL DETAILS

Nationality – South African  
Date of Birth – 1965-03-30  
Domicile – Johannesburg, South Africa

#### Languages

English – Very Good  
Romanian – Excellent

## CURRICULUM VITAE

ELIZE BUTLER

**PROFESSION:** Palaeontologist

**YEARS' EXPERIENCE:** 25 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

Registered as a PhD fellow at the Zoology Department of the UFS

2013 to current

**Dissertation title:** A new gorgonopsian from the uppermost *Daptocephalus Assemblage Zone*, in the Karoo Basin of South Africa

## **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 Noupoot 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 Noupoot, 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 Noupoot 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 Noupoot, Northern Cape. Savannah South Africa. Bloemfontein.

**Butler, E. 2016.** Palaeontological Impact Assessment of the proposed upgrading of the main road MR450 (R335) from the 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.

**Butler, E. 2017.** Palaeontological Desktop Assessment of the proposed development of the new open cast mining operations of the Impunzi mine in the Mpumalanga Province. Bloemfontein.

**Butler, E. 2017.** Palaeontological Desktop Assessment of the construction of the proposed Viljoenskroon Munic 132 KV line, Vierfontein substation and related projects. Bloemfontein.

**Butler, E. 2017.** Palaeontological Desktop Assessment of the proposed rehabilitation of 5 ownerless asbestos mines. Bloemfontein.

**Butler, E. 2017.** Palaeontological Desktop Assessment of the proposed development of the Lephalale coal and power project, Lephalale, Limpopo Province, Republic of South Africa. Bloemfontein.

**Butler, E. 2017.** Palaeontological Impact Assessment of the proposed construction of a 132KV powerline from the Tweespruit distribution substation (in the Mantsopa local municipality) to the Driedorp rural substation (within the Naledi local municipality), Free State province. Bloemfontein.

**Butler, E. 2017.** Palaeontological Desktop Assessment of the proposed development of the new coal-fired power plant and associated infrastructure near Makhado, Limpopo Province. Bloemfontein.

**Butler, E. 2017.** Palaeontological Impact Assessment of the proposed construction of a Photovoltaic Solar Power station near Collett substation, Middelberg, Eastern Cape. Bloemfontein.

**Butler, E. 2017.** Palaeontological Impact Assessment for the proposed township establishment of 2000 residential sites with supporting amenities on a portion of farm 826 in Botshabelo West, Mangaung Metro, Free State Province. Bloemfontein.

**Butler, E. 2017.** Palaeontological Desktop Assessment for the proposed prospecting right project without bulk sampling, in the Koa Valley, Northern Cape Province. Bloemfontein.

**Butler, E. 2017.** Palaeontological Desktop Assessment for the proposed Aroams prospecting right project, without bulk sampling, near Aggeneys, Northern Cape Province. Bloemfontein.

**Butler, E. 2017.** Palaeontological Impact Assessment of the proposed Belvior aggregate quarry II on portion 7 of the farm Maidenhead 169, Enoch Mgijima Municipality, division of Queenstown, Eastern Cape. Bloemfontein.

**Butler, E. 2017.** PIA site visit and report 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. 2017.** Palaeontological Impact Assessment of the proposed construction of Tina Falls Hydropower and associated power lines near Cumbu, Mthlontlo Local Municipality, Eastern Cape. Bloemfontein.

**Butler, E. 2017.** Palaeontological Desktop Assessment of the proposed construction of the Mangaung Gariep Water Augmentation Project. Bloemfontein.

**Butler, E. 2017.** Palaeontological Impact Assessment of the proposed Belvoir aggregate quarry II on portion 7 of the farm Maidenhead 169, Enoch Mgijima Municipality, division of Queenstown, Eastern Cape. Bloemfontein.

**Butler, E. 2017.** Palaeontological Impact Assessment of the proposed construction of the Melkspruit-Rouxville 132KV Power line. Bloemfontein.

**Butler, E. 2017** Palaeontological Desktop Assessment of the proposed development of a railway siding on a portion of portion 41 of the farm Rustfontein 109 is, Govan Mbeki local municipality, Gert Sibande district municipality, Mpumalanga Province. Bloemfontein.

**Butler, E. 2017.** Palaeontological Impact Assessment of the proposed consolidation of the proposed Ilima Colliery in the Albert Luthuli local municipality, Gert Sibande District Municipality, Mpumalanga Province. Bloemfontein.

**Butler, E. 2017.** Palaeontological Desktop Assessment of the proposed extension of the Kareerand Tailings Storage Facility, associated borrow pits as well as a storm water drainage channel in the Vaal River near Stilfontein, North West Province. Bloemfontein.

**Butler, E. 2017.** Palaeontological Desktop Assessment of the proposed construction of a filling station and associated facilities on the Erf 6279, district municipality of John Taolo Gaetsewe District, Ga-Segonyana Local Municipality Northern Cape. Bloemfontein.

**Butler, E. 2017.** Palaeontological Desktop Assessment of the proposed of the Lephallale Coal and Power Project, Lephallale, Limpopo Province, Republic of South Africa. Bloemfontein.

**Butler, E. 2017.** Palaeontological Desktop Assessment of the proposed Overvaal Trust PV Facility, Buffelspoort, North West Province. Bloemfontein.

**Butler, E. 2017.** Palaeontological Impact Assessment of the proposed development of the H2 Energy Power Station and associated infrastructure on Portions 21; 22 And 23 of the farm Hartebeestspruit in the Thembisile Hani Local Municipality, Nkangala District near Kwamhlanga, Mpumalanga Province. Bloemfontein.

**Butler, E. 2017.** Palaeontological Impact Assessment of the proposed upgrade of the Sandriver Canal and Klippan Pump station in Welkom, Free State Province. Bloemfontein.

**Butler, E. 2017.** Palaeontological Impact Assessment of the proposed upgrade of the 132kv and 11kv power line into a dual circuit above ground power line feeding into the Urania substation in Welkom, Free State Province. Bloemfontein.

**Butler, E. 2017.** Palaeontological Desktop Assessment of the proposed Swaziland-Mozambique border patrol road and Mozambique barrier structure. Bloemfontein.



**Butler, E. 2017.** Palaeontological Impact Assessment of the proposed diamonds alluvial & diamonds general prospecting right application near Christiana on the remaining extent of portion 1 of the farm Kaffraria 314, registration division HO, North West Province. Bloemfontein.

**Butler, E. 2017.** Palaeontological Desktop Assessment for the proposed development of Wastewater Treatment Works on Hartebeesfontein, near Panbult, Mpumalanga. Bloemfontein.

**Butler, E. 2017.** Palaeontological Desktop Assessment for the proposed development of Wastewater Treatment Works on Rustplaas near Piet Retief, Mpumalanga. Bloemfontein.

**Butler, E. 2018.** Palaeontological Impact Assessment for the Proposed Landfill Site in Luckhoff, Letsemeng Local Municipality, Xhariep District, Free State. Bloemfontein.

**Butler, E. 2018.** Palaeontological Impact Assessment of the proposed development of the new Mutsho coal-fired power plant and associated infrastructure near Makhado, Limpopo Province. Bloemfontein.

**Butler, E. 2018.** Palaeontological Impact Assessment of the authorisation and amendment processes for Manangu mine near Delmas, Victor Khanye local municipality, Mpumalanga. Bloemfontein.

**Butler, E. 2018.** Palaeontological Desktop Assessment for the proposed Mashishing township establishment in Mashishing (Lydenburg), Mpumalanga Province. Bloemfontein.

**Butler, E. 2018.** Palaeontological Desktop Assessment for the Proposed Mlonzi Estate Development near Lusikisiki, Ngquza Hill Local Municipality, Eastern Cape. Bloemfontein.

**Butler, E. 2018.** Palaeontological Phase 1 Assessment of the proposed Swaziland-Mozambique border patrol road and Mozambique barrier structure. Bloemfontein.

**Butler, E. 2018.** Palaeontological Desktop Assessment for the proposed electricity expansion project and Sekgame Switching Station at the Sishen Mine, Northern Cape Province. Bloemfontein.

**Butler, E. 2018.** Palaeontological field assessment of the proposed construction of the Zonnebloem Switching Station (132/22kV) and two loop-in loop-out power lines (132kV) in the Mpumalanga Province. Bloemfontein.

**Butler, E. 2018.** Palaeontological Field Assessment for the proposed re-alignment and decommissioning of the Firham-Platrand 88kv Powerline, near Standerton, Lekwa Local Municipality, Mpumalanga province. Bloemfontein.

**Butler, E. 2018.** Palaeontological Desktop Assessment of the proposed Villa Rosa development In the Buffalo City Metropolitan Municipality, East London. Bloemfontein.

**Butler, E. 2018.** Palaeontological field Assessment of the proposed Villa Rosa development In the Buffalo City Metropolitan Municipality, East London. Bloemfontein.

**Butler, E. 2018.** Palaeontological desktop assessment of the proposed Mookodi – Mahikeng 400kV line, North West Province. Bloemfontein.

**Butler, E. 2018.** Palaeontological Desktop Assessment for the proposed Thornhill Housing Project, Ndlambe Municipality, Port Alfred, Eastern Cape Province. Bloemfontein.

**Butler, E. 2018.** Palaeontological desktop assessment of the proposed housing development on portion 237 of farm Hartebeestpoort 328. Bloemfontein.

**Butler, E. 2018.** Palaeontological desktop assessment of the proposed New Age Chicken layer facility located on holding 75 Endicott near Springs in Gauteng. Bloemfontein.

**Butler, E. 2018** Palaeontological Desktop Assessment for the development of the proposed Leslie 1 Mining Project near Leandra, Mpumalanga Province. Bloemfontein.

**Butler, E. 2018.** Palaeontological field assessment of the proposed development of the Wildealskloof mixed use development near Bloemfontein, Free State Province. Bloemfontein.

**Butler, E. 2018.** Palaeontological Field Assessment of the proposed Megamor Extension, East London. Bloemfontein.

**Butler, E. 2018.** Palaeontological Impact Assessment of the proposed diamonds Alluvial & Diamonds General Prospecting Right Application near Christiana on the Remaining Extent of Portion 1 of the Farm Kaffraria 314, Registration Division HO, North West Province. Bloemfontein.

## **CONFERENCE CONTRIBUTIONS**

### **NATIONAL**

#### **PRESENTATION**

Butler, E., Botha-Brink, J., and F. Abdala. A new gorgonopsian from the uppermost *Dicynodon Assemblage Zone*, Karoo Basin of South Africa. 18<sup>th</sup> the Biennial conference of the PSSA 2014. Wits, Johannesburg, South Africa.

### **INTERNATIONAL**

Attended the Society of Vertebrate Palaeontology 73<sup>th</sup> Conference in Los Angeles, America. October 2012.

## **CONFERENCES: POSTER PRESENTATION**

### **NATIONAL**

Butler, E., and J. Botha-Brink. Cranial skeleton of *Galesaurus planiceps*, implications for biology and lifestyle. University of the Free State Seminar Day, Bloemfontein. South Africa. November 2007.

Butler, E., and J. Botha-Brink. Postcranial skeleton of *Galesaurus planiceps*, implications for biology and lifestyle. 14<sup>th</sup> Conference of the PSSA, Matjesfontein, South Africa. September 2008:

Butler, E., and J. Botha-Brink. The biology of the South African non-mammaliaform cynodont *Galesaurus planiceps*. 15<sup>th</sup> Conference of the PSSA, Howick, South Africa. August 2008.

### **INTERNATIONAL VISITS**

Natural History Museum, London

July 2008

Paleontological Institute, Russian Academy of Science, Moscow

November 2014

**Name** Stephen Burton

**Profession** Environmental Scientist

**Name of Firm** SiVEST SA (Pty) Ltd

**Present Appointment** Environmental Scientist:  
Environmental Division

**Years with Firm** 11 Years

**Date of Birth** 12 January 1979

**ID Number** 7901125138083

**Nationality** South African



### Education

Matric Exemption (Natal Education Department)  
Marit burg College, PMB, K N (1991 – 1996)

### Professional Qualifications

B.Sc. ( oology 2002), University of Natal PMB, K N  
B.Sc. Honours ( oology 2003), University of Natal PMB, K N  
M.Sc. ( oology 2006), University of Kwa ulu-Natal PMB, K N  
Pr.Sci.Nat. Registration No. 117474

### Years of Experience

12 Years

### Membership to Professional Societies

International Association for Impact Assessment South Africa (IAIASa)  
South African Council for Natural Scientific Professions (SACNASP) Pr. Sci. Nat. Reg No. 117474

### Employment Record

April 2008 – present SiVEST SA (Pty) Ltd: Environmental Division - Environmental Scientist  
May 2007 – March 2008 UDIDI Project Development Company: Environmental Planner

### Language Proficiency

LANGUAGE	SPEAK	READ	WRITE
English	Fluent	Fluent	Fluent
Afrikaans	Good	Good	Good

### Key Experience

Field of Specialisation in Environmental Science, oology (specifically Ornithology and Mammology), Entomology and Wetland Ecology. Stephen is skilled in the following fields:-

- Evaluation of Biodiversity

- Management Recommendations
- Scoping Reports and Environmental Impact Assessments
- Bird Identification
- Grass Identification
- Tree Identification
- Mammal Identification
- Wetland Ecology
- Wetland Delineation
- Wetland Functionality Assessments
- Wetland Rehabilitation Plans
- GIS Package Skills, particularly ESRI products
- Statistical Package Skills, particularly STATISTICA, PDAP and R-Statistics.

Stephen has completed a Bachelor of Science Degree with a Zoology Major (University of Natal, PMB), as well as a Bachelor of Science (Honours) in Zoology (University of Natal, PMB). Stephen has also completed a Master of Science Degree in Zoology (University of Kwa ulu-Natal, PMB). This post-graduate degree was fieldwork and lab based and provided practical experience in conceptualising, planning, modelling and executing of a project.

Stephen has been involved in consulting since May 2007, which included scoping reports, environmental management plans, integrated management plans, rezoning applications, development facilitation act applications, basic assessment reports, environmental impact reports and strategic environmental assessments. He has been involved in a number of faunal assessments for developments ranging from power lines and water pipelines, to housing developments and light industrial developments. In addition, Stephen has undertaken a number of wetland assessments, and wetland rehabilitation plans, for developments ranging from pipelines through housing and industrial developments.

Since joining SiVEST Environmental Division in April 2008, Stephen has been involved in a number of projects ranging from Environmental Management Planning for Eskom Power lines to the writing up of scoping reports and environmental impact reports for various projects, and the auditing of Eskom Power lines, district roads and Umgeni Water pipelines and dams. In addition, he has developed specialist skills in faunal and wetland assessments for a range of development types.

## Projects Experience

### April 2008 – present

#### **POWERLINE/ROADS PROJECTS**

- D1562 Road Upgrade
- Franklin Overhead Power Line
- Eskom Grassridge Melkhout Power Line Rebuild
- Bulwer-Lamington Power Line
- Lukhanyeni and Maduna Access Roads, Umzimkhulu, Basic Assessment Class Application
- D1131 and D1137 Roads in Msunduzi
- Harvard-Soutdrift Power Line (Solar Reserve South Africa)
- Lengau Sub-Station & Switching Yard (Solar Reserve South Africa)
- Eskom Corinth-Mongwana
- Eskom Ndwedwe to Appelsbosch
- Eskom Empangeni-Mandeni / Fairbreeke
- Spoornet Coal Link Upgrade
- Eskom Eros to Port Edward 132kV distribution lines
- Eskom Royal Substation
- Eskom Corinth-Lamington

## DEVELOPMENT PROJECTS

- Shemula Water Treatment Works Expansion
- Mooi River Industrial Park Development, EIA
- MiddelFontein Housing Development, Kokstad, EIA
- Thanda Integrated Management Plan Development
- Ladysmith Extension 15 Development EIA
- Ladysmith Shopping Mall EIA
- Ladysmith Pedestrian Bridges BA
- Peacetown Taxi Rank BA
- Crookes Brothers EMF – Analysis Report

## WATER PROJECTS

- Swayimane Community Water Supply Scheme
- Mooi-Mgeni Water Transfer System – Phase 2 (Trans-Caledon Tunnel Authority)
- Middeldrift Phase 2 Community Water Supply Scheme
- Shemula Water Treatment Works Expansion and Rising Main
- Richmond Pipeline, Umgeni Water
- Imvutshane Dam, Umgeni Water
- Shemula Water Treatment Works Expansion
- Bulwer Dam EIA
- Ha elmere Pipeline, Umgeni Water
- Sundumbilli Community Water Supply Scheme
- Bulwer Farm Community Water Supply Scheme
- Umhlumayo Phase 4 (Fitty Park) Water Supply Scheme
- Raisethorpe Canal

## ENVIRONMENTAL AUDITING / ENVIRONMENTAL CONTROL OFFICER (ECO)

- Mooi-Mgeni Water Transfer System – Phase 2 (Trans-Caledon Tunnel Authority)
- imbali Golf Course Estate Development
- Middeldrift Phase 2 Community Water Supply Scheme
- Shemula Water Treatment Works Expansion and Rising Main
- welethu - Port Edward Power Line
- Richmond Pipeline, Umgeni Water
- Imvutshane Dam, Umgeni Water
- Ha elmere Pipeline, Umgeni Water
- Mpumulanga Town Centre Precinct, Shopping Centre Development
- Lukhanyeni and Maduna Access Roads, Um imkhulu Environmental Auditing
- Rainbow Farms Broiler Houses (B17/B18)
- Ludeke- welethu Power Lines, Port Edward
- Sundumbilli Community Water Supply Scheme
- Eros to Kokstad Power Line
- Roads in the Msundu i Municipality
- Raisethorpe Canal
- Eskom Empangeni-Mandeni / Fairbree e(Obanjeni) Power Line
- Eskom Mandeni-Dlange wa Power Line
- Brewitt Park Housing Development, Escourt

## GIS INPUT MAPPING

- Arcelor-Mittal Newcastle Vegetation Assessment – Mapping & Desktop Assessment
- Normandien Farms – Mapping & Desktop Assessment

- imbali Lakes and Golf Course Estate - Mapping
- Cornubia Industrial Development one - Mapping
- Mshwathi Pipeline - Mapping
- Porritt Access Road Dispute, Snowdon Farm Trust - Mapping
- SNA Roads - Mapping & Desktop Assessment
- Ballito Flats - Mapping & Desktop Assessment
- DOW Veterinary Quarantine - Mapping & Desktop Assessment
- Farm Isonti - Mapping
- Havaan CT - Mapping
- Ilinga Phase 3 EIA - Mapping
- Ellingham Estate - Mapping
- Motala Housing - Mapping
- Ndundula Road - Mapping & Desktop Assessment
- Okhahlamba Landfill and Cemetery Project - Mapping & Desktop Assessment
- SNA Roads - Mapping & Desktop Assessment
- Woodridge Estate - Mapping
- Umgeni Water Ngcebo Biodiversity - Mapping
- Alton Warehouse - Mapping & Desktop Assessment
- Shell Hans Dettman - Mapping & Desktop Assessment
- Lower Tugela Bulk Water Supply Scheme Extension - Mapping & Desktop Assessment

#### WETLAND ASSESSMENTS AND REHABILITATION PLANS

- Rockdale Wetland Assessment
- Tooverberg Wind Energy Farm
- Sibaya Node 5 Development
- Transnet Wetland Functionality and Biodiversity Assessment for Port of Richards Bay
- Cornubia Rem 68 Development
- Dube Tradeport State of the Environment Report
- Eshowe SSA1 Bulk Water Supply Scheme
- Umgeni Water Waste Water Treatment Plant Offsets
- Osiweni Industrial Development
- Bishopstowe Strategic Environmental Assessment
- Esheni D Housing Development
- Ilinga Phase 3 Residential Development Amendment
- Dannhauser Bulk Water Supply
- Transnet Richards Bay Port Wetland Assessment
- Raisethorpe Canal Phase 2
- Mimosadale Bulk Water Supply
- Greater Edendale EMF
- Shemula Phases 2-6 Pipeline
- Sumitomo New Rubber Plant
- Riverside Cemetery Development
- DTP Support Zone 2 Development
- Wosiyane/Swayimane Pipeline
- IRPTN Corridor 4 Development
- Sibaya Development
- Cornubia North Development
- Tinley Manor North Development
- Ilinga Phase 3 Development
- Nonoti-inkwazi Development
- imbali Estate Properties
- Mthandeni Irrigation Scheme



- Strode Property Development
- Ethekewini Integrated Rapid Public Transport Network Corridor 9
- D1562 Road Upgrade
- Cornubia Phase 2 Development
- Compensation Flats Development
- imbali Estate Development
- Mandeni Cemetery
- Fairmont Hotel
- Tinley Manor South Development
- Maidstone Mill Development
- Mnambithi Substation and Powerline
- N uthu Town Erf 16 & 17 Development
- Goswell Platform Development - Cato Ridge
- Driefontein Pipeline Route - Ladysmith
- Blaaubosch Housing Development - Newcastle
- Madadeni Housing Development - Newcastle
- Hyde Park Country Estate
- Newcastle Municipality New Cemetery Sites

#### FAUNAL ASSESSMENTS

- Umlaas Gate Faunal Assessment
- Ntunjambili Bulk Water Supply Scheme
- In-depth specialist studies (including faunal) for Port of Richards Bay
- Kassier Road North Mixed Use Development
- Transnet Richards Bay Port Faunal Assessment
- Greater Edendale EMF
- Shemula Phase 2-6 Pipeline
- Milky Way Shopping Centre Development
- Dudley Pringle Development
- Lindokuhle Housing Development
- Shongweni Bulk Water Pipeline
- Ethekewini Integrated Rapid Public Transport Network Corridor 1
- Ethekewini Integrated Rapid Public Transport Network Corridor 3
- Ethekewini Integrated Rapid Public Transport Network Corridor 9
- Newcastle Municipality New Cemetery Sites
- Shongweni Mixed-Use Development
- Nonoti Beach Tourism Development
- Proposed Shoprite & Checkers Distribution Centre Development, Marianhill
- Proposed Cornubia Development, Umhlanga
- Lower Tugela Bulk Water Supply Scheme Extension
- Proposed Redcliffe Housing Development in Ethekewini Municipality

#### AVI- FAUNAL ASSESSMENTS

- Proposed High Voltage Powerline to Cygnus Substation, Empangeni
- Proposed High Voltage Powerline between Corinth and Lamington Substations, Underberg
- Proposed High Voltage Powerline between Corinth and M ongwana Substations



## Dr. Neville Bews & Associates – Johannesburg, South Africa

### EDUCATION

- *B.A. (Soc), University of South Africa, 1980*
- *B.A. (Soc) (Hons), University of South Africa, 1984*
- *The Henley Post Graduate Certificate in Management, Henley Management College, United Kingdom*
- *M.A. (Cum Laude), Rand Afrikaans University, 1999*
- *D. Litt. et Phil., Rand Afrikaans University, 2000*

Dr Neville Bews is a senior social scientist and human resource professional with 38 years' experience. He consults in the fields of Social Impact Assessments and research, and human resource management. He has worked on a number of large infrastructure, mining and water resource projects. He at times lectures on social impact assessment for the Department of Sociology, University of Johannesburg.

## EXPERIENCE – EXAMPLES

### Water resources and regional planning Social Impact Assessments

#### Department of Water Affairs and Forestry

#### South Africa

Social impact assessment for the Mokolo and Crocodile River (West) Water Augmentation Project for increased and assurance of water supply. Research socio-economic circumstances, data analysis, assessment, authored report.

Mzimvubu Water Project Eastern Cape. Research socio-economic circumstances, data analysis, assessment, authored report. Umkhomazi Water Project Phase 1 – Raw Water Component Smithfield Dam - 14/12/16/3/3/3/94; Water Conveyance Infrastructure - 14/12/16/3/3/3/94/1; Balancing Dam - 14/12/16/3/3/3/94/2.

Umkhomazi Water Project Phases 1 – Raw Water Components

Smithfield Dam – 14/12/16/3/3/3/94/

Water Conveyance Infrastructure – 14/12/16/3/3/3/94/1

Balancing Dam – 14/12/16/3/3/3/94/2

Umkhomazi Water Project Phases 2 – Potable Water Component – 14/12/16/3/3/3/95.

**The Aveng (Africa) Group Limited (Grinaker LTA)**

**South Africa**

Assisting the construction company with the social management of the Mokolo and Crocodile River (West) Water Augmentation Project. Consult and mediate between contractors and affected parties advise on strategies to reduce tensions between contractors and the public.

**Sedibeng District Municipality**

**South Africa**

Social impact assessment for the Environmental Management Plan for the Sedibeng District, on behalf of Felehetsa Environmental (Pty) Ltd. Research socio-economic circumstances, data analysis, assessment, authored report.

**Felehetsa Environmental (Pty) Ltd**

**South Africa**

Social Impact Assessment for Waterfall Wedge housing and business development situated in Midrand Gauteng. Research socio-economic circumstances, data analysis, assessment, authored report.

**NEMAI Consulting Environmental & Social Consultants**

**South Africa**

Ncwabeni: Off-Channel Storage Dam, KwaZulu-Natal. Research socio-economic circumstances, data analysis, assessment, authored report.

### **Social Assessments for mining clients**

**Vale**

**Mozambique**

Socio-economic impact assessment of proposed Moatize power plant, Tete. Research socio-economic circumstances, data analysis, assessment, authored report.

**Exxaro Resources Limited**

**South Africa**

Social impact assessment for the social and labour plan for Leeuwpan Coal Mine, Delmas. Research socio-economic circumstances, data analysis, assessment, authored report.

Social impact assessment for the social and labour plan for Glen Douglas Dolomite Mine, Henley-on-Klip. Research socio-economic circumstances, data analysis, assessment, authored report.

Social impact assessment for the social and labour plan for Grootegeluk Open Cast Coal Mine, Lephallale. Research socio-economic circumstances, data analysis, assessment, authored report.

Social and labour plan for the Paardekraal Project, Belfast. Research socio-economic circumstances, data analysis, assessment, authored report.

Social impact assessment for the Paardekraal Belfast Project Belfast. Research socio-economic circumstances, data analysis, assessment, authored report.

**Kumba Resources Ltd**

**South Africa**

Social Impact Assessments for the Sishen Iron Ore Mine in Kathu Northern Cape. Research socio-economic circumstances, data analysis, assessment, authored report.

Social Impact Assessments for the Sishen South Project in Postmasburg, Northern Cape. Research socio-economic circumstances, data analysis, assessment, authored report.

Social Impact Assessments for the Dingleton resettlement project at Sishen Iron Ore Mine Kathu, Northern Cape. Research socio-economic circumstances, data analysis, assessment, authored report.

**Gold Fields**

**South Africa**

Social Impact Assessment for the Gold Fields West Wits Project. Research socio-economic circumstances, data analysis, assessment, authored report.

**Anglo Coal**

**South Africa**

Review of social impact assessment for the proposed Waterberg Gas 37-spot coalbed methane (CBM) bulk yield test project.

**Sekoko Mining**

**South Africa**

Sekoko Wayland Iron Ore, Molemole Local Municipalities in Limpopo Province. Research socio-economic circumstances, data analysis, assessment, authored report.

**Memor Mining (Pty) Ltd**

**South Africa**

Langpan Chrome Mine, Thabazimbi, Limpopo. Research socio-economic circumstances, data analysis, assessment, authored report.

**Prescali Environmental Consultants (Pty) Ltd**

**South Africa**

Vlakpoort Open Cast Mine – Thabazimbi, Limpopo. Research socio-economic circumstances, data analysis, assessment, authored report.

**Afrimat Ltd**

**South Africa**

1. Marble Hall Lime Burning Project: Social Impact Assessment – Limpopo.
2. Glen Douglas Lime Burning Project: Social Impact Assessment - Henley-on Klip, Midvaal

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## Social assessments for regional and linear projects

### **Gautrans**

**South Africa**

Social impact for the Gautrain Rapid Rail Link, Pretoria to Johannesburg and Kempton Park. Managed a team of 10 field workers, research socio-economic circumstances, data analysis, assessment, and co-authored report.

### **South African National Road Agency Limited**

**South Africa**

Social Impact of tolling the Gauteng Freeway Improvement Project. Research socio-economic circumstances, data analysis, assessment, authored report.

Social Impact of the N2 Wild Coast Toll Highway. Managed a team of three specialists. Research socio-economic circumstances, data analysis, assessment, co-authored report.

SIA for the N3 Keeversfontein to Warden (De Beers Pass Section). Research socio-economic circumstances, data analysis, assessment, authored report.

### **Transnet**

**South Africa**

Social impact assessment for the Transnet New Multi-Product Pipeline Project (555 km) (Commercial Farmers). Research socio-economic circumstances, data analysis, assessment, authored report.

Expansion of Railway Loops at Arthursview; Paul; Phokeng and Rooiheuvel Sidings in the Bojanala Platinum District Municipality in the North West Province for Transnet Soc Ltd.

### **Eskom Holdings Limited**

**South Africa**

Social Impact Assessment for the Ubertas 88/11kV Substation in Sandton, Johannesburg. Research socio-economic circumstances, data analysis, assessment, authored report.

Nuclear 1 Power Plant. Assisted with the social impact assessment consulting to Arcus GIBB Engineering & Science. Peer review and adjusted the report and assisted at the public participation feedback meetings.

Social impact assessment for Eskom Holdings Limited, Transmission Division's Neptune-Poseidon 400kV Power Line in the Eastern Cape. Research socio-economic circumstances, data analysis, assessment, authored report.

Social Impact assessment for Eskom Holdings Limited, Transmission Division, Forskor-Mernsky 275kV±130km Powerline and Associated Substation Works in Limpopo Province. Research socio-economic circumstances, data analysis, assessment, authored report.

**Eskom Holdings Limited, Transmission Division**

**South Africa**

Social Impact assessment for Eskom Holdings Limited, Transmission Division, Tubatse Strengthening Phase 1 – Senakangwedi B Integration in Limpopo Province. Research socio-economic circumstances, data analysis, assessment, authored report.

Basic SIA study for Proposed 1 X 400 kV Eskom Maphutha - Witkop 170 km Powerline.

Social Impact Assessment for the Mulalo Main Transmission Substation and Power Line Integration Project, Secunda

**MGTD Environmental**

**South Africa**

Social impact assessment for a 150MW Photovoltaic Power Plant and Associated Infrastructure in Mpumalanga. Research socio-economic circumstances, data analysis, assessment, authored report.

10MWp Photovoltaic Power Plant & Associated Infrastructure, North West Province. Research socio-economic circumstances, data analysis, assessment, authored report.

**eThekweni Municipality**

**South Africa**

Social impact assessment for the proposed infilling of the Model Yacht Pond at Blue Lagoon, Stiebel Place, Durban. Research socio-economic circumstances, data analysis, assessment, authored report.

Kennedy Road Housing Project, Ward 25 situated on 316 Kennedy Road, Clare Hills (Erf 301, Portion 5).

**Afzelia Environmental Consultants and Environmental Planning & Design**

**South Africa**

Proposed Cato Ridge Crematorium In Kwazulu-Natal Province

**MGTD Environmental**

**South Africa**

ABC Prieska Solar Project; Proposed 75 MWp Photovoltaic Power Plant and its associated infrastructure on a portion of the remaining extent of ERF 1 Prieska, Northern Cape. Research socio-economic circumstances, data analysis, assessment, authored report.

ABC Prieska Solar Project; Proposed 75 MWp Photovoltaic Power Plant and its associated infrastructure on a portion of the remaining extent of ERF 1 Prieska, Northern Cape.

## **Assessments for social projects and social research**

**Australia – Africa 2006 Sport Development Program**

**South Africa**

To establish and assess the impact of the Active Community Clubs Initiative on the communities of NU2 (in the township of Mdantsane)\*and Tshabo (a rural village). Lead researcher social, data collection and analysis, assessment.

**United Nations Office on Drugs and Crime** **South Africa**  
Evaluation of a Centre for Violence Against Women in Upington. Research socio-economic circumstances, data analysis, assessment, co-authored report.

**University of Johannesburg** **South Africa**  
Research into research outputs of academics working in the various departments of the university. Research socio-economic circumstances, data analysis, assessment, authored report.

## Human Resource and management training

**Various national companied** **South Africa**  
Developed and run various management courses such as, recruitment selection & placement; industrial relations / disciplinary hearings; team building workshops; multiculturalism workshop.  
1986-2007

**University of South Africa, Department of Industrial Psychology** **South Africa**  
Developed the performance development study guide for industrial psychology 3. 2000

**Authored Chapters in HR books** **South Africa**  
In Slabbert J.A. de Villiers, A.S. & Parker A (eds.). Managing employment relations in South Africa. Teamwork within the world-class organisation. 2005

In Muchinsky, P. M. Kriek, H. J. & Schreuder, A. M. G. Personnel Psychology 3rd Edition  
Chapter 9 – Human resource planning.  
Chapter 10 – The changing nature of work. 2005

In Rossouw, G. J. and van Vuuren, L. Business Ethics - Made in Africa 4th Edition.  
Chapter 11 – Building Trust with Ethics. 2010

**South African Management Development Institute (SAMDI) Democratic Republic of the Congo**  
Developed a course on Strategic Human Resource Planning for SAMDI and the Democratic Republic of the Congo as well as trainer's manuals for this course. 2006.

**Competition Tribunal** **South Africa**  
Developed a Performance Management System and Policy for the Competition Tribunal South Africa. 2006

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## PUBLICATIONS

Bews, N. & Martins, N. 2002. An evaluation of the facilitators of trustworthiness. SA Journal of Industrial Psychology. 28(4), 14-19.

Bews, N. Martins, N. & von der Ohe, H. 2002. Editorial. SA Journal of Industrial Psychology. 28(4), 1.

Bews, N. & Rossouw, D. 2002. Contemporary organisational change and the importance of trust. SA Journal of Industrial Psychology. 28(4), 2-6.

Bews, N. & Uys, T. 2002. The impact of organisational restructuring on perceptions of trustworthiness. SA Journal of Industrial Psychology. 28(4), 21-28.

Bews, N & Rossouw, D. 2002. A role for business ethics in facilitating trustworthiness. Journal of Business Ethics. 39: 377-390.

Bews, N. 2009. A matter of trust – Gaining the confidence of the public and client. IAIA Newsletter Forthcoming (Spring 2009).

Bews, N. 2009. Does he who pays the bill call the shots? Sitting astride client and public interest – the dilemma of maintaining credibility in impact assessments. IAIA Newsletter Winter – 2009.

Bews, N. 2002. Reducing your company's risk of sexual harassment claims. HR Future. (2) 2 10-11.

Bews, N. & Martins, N. von der Ohe, H. 2002. Organisational change and trust: Experiences here and abroad. Management Today, (18) 8 34-35.

Martins, N. Bews, N. & von der Ohe, H. 2002. Organisational change and trust. Lessons from Europe and South African organisations. HR Future, (2)9 46-47.

Rossouw, D. & Bews, N. 2002. The importance of trust within a changing business environment. Management Today. 18(2) 26-27.

Bews, N. 2001. You can put a value to trust in the new economy. HR Future, (1)1 48-49.

Bews, N. 2001. Maintaining trust during organisational change. Management Today, (17) 2 36-39.

Bews, N. 2001. Business ethics, trust and leadership: how does Africa fare? Management Today, (17) 7 14-15.

Rossouw, D & Bews, N. 2001. Trust is on the decline in the workplace, yet it's vital for modern organisational success. People Dynamics. (18) 6 28-30.



---

Bews, N. & Uys, T. 2001. The effects of restructuring on organisational trust. *HR Future*, (1)8 50-52.

Rossouw, G. J. & Bews, N. F. 2010. Building Trust with Ethics. In Rossouw, G. J. and van Vuuren, L. *Business Ethics - Made in Africa 4th Edition*. Cape Town: Oxford University Press.

Bews N. 2005. Teamwork within the world-class organisation. In Slabbert J.A. de Villiers, A.S. & Parker A (eds.). *Managing employment relations in South Africa*. Durban : Butterworths.

Bews, N. F. 2005. Human resource planning. In Muchinsky, P. M. Kriek, H. J. & Schreuder, A. M. G. 2005. *Personnel Psychology 3rd Edition*. Cape Town; Oxford University Press.

Bews, N. F. 2005. The changing nature of work. In Muchinsky, P. M. Kriek, H. J. & Schreuder, A. M. G. 2005. *Personnel Psychology 3rd Edition*. Cape Town; Oxford University Press.

Bews, N. F. 2005. Chapter 9 & 13. In Muchinsky, P. M. Kriek, H. J. & Schreuder, A. M. G. 2005. *Instructor's Manual. Personnel Psychology 3rd Edition*. Cape Town; Oxford University Press.

Bews, N. F., Schreuder, A. M. G. & Vosloo, S. E. 2000. *Performance Development. Study guide for Industrial Psychology 3*. Pretoria: University of South Africa.

Uys, T. and Bews, N. 2003. "Not in my Backyard": Challenges in the Social Impact Assessment of the Gautrain. Department of Sociology Seminar, RAU. 23 May 2003.

Bews, N. 2002. The value of trust in the new economy. Industrial Relations Association of South Africa (Irasa). Morning seminar 21 August 2002.

Bews, N, 2002. The issue of trust considered. Knowledge Recourses seminar on Absenteeism. The Gordon Institute of Business. 27 August 2002.

Bews, N. & Uys, T. 2001. The impact of organisational trust on perceptions of trustworthiness. South African Sociological Association Conference. Pretoria.

Bews, N. 2001. Business Trust, Ethics & Leadership:- Made in Africa. International Management Today/Productivity Development Conference. Hosted by Productivity Development (Pty) Ltd & Management Today. Best Knowledge in Leadership Practice Conference 23-24 July 2001.

Bews, N. 2001. Charting new directions in leading organisational culture and climate change. Workplace Transformation and Organisational Renewal. Hosted by The Renaissance Network. November 2001.

Bews, N. 2000. Towards a model for trust. South African Sociological Association Conference. Saldanha.

---

Bews, N. 2003. 'Social Impact Assessments, theory and practice juxtaposed – Experience from a South African rapid rail project.' New Directions in Impact Assessment for Development: Methods and Practice Conference. University of Manchester, Manchester, England.

### **MEMBERSHIP OF PROFESSIONAL BODIES**

Member of South African Affiliate of the International Association for Impact Assessment (IAIAsa).  
Membership Number: 2399

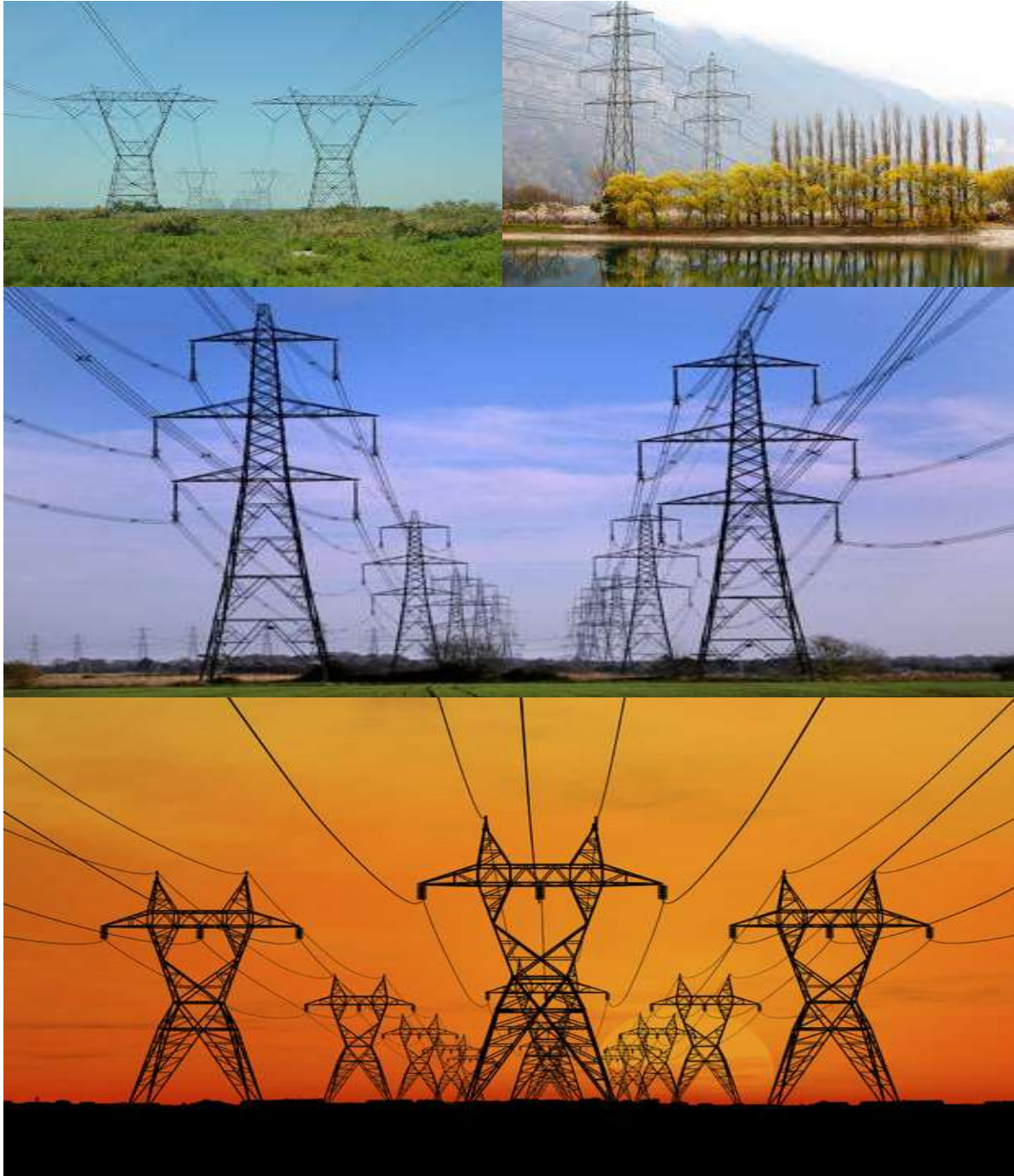
Registered on database for scientific peer review of iSimangaliso GEF project outputs

## **Annexure B**

### **Pre-Approved Generic EMPr Templates**

APPENDIX 1  
GENERIC ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) FOR THE  
DEVELOPMENT AND EXPANSION FOR OVERHEAD ELECTRICITY  
TRANSMISSION AND DISTRIBUTION INFRASTRUCTURE

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

Part	Section	Heading	Content
			<p>template contained in <u>Part B: Section 1</u>, and understands that the impact management outcomes and impact management actions are <b>legally binding</b>. 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 <u>Part C</u>.</p> <p>This section <b>must be</b> submitted to the CA together with the final BAR or EIAR. The information submitted to the CA will be considered to be incomplete should a signed copy of <u>Part B: section 2</u> not be submitted. Once approved, this Section forms part of the EMPr for the development and is legally binding.</p>
C		Site specific sensitivities/ attributes	<p>If any specific environmental sensitivities/ attributes are present on the site which require site specific impact management outcomes and impact management actions, not included in the pre-approved generic EMPr, to manage impacts, these specific impact management outcomes and impact management actions must be included in this section. These specific environmental attributes must be referenced spatially and impact management outcomes and impact management actions must be provided. These specific impact management outcomes and impact management actions must be presented in the format of the pre-approved EMPr template (<u>Part B: section 1</u>)</p> <p>This section will not be required should the site contain no specific environmental sensitivities or attributes. However, if <u>Part C</u> is applicable to the site, it <b>is required</b> 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 approved, Part C forms part of the EMPr for the site and is legally binding.</p>

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

## 6. Completion of part B: section 1: the pre-approved generic EMP 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

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

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

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

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

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

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



Responsible Person (s)	Role and Responsibilities
	<p>The responsibilities of the ECO will include the following:</p> <ul style="list-style-type: none"> <li>- Be aware of the findings and conclusions of all EA related to the development;</li> <li>- Be familiar with the recommendations and mitigation measures of this EMPr;</li> <li>- Be conversant with relevant environmental legislation, policies and procedures, and ensure compliance with them;</li> <li>- 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;</li> <li>- Educate the construction team about the management measures contained in the EMPr and environmental licenses;</li> <li>- Compilation and administration of an environmental monitoring plan to ensure that the environmental management measures are implemented and are effective;</li> <li>- Monitoring the performance of the Contractors and ensuring compliance with the EMPr and associated Method Statements;</li> <li>- 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;</li> <li>- Liaison between the DPM, Contractors, authorities and other lead stakeholders on all environmental concerns;</li> <li>- Compile a regular environmental audit report highlighting any non-compliance issues as well as satisfactory or exceptional compliance with the EMPr;</li> <li>- Validating the regular site inspection reports, which are to be prepared by the contractor Environmental Officer (cEO);</li> <li>- Checking the cEO's record of environmental incidents (spills, impacts, legal transgressions etc) as well as corrective and preventive actions taken;</li> <li>- Checking the cEO's public complaints register in which all complaints are recorded, as well as action taken;</li> <li>- Assisting in the resolution of conflicts;</li> <li>- Facilitate training for all personnel on the site – this may range from carrying out the training, to reviewing the training programmes of the Contractor;</li> <li>- 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;</li> <li>- Maintenance, update and review of the EMPr;</li> <li>- Communication of all modifications to the EMPr to the relevant stakeholders.</li> </ul>
developer Environmental Officer	<u>Role</u>

Responsible Person (s)	Role and Responsibilities
(dEO)	<p>The dEOs will report to the Project Manager and are responsible for implementation of the EMPr, environmental monitoring and reporting, providing environmental input to the Project Manager and Contractor's Manager, liaising with contractors and the landowners as well as a range of environmental coordination responsibilities.</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> <li>- Be fully conversant with the EMPr;</li> <li>- Be familiar with the recommendations and mitigation measures of this EMPr, and implement these measures;</li> <li>- Ensure that all stipulations within the EMPr are communicated and adhered to by the Employees, Contractor(s) ;</li> <li>- Confine the development site to the demarcated area;</li> <li>- Conduct environmental internal audits with regards to EMPr and authorisation compliance (on cEO);</li> <li>- Assist the contractors in addressing environmental challenges on site;</li> <li>- Assist in incident management:</li> <li>- Reporting environmental incidents to developer and ensuring that corrective action is taken, and lessons learnt shared;</li> <li>- Assist the contractor in investigating environmental incidents and compile investigation reports;</li> <li>- Follow-up on pre-warnings, defects, non-conformance reports;</li> <li>- Measure and communicate environmental performance to the Contractor;</li> <li>- Conduct environmental awareness training on site together with ECO and cEO;</li> <li>- Ensure that the necessary legal permits and / or licenses are in place and up to date;</li> <li>- Acting as Developer's Environmental Representative on site and work together with the ECO and contractor;</li> </ul>
Contractor	<p><u>Role</u></p> <p>The Contractor appoints the cEO and has overall responsibility for ensuring that all work, activities, and actions linked to the delivery of the contract are in line with the EMPr and that Method Statements are implemented as described. External contractors must ensure compliance with this EMPr while performing the onsite activities as per their contract with the Project Developer. The contractors are required, where</p>

Responsible Person (s)	Role and Responsibilities
	<p>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.</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> <li>- project delivery and quality control for the development services as per appointment;</li> <li>- 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;</li> <li>- 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;</li> <li>- attend on site meeting(s) prior to the commencement of activities to confirm the procedure and designated activity zones;</li> <li>- 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.</li> </ul>
contractor Environmental Officer (cEO)	<p><u>Role</u></p> <p>Each Contractor affected by the EMPr should appoint a cEO, who is responsible for the on-site implementation of the EMPr (or relevant sections of the EMPr). The Contractor's representative can be the site agent; site engineer; a dedicated environmental officer; or an independent consultant. The Contractor must ensure that the Contractor's Representative is suitably qualified to perform the necessary tasks and is appointed at a level such that she/he can interact effectively with other site Contractors, labourers, the Environmental Control Officer and the public. As a minimum the cEO shall meet the following criteria:</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> <li>- Be on site throughout the duration of the project and be dedicated to the project;</li> <li>- Ensure all their staff are aware of the environmental requirements, conditions and constraints with respect to all of their activities on site;</li> <li>- Implementing the environmental conditions, guidelines and requirements as stipulated within the EA,</li> </ul>

Responsible Person (s)	Role and Responsibilities
	<p>EMPr and Method Statements;</p> <ul style="list-style-type: none"> <li>- Attend the Environmental Site Meeting;</li> <li>- Undertaking corrective actions where non-compliances are registered within the stipulated timeframes;</li> <li>- Report back formally on the completion of corrective actions;</li> <li>- Assist the ECO in maintaining all the site documentation;</li> <li>- Prepare the site inspection reports and corrective action reports for submission to the ECO;</li> <li>- Assist the ECO with the preparing of the monthly report; and</li> <li>- Where more than one Contractor is undertaking work on site, each company appointed as a Contractor will appoint a cEO representing that company.</li> </ul>

## 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 Substance's;
- Vegetation management – Protected, clearing, aliens, felling;
- Access management – Roads, gates, crossings etc.;
- Fire plan;
- Waste management – transport, storage, segregation, classification, disposal (all waste streams);
- Social interaction – complaints management, compensation claims, access to properties etc.;
- Water – use (source, abstraction and disposal), access and all related information, crossings and mitigation;
- Emergency preparedness – Spills, training, other environmental emergencies;
- Dust and noise management methodologies;
- Fauna interaction and risk management – only if the risk was identified – wildlife interaction especially on game farms; and
- Heritage and palaeontology management.

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

#### 4.6 Environmental Incident Log (Diary)

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

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

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

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

The Environmental Incident Log will be captured in the EAR.

#### 4.7 Non-compliance

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

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

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

#### 4.8 Corrective action records

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

#### 4.9 Photographic record

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

The Contractor shall:

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

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

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



#### 4.10 Complaints register

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

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

#### 4.11 Claims for damages

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

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

#### 4.12 Interactions with affected parties

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

The ECOs shall:

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

#### 4.13 Environmental audits

Internal environmental audits of the activity and implementation of the EMPr must be undertaken. The findings and outcomes 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 contractor and the holder of the EA. This template, once signed and dated, is legally binding. The holder of the EA will remain responsible for its implementation.

**5.1 Environmental awareness training**

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

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> <li>- All staff must receive environmental awareness training prior to commencement of the activities;</li> <li>- The Contractor must allow for sufficient sessions to train all personnel with no more than 20 personnel attending each course;</li> <li>- Refresher environmental awareness training is available as and when required;</li> <li>- 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;</li> <li>- The Contractor must erect and maintain information posters at key locations on site, and the posters must include the following information as a minimum:               <ul style="list-style-type: none"> <li>a) Safety notifications; and</li> <li>b) No littering.</li> </ul> </li> <li>- Environmental awareness training must include as a minimum the following:               <ul style="list-style-type: none"> <li>a) Description of significant environmental impacts, actual or potential, related to their work activities;</li> <li>b) Mitigation measures to be implemented when carrying out specific activities;</li> <li>c) Emergency preparedness and response</li> </ul> </li> </ul>						

<p>procedures;</p> <ul style="list-style-type: none"> <li>d) Emergency procedures;</li> <li>e) Procedures to be followed when working near or within sensitive areas;</li> <li>f) Wastewater management procedures;</li> <li>g) Water usage and conservation;</li> <li>h) Solid waste management procedures;</li> <li>i) Sanitation procedures;</li> <li>j) Fire prevention; and</li> <li>k) Disease prevention.</li> </ul> <ul style="list-style-type: none"> <li>- A record of all environmental awareness training courses undertaken as part of the EMPr must be available;</li> <li>- Educate workers on the dangers of open and/or unattended fires;</li> <li>- A staff attendance register of all staff to have received environmental awareness training must be available.</li> <li>- Course material must be available and presented in appropriate languages that all staff can understand.</li> </ul>						
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**5.2 Site Establishment development**



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

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> <li>- 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;</li> <li>- Location of camps must be within approved area to ensure that the site does not impact on sensitive areas identified in the environmental assessment or site walk through;</li> <li>- Sites must be located where possible on previously disturbed areas;</li> <li>- The camp must be fenced in accordance with <b>Section 5.5: Fencing and gate installation</b>; and</li> <li>- The use of existing accommodation for contractor staff, where possible, is encouraged.</li> </ul>						

**5.3 Access restricted areas**

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**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
<ul style="list-style-type: none"> <li>- Identification of access restricted areas is to be informed by the environmental assessment, site walk through and any additional areas identified during development;</li> <li>- 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</li> <li>- Unauthorised access and development related activity inside access restricted areas is prohibited.</li> </ul>						

**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
<ul style="list-style-type: none"> <li>- Access to the servitude and tower positions must be negotiated with the relevant landowner and must fall within the assessed and authorised area;</li> <li>- An access agreement must be formalised and signed by the DPM, Contractor and landowner before commencing with the activities;</li> </ul>						

<ul style="list-style-type: none"> <li>- The access roads to tower positions must be signposted after access has been negotiated and before the commencement of the activities;</li> <li>- 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</li> <li>- All contractors must be made aware of all these access routes.</li> <li>- Any access route deviation from that in the written agreement must be closed and re-vegetated immediately, at the contractor's expense;</li> <li>- Maximum use of both existing servitudes and existing roads must be made to minimize further disturbance through the development of new roads;</li> <li>- In circumstances where private roads must be used, the condition of the said roads must be recorded in accordance with <b>section 4.9: photographic record</b>; prior to use and the condition thereof agreed by the landowner, the DPM, and the contractor;</li> <li>- Access roads in flattish areas must follow fence lines and tree belts to avoid fragmentation of vegetated areas or croplands</li> <li>- Access roads must only be developed on pre-planned and approved roads.</li> </ul>						
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**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
<ul style="list-style-type: none"> <li>- Use existing gates provided to gain access to all parts of the area authorised for development, where possible;</li> <li>- Existing and new gates to be recorded and documented in accordance with <b>section 4.9: photographic record</b>;</li> <li>- All gates must be fitted with locks and be kept locked at all times during the development phase, unless otherwise agreed with the landowner;</li> <li>- At points where the line crosses a fence in which there is no suitable gate within the extent of the line servitude, on the instruction of the DPM, a gate must be installed at the approval of the landowner;</li> <li>- Care must be taken that the gates must be so erected that there is a gap of no more than 100 mm between the bottom of the gate and the ground;</li> <li>- Where gates are installed in jackal proof fencing, a suitable reinforced concrete sill must be provided beneath the gate;</li> <li>- Original tension must be maintained in the fence wires;</li> <li>- All gates installed in electrified fencing must be re-electrified;</li> <li>- All demarcation fencing and barriers must be maintained in good working order for the duration of overhead transmission and distribution electricity infrastructure development activities;</li> <li>- Fencing must be erected around the camp, batching plants, hazardous storage areas, and all designated access</li> </ul>						

<p>restricted areas, where appropriate and would not cause harm to the sensitive flora;</p> <ul style="list-style-type: none"> <li>- Any temporary fencing to restrict the movement of life-stock must only be erected with the permission of the land owner.</li> <li>- All fencing must be developed of high quality material bearing the SABS mark;</li> <li>- The use of razor wire as fencing must be avoided;</li> <li>- 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;</li> <li>- On completion of the development phase all temporary fences are to be removed;</li> <li>- The contractor must ensure that all fence uprights are appropriately removed, ensuring that no uprights are cut at ground level but rather removed completely.</li> </ul>						
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**5.6 Water Supply Management**

<p><b>Impact management outcome:</b> Undertake responsible water usage.</p>						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> <li>- 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;</li> <li>- The Contractor must ensure the following: <ul style="list-style-type: none"> <li>a. The vehicle abstracting water from a river does not enter</li> </ul> </li> </ul>						

<p>or cross it and does not operate from within the river;</p> <p>b. No damage occurs to the river bed or banks and that the abstraction of water does not entail stream diversion activities; and</p> <p>c. All reasonable measures to limit pollution or sedimentation of the downstream watercourse are implemented.</p> <p>– Ensure water conservation is being practiced by:</p> <p>a. Minimising water use during cleaning of equipment;</p> <p>b. Undertaking regular audits of water systems; and</p> <p>c. Including a discussion on water usage and conservation during environmental awareness training.</p> <p>d. The use of grey water is encouraged.</p>						
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**5.7 Storm and waste water management**

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

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<p>– 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;</p> <p>– All spillage of oil onto concrete surfaces must be controlled by the use of an approved absorbent material and the used absorbent material disposed of at an appropriate waste disposal facility;</p> <p>– Natural storm water runoff not contaminated during the</p>						

<p>development and clean water can be discharged directly to watercourses and water bodies, subject to the Project Manager's approval and support by the ECO;</p> <ul style="list-style-type: none"> <li>– 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.</li> </ul>						
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**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
<ul style="list-style-type: none"> <li>– All measures regarding waste management must be undertaken using an integrated waste management approach;</li> <li>– Sufficient, covered waste collection bins (scavenger and weatherproof) must be provided;</li> <li>– A suitably positioned and clearly demarcated waste collection site must be identified and provided;</li> <li>– The waste collection site must be maintained in a clean and orderly manner;</li> </ul>						

<ul style="list-style-type: none"> <li>- Waste must be segregated into separate bins and clearly marked for each waste type for recycling and safe disposal;</li> <li>- Staff must be trained in waste segregation;</li> <li>- Bins must be emptied regularly;</li> <li>- General waste produced onsite must be disposed of at registered waste disposal sites/ recycling company;</li> <li>- Hazardous waste must be disposed of at a registered waste disposal site;</li> <li>- Certificates of safe disposal for general, hazardous and recycled waste must be maintained.</li> </ul>						
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**5.9 Protection of watercourses and estuaries**

<p><b>Impact management outcome:</b> Pollution and contamination of the watercourse environment and or estuary erosion are prevented.</p>						
<p><b>Impact Management Actions</b></p>	<p><b>Implementation</b></p>			<p><b>Monitoring</b></p>		
	<p>Responsible person</p>	<p>Method of implementation</p>	<p>Timeframe for implementation</p>	<p>Responsible person</p>	<p>Frequency</p>	<p>Evidence of compliance</p>
<ul style="list-style-type: none"> <li>- 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;</li> <li>- In the event of a spill, prompt action must be taken to clear the polluted or affected areas;</li> <li>- Where possible, no development equipment must traverse any seasonal or permanent wetland</li> <li>- No return flow into the estuaries must be allowed and no disturbance of the Estuarine Functional Zone should occur;</li> </ul>						

<ul style="list-style-type: none"> <li>- Development of permanent watercourse or estuary crossing must only be undertaken where no alternative access to tower position is available;</li> <li>- There must not be any impact on the long term morphological dynamics of watercourses or estuaries;</li> <li>- Existing crossing points must be favored over the creation of new crossings (including temporary access)</li> <li>- When working in or near any watercourse or estuary, the following environmental controls and consideration must be taken: <ul style="list-style-type: none"> <li>a) Water levels during the period of construction; No altering of the bed, banks, course or characteristics of a watercourse</li> <li>b) During the execution of the works, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented e.g. including ensuring that construction equipment is well maintained;</li> <li>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</li> <li>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.</li> </ul> </li> </ul>						
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**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
<p><b>General:</b></p> <ul style="list-style-type: none"> <li>- Indigenous vegetation which does not interfere with the development must be left undisturbed;</li> <li>- Protected or endangered species may occur on or near the development site. Special care should be taken not to damage such species;</li> <li>- 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;</li> <li>- Permits for removal must be obtained from the Department of Agriculture, Forestry and Fisheries prior to the cutting or clearing of the affected species, and they must be filed;</li> <li>- 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;</li> <li>- Trees felled due to construction must be documented and form part of the Environmental Audit Report;</li> <li>- Rivers and watercourses must be kept clear of felled trees, vegetation cuttings and debris;</li> <li>- Only a registered pest control operator may apply herbicides on a commercial basis and commercial application must be carried out under the supervision of a registered pest control operator, supervision of a registered</li> </ul>						

<p>pest control operator or is appropriately trained;</p> <ul style="list-style-type: none"> <li>- A daily register must be kept of all relevant details of herbicide usage;</li> <li>- No herbicides must be used in estuaries;</li> <li>- All protected species and sensitive vegetation not removed must be clearly marked and such areas fenced off in accordance to <b>Section 5.3: Access restricted areas.</b></li> </ul> <p><b>Servitude:</b></p> <ul style="list-style-type: none"> <li>- 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;</li> <li>- 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 land owner and the EA holder</li> <li>- 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;</li> <li>- 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;</li> <li>- 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;</li> <li>- In the case of the development of new overhead transmission and distribution infrastructures, a one metre "trace-line" must be cut through the vegetation for stringing</li> </ul>						
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purposes only and no vehicle access must be cleared along the "trace-line". Alternative methods of stringing which limit impact to the environment must always be considered.						
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**5.11 Protection of fauna**

**Impact management outcome:** Minimise disturbance to fauna.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> <li>- No interference with livestock must occur without the landowner's written consent and with the landowner or a person representing the landowner being present;</li> <li>- The breeding sites of raptors and other wild birds species must be taken into consideration during the planning of the development programme;</li> <li>- 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;</li> <li>- Nesting sites on existing parallel lines must be documented;</li> <li>- Special recommendations of the avian specialist must be adhered to at all times to prevent unnecessary disturbance of birds;</li> <li>- Bird guards and diverters must be installed on the new line as per the recommendations of the specialist;</li> <li>- 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;</li> <li>- No deliberate or intentional killing of fauna is allowed;</li> </ul>						

<ul style="list-style-type: none"> <li>- In areas where snakes are abundant, snake deterrents to be deployed on the pylons to prevent snakes climbing up, being electrocuted and causing power outages; and</li> <li>- 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.</li> </ul>						
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**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
<ul style="list-style-type: none"> <li>- Identify, demarcate and prevent impact to all known sensitive heritage features on site in accordance with the No-Go procedure in <b>Section 5.3: Access restricted areas</b>;</li> <li>- Carry out general monitoring of excavations for potential fossils, artefacts and material of heritage importance;</li> <li>- 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</li> </ul>						

remove/collect such material before development recommences.						
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### 5.13 Safety of the public

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

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> <li>- 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.;</li> <li>- All unattended open excavations must be adequately fenced or demarcated;</li> <li>- Adequate protective measures must be implemented to prevent unauthorised access to and climbing of partly constructed towers and protective scaffolding;</li> <li>- Ensure structures vulnerable to high winds are secured;</li> <li>- Maintain an incidents and complaints register in which all incidents or complaints involving the public are logged.</li> </ul>						

### 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
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	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> <li>- Mobile chemical toilets are installed onsite if no other ablution facilities are available;</li> <li>- 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;</li> <li>- Where mobile chemical toilets are required, the following must be ensured:               <ul style="list-style-type: none"> <li>a) Toilets are located no closer than 100 m to any watercourse or water body;</li> <li>b) Toilets are secured to the ground to prevent them from toppling due to wind or any other cause;</li> <li>c) No spillage occurs when the toilets are cleaned or emptied and the contents are managed in accordance with the EMPr;</li> <li>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;</li> <li>e) Toilets are emptied before long weekends and workers holidays, and must be locked after working hours;</li> <li>f) Toilets are serviced regularly and the ECO must inspect toilets to ensure compliance to health standards;</li> </ul> </li> <li>- A copy of the waste disposal certificates must be maintained.</li> </ul>						

**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
<ul style="list-style-type: none"> <li>- Undertake environmentally-friendly pest control in the camp area;</li> <li>- Ensure that the workforce is sensitised to the effects of sexually transmitted diseases, especially HIV AIDS;</li> <li>- The Contractor must ensure that information posters on AIDS are displayed in the Contractor Camp area;</li> <li>- Information and education relating to sexually transmitted diseases to be made available to both construction workers and local community, where applicable;</li> <li>- Free condoms must be made available to all staff on site at central points;</li> <li>- Medical support must be made available;</li> <li>- Provide access to Voluntary HIV Testing and Counselling Services.</li> </ul>						

### 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
<ul style="list-style-type: none"> <li>- Compile an Emergency Response Action Plan (ERAP) prior to the commencement of the proposed project;</li> <li>- The Emergency Plan must deal with accidents, potential spillages and fires in line with relevant legislation;</li> <li>- All staff must be made aware of emergency procedures as part of environmental awareness training;</li> <li>- The relevant local authority must be made aware of a fire as soon as it starts;</li> <li>- In the event of emergency necessary mitigation measures to contain the spill or leak must be implemented (see <b>Hazardous Substances section 5.17</b>).</li> </ul>						

**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
<ul style="list-style-type: none"> <li>- The use and storage of hazardous substances to be minimised and non-hazardous and non-toxic alternatives</li> </ul>						

<p>substituted where possible;</p> <ul style="list-style-type: none"> <li>- All hazardous substances must be stored in suitable containers as defined in the Method Statement;</li> <li>- Containers must be clearly marked to indicate contents, quantities and safety requirements;</li> <li>- All storage areas must be bunded. The bunded area must be of sufficient capacity to contain a spill / leak from the stored containers;</li> <li>- Bunded areas to be suitably lined with a SABS approved liner;</li> <li>- An Alphabetical Hazardous Chemical Substance (HCS) control sheet must be drawn up and kept up to date on a continuous basis;</li> <li>- All hazardous chemicals that will be used on site must have Material Safety Data Sheets (MSDS);</li> <li>- All employees working with HCS must be trained in the safe use of the substance and according to the safety data sheet;</li> <li>- Employees handling hazardous substances / materials must be aware of the potential impacts and follow appropriate safety measures. Appropriate personal protective equipment must be made available;</li> <li>- The Contractor must ensure that diesel and other liquid fuel, oil and hydraulic fluid is stored in appropriate storage tanks or in bowsers;</li> <li>- 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);</li> </ul>						
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<ul style="list-style-type: none"> <li>- The floor of the bund must be sloped, draining to an oil separator;</li> <li>- Provision must be made for refueling at the storage area by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained;</li> <li>- All empty externally dirty drums must be stored on a drip tray or within a bund area;</li> <li>- No unauthorised access into the hazardous substances storage areas must be permitted;</li> <li>- No smoking must be allowed within the vicinity of the hazardous storage areas;</li> <li>- Adequate fire-fighting equipment must be made available at all hazardous storage areas;</li> <li>- Where refueling away from the dedicated refueling station is required, a mobile refueling unit must be used. Appropriate ground protection such as drip trays must be used;</li> <li>- 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;</li> <li>- The responsible operator must have the required training to make use of the spill kit in emergency situations;</li> <li>- An appropriate number of spill kits must be available and must be located in all areas where activities are being undertaken;</li> <li>- 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 <b>Section 5.7</b> for procedures concerning <b>storm and waste water management</b> and <b>5.8</b> for <b>solid and hazardous waste management</b>.</li> </ul>						
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**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
<ul style="list-style-type: none"> <li>- Where possible and practical all maintenance of vehicles and equipment must take place in the workshop area;</li> <li>- During servicing of vehicles or equipment, especially where emergency repairs are effected outside the workshop area, a suitable drip tray must be used to prevent spills onto the soil. The relevant local authority must be made aware of a fire as soon as it starts;</li> <li>- Leaking equipment must be repaired immediately or be removed from site to facilitate repair;</li> <li>- Workshop areas must be monitored for oil and fuel spills;</li> <li>- Appropriately sized spill kit kept onsite relevant to the scale of the activity taking place must be available;</li> <li>- 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;</li> <li>- Water drainage from the workshop must be contained and managed in accordance <b>Section 5.7: storm and waste water management</b>.</li> </ul>						

### 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
<ul style="list-style-type: none"> <li>– Concrete mixing must be carried out on an impermeable surface;</li> <li>– Batching plants areas must be fitted with a containment facility for the collection of cement laden water.</li> <li>– Dirty water from the batching plant must be contained to prevent soil and groundwater contamination</li> <li>– Bagged cement must be stored in an appropriate facility and at least 10 m away from any water courses, gullies and drains;</li> <li>– A washout facility must be provided for washing of concrete associated equipment. Water used for washing must be restricted;</li> <li>– Hardened concrete from the washout facility or concrete mixer can either be reused or disposed of at an appropriate licenced disposal facility;</li> <li>– Empty cement bags must be secured with adequate binding material if these will be temporarily stored on site;</li> <li>– Sand and aggregates containing cement must be kept damp to prevent the generation of dust (Refer to <b>Section 5.20: Dust emissions</b>)</li> </ul>						

<ul style="list-style-type: none"> <li>- 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;</li> <li>- Temporary fencing must be erected around batching plants in accordance with <b>Section 5.5: Fencing and gate installation.</b></li> </ul>						
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**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
<ul style="list-style-type: none"> <li>- Take all reasonable measures to minimise the generation of dust as a result of project development activities to the satisfaction of the ECO;</li> <li>- 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;</li> <li>- Excavation, handling and transport of erodible materials must be avoided under high wind conditions or when a visible dust plume is present;</li> <li>- 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</li> </ul>						

<p>acceptable level;</p> <ul style="list-style-type: none"> <li>- Where possible, soil stockpiles must be located in sheltered areas where they are not exposed to the erosive effects of the wind;</li> <li>- Where erosion of stockpiles becomes a problem, erosion control measures must be implemented at the discretion of the ECO;</li> <li>- Vehicle speeds must not exceed 40 km/h along dust roads or 20 km/h when traversing unconsolidated and non-vegetated areas;</li> <li>- Straw stabilisation must be applied at a rate of one bale/10 m<sup>2</sup> and harrowed into the top 100 mm of top material, for all completed earthworks;</li> <li>- For significant areas of excavation or exposed ground, dust suppression measures must be used to minimise the spread of dust.</li> </ul>						
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**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
<ul style="list-style-type: none"> <li>- Any blasting activity must be conducted by a suitably licensed blasting contractor; and</li> <li>- Notification of surrounding landowners, emergency services site personnel of blasting activity 24 hours prior to such</li> </ul>						

activity taking place on Site.						
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**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
<ul style="list-style-type: none"> <li>- The Contractor must keep noise level within acceptable limits, Restrict the use of sound amplification equipment for communication and emergency only;</li> <li>- All vehicles and machinery must be fitted with appropriate silencing technology and must be properly maintained;</li> <li>- 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;</li> <li>- 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.</li> </ul>						

**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
<ul style="list-style-type: none"> <li>- Designate smoking areas where the fire hazard could be regarded as insignificant;</li> <li>- Firefighting equipment must be available on all vehicles located on site;</li> <li>- The local Fire Protection Agency (FPA) must be informed of construction activities;</li> <li>- Contact numbers for the FPA and emergency services must be communicated in environmental awareness training and displayed at a central location on site;</li> <li>- Two way swop of contact details between ECO and FPA.</li> </ul>						

**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
<ul style="list-style-type: none"> <li>- All material that is excavated during the project development phase (either during piling (if required) or earthworks) must be stored appropriately on site in order to minimise impacts to watercourses, watercourses and water bodies;</li> <li>- All stockpiled material must be maintained and kept clear of weeds and alien vegetation growth by undertaking regular weeding and control methods;</li> <li>- Topsoil stockpiles must not exceed 2 m in height;</li> <li>- During periods of strong winds and heavy rain, the stockpiles must be covered with appropriate material (e.g. cloth, tarpaulin etc.);</li> <li>- Where possible, sandbags (or similar) must be placed at the bases of the stockpiled material in order to prevent erosion of the material.</li> </ul>						

**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	Method of	Timeframe for	Responsible	Frequency	Evidence of

	person	implementation	implementation	person		compliance
<ul style="list-style-type: none"> <li>- No vegetation clearing must occur during survey and pegging operations;</li> <li>- No new access roads must be developed to facilitate access for survey and pegging purposes;</li> <li>- Project manager, botanical specialist and contractor to agree on final tower positions based on survey within assessed and approved areas;</li> <li>- 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.</li> </ul>						

**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
<ul style="list-style-type: none"> <li>- 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;</li> <li>- Spoil can however be used for landscaping purposes and must be covered with a layer of 150 mm topsoil for rehabilitation purposes;</li> <li>- Management of equipment for excavation purposes must be undertaken in accordance with <b>Section 5.18: Workshop equipment maintenance and storage</b>; and</li> <li>- Hazardous substances spills from equipment must be</li> </ul>						



<p>managed in accordance with <b>Section 5.17: Hazardous substances</b>.</p> <ul style="list-style-type: none"> <li>– Batching of cement to be undertaken in accordance with <b>Section 5.19 : Batching plants</b>;</li> <li>– Residual cement must be disposed of in accordance with <b>Section 5.8: Solid and hazardous waste management</b>.</li> </ul>						
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**5.27 Assembly and erecting towers**

<p><b>Impact management outcome:</b> No environmental degradation occurs as a result of assembly and erecting of towers.</p>						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> <li>– Prior to erection, assembled towers and tower sections must be stored on elevated surface (suggest wooden blocks) to minimise damage to the underlying vegetation;</li> <li>– In sensitive areas, tower assembly must take place off-site or away from sensitive positions;</li> <li>– The crane used for tower assembly must be operated in a manner which minimises impact to the environment;</li> <li>– The number of crane trips to each site must be minimised;</li> <li>– Wheeled cranes must be utilised in preference to tracked cranes;</li> <li>– Consideration must be given to erecting towers by helicopter or by hand where it is warranted to limit the extent</li> </ul>						

<p>of environmental impact;</p> <ul style="list-style-type: none"> <li>- Access to tower positions to be undertaken in accordance with access requirements in specified in Section 8.4: Access Roads;</li> <li>- Vegetation clearance to be undertaken in accordance with general vegetation clearance requirements specified in Section 8.10: Vegetation clearing;</li> <li>- No levelling at tower sites must be permitted unless approved by the Development Project Manager or Developer Site Supervisor;</li> <li>- Topsoil must be removed separately from subsoil material and stored for later use during rehabilitation of such tower sites;</li> <li>- Topsoil must be stored in heaps not higher than 1m to prevent destruction of the seed bank within the topsoil;</li> <li>- Excavated slopes must be no greater than 1:3, but where this is unavoidable, appropriate measures must be undertaken to stabilise the slopes;</li> <li>- 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;</li> <li>- Only existing disturbed areas are utilised as spoil areas;</li> <li>- Drainage is provided to control groundwater exit gradient with the spill areas such that migration of fines is kept to a minimum;</li> <li>- Surface water runoff is appropriately channeled through or around spoil areas;</li> <li>- 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;</li> <li>- The surface of the spoil is appropriately rehabilitated in</li> </ul>						
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<p>accordance with the requirements specified in Section 5.29: Landscaping and rehabilitation;</p> <ul style="list-style-type: none"> <li>- 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 as construction activities on the site is complete. Spreading of topsoil must not be undertaken at the beginning of the dry season.</li> </ul>						
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**5.28 Stringing**

<p><b>Impact management outcome:</b> No environmental degradation occurs as a result of stringing.</p>						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> <li>- 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;</li> <li>- The winch and tensioner station must be equipped with drip trays in order to contain any fuel, hydraulic fuel or oil spills and leaks;</li> <li>- Refueling of the winch and tensioner stations must be undertaken in accordance with Section 5.17: Hazardous substances;</li> </ul>						

<ul style="list-style-type: none"> <li>- 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 hand held implements, with vegetation being cut off at ground level. No tracked or wheeled mechanised equipment must be used;</li> <li>- Alternative methods of stringing which limit impact to the environment must always be considered e.g. by hand or by using a helicopter;</li> <li>- 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;</li> <li>- 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;</li> <li>- Where stringing operations cross cultivated land, damage to crops is restricted to the minimum required to conduct stringing operations, and reasonable notice (10 work days minimum), in writing, must be provided to the landowner;</li> <li>- Necessary scaffolding protection measures must be installed to prevent damage to the structures supporting certain high value agricultural areas such as vineyards, orchards, nurseries.</li> </ul>						
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**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
<ul style="list-style-type: none"> <li>- Develop and implement communication strategies to facilitate public participation;</li> <li>- Develop and implement a collaborative and constructive approach to conflict resolution as part of the external stakeholder engagement process;</li> <li>- Sustain continuous communication and liaison with neighboring owners and residents</li> <li>- Create work and training opportunities for local stakeholders; and</li> <li>- 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.</li> </ul>						

**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
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	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> <li>- Bunds must be emptied (where applicable) and need to be undertaken in accordance with the impact management actions included in <b>sections 5.17: management of hazardous substances</b> and <b>5.18 workshop, equipment maintenance and storage</b>;</li> <li>- Hazardous storage areas must be well ventilated;</li> <li>- Fire extinguishers must be serviced and accessible. Service records to be filed and audited at last service;</li> <li>- Emergency and contact details displayed must be displayed;</li> <li>- Security personnel must be briefed and have the facilities to contact or be contacted by relevant management and emergency personnel;</li> <li>- Night hazards such as reflectors, lighting, traffic signage etc. must have been checked;</li> <li>- Fire hazards identified and the local authority must have been notified of any potential threats e.g. large brush stockpiles, fuels etc.;</li> <li>- Structures vulnerable to high winds must be secured;</li> <li>- Wind and dust mitigation must be implemented;</li> <li>- Cement and materials stores must have been secured;</li> <li>- Toilets must have been emptied and secured;</li> <li>- Refuse bins must have been emptied and secured;</li> <li>- Drip trays must have been emptied and secured.</li> </ul>						

**5.31 Landscaping and rehabilitation**

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**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
<ul style="list-style-type: none"> <li>- 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;</li> <li>- 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</li> <li>- 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;</li> <li>- 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;</li> <li>- 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;</li> <li>- Rehabilitation of tower sites and access roads outside of farmland;</li> <li>- Indigenous species must be used for with species and/grasses to where it compliments or approximates the original condition;</li> <li>- Stockpiled topsoil must be used for rehabilitation (refer to</li> </ul>						

<p>Section <b>5.24: Stockpiling and stockpiled areas</b>);</p> <ul style="list-style-type: none"> <li>- Stockpiled topsoil must be evenly spread so as to facilitate seeding and minimise loss of soil due to erosion;</li> <li>- Before placing topsoil, all visible weeds from the placement area and from the topsoil must be removed;</li> <li>- Subsoil must be ripped before topsoil is placed;</li> <li>- The rehabilitation must be timed so that rehabilitation can take place at the optimal time for vegetation establishment;</li> <li>- Where impacted through construction related activity, all sloped areas must be stabilised to ensure proper rehabilitation is effected and erosion is controlled ;</li> <li>- 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;</li> <li>- Spoil can be used for backfilling or landscaping as long as it is covered by a minimum of 150 mm of topsoil.</li> <li>- 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: <ul style="list-style-type: none"> <li>a) Annual and perennial plants are chosen;</li> <li>b) Pioneer species are included;</li> <li>c) Species chosen must be indigenous to the area with the seeds used coming from the area;</li> <li>d) Root systems must have a binding effect on the soil;</li> <li>e) The final product must not cause an ecological imbalance in the area</li> </ul> </li> </ul>						
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**6 ACCESS TO THE GENERIC EMPr**



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

**PART B: SECTION 2**

**7 SITE SPECIFIC INFORMATION AND DECLARATION**

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

7.1.1 Details of the applicant:

Name of applicant:

Tel No:

Fax No:

Postal Address:

Physical Address:

7.1.2 Details and expertise of the EAP:

Name of applicant:

Tel No:

Fax No:

E-mail address:

Expertise of the EAP (Curriculum Vitae included):

7.1.3 Project name:

7.1.4 Description of the project:

7.1.5 Project location:

NO	FARM NAME( if applicable)	FARM NUMBER( if applicable)	PORTION NAME	PORTION NUMBER	LATITUDE	LONGITUDE

7.1.6 Preliminary technical specification of the overhead transmission and distribution:

- Length
- Tower parameters
  - Number and types of towers
  - Tower spacing (mean and maximum)
  - Tower height (lowest, mean and height)
  - Conductor attachment height (mean)
  - Minimum ground clearance

## 7.2 Sub-section 2: Development footprint site map

This sub-section must include a map of the site sensitivity overlaid with the preliminary infrastructure layout. The sensitivity map must be prepared from the national web based environmental screening tool, when available for compulsory use at: <https://screening.environment.gov.zg/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.

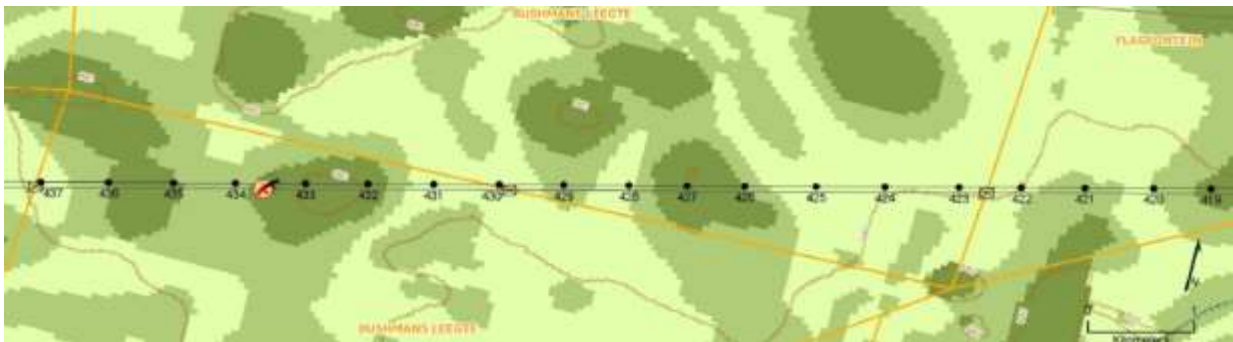


Figure 1: Example of an environmental sensitivity map in the context of a final overhead transmission and distribution profile

## 7.3 Sub-section 3: Declaration

The proponent/applicant or holder of the EA affirms that he/she will abide and comply with the prescribed impact management outcomes and impact management actions as stipulated in part B: section 1 of the generic EMPr and have the understanding that the impact management outcomes and impact management actions are legally binding. The proponent/applicant or holder of the EA affirms that he/she will provide written notice to the CA 14 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:

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

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

## PART C

### 8 SITE SPECIFIC ENVIRONMENTAL ATTRIBUTES

If any specific environmental sensitivities/attributes are present on the site which require more specific impact management outcomes and 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.

## 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.

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

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## **environmental affairs**

Department:  
Environmental Affairs  
REPUBLIC OF SOUTH AFRICA

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## **INTRODUCTION**

### **1. Background**

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

### **2. Purpose**

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

### **3. Objective**

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

### **4. Scope**

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

## 5. Structure of this document

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

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

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

Part	Section	Heading	Content
			<p>information in this section must be prepared by an EAP and must contain his/her name and expertise including a curriculum vitae. Once approved, Part C forms part of the EMPr for the site and is legally binding.</p> <p>This section applies only <b>to additional</b> impact management outcomes and impact management actions that are necessary for the avoidance, management and mitigation of impacts and risks associated with the specific development or expansion and which are not already included in <u>Part B: section 1</u>.</p>
		Appendix 1	Contains the method statements to be prepared prior to commencement of the activity. The method statements are <b>not required</b> 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 property or farm in which the proposed substation infrastructure is proposed as well as the 21-digit Surveyor General code of each cadastral land parcel and, where available, the farm name.

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

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

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

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



## PART A – GENERAL INFORMATION

### 1. DEFINITIONS

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

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

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

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

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

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

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

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

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

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

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

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

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

## 2. ACRONYMS and ABBREVIATIONS

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

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

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

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

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

Responsible Person(s)	Role and Responsibilities
Developer Site Supervisor (DSS)	<p><u>Role</u> The DSS reports directly to the DPM, oversees site works, liaises with the contractor(s) and the ECO. The DSS is responsible for the day to day implementation of the EMPr and for ensuring the compliance of all contractors with the conditions and requirements stipulated in the EMPr.</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> <li>- Ensure that all contractors identify a contractor's Environmental Officer (cEO);</li> <li>- Must be fully conversant with the conditions of the EA. Oversees site works, liaison with Contractor, DPM and ECO;</li> <li>- Must ensure that all landowners have the relevant contact details of the site staff, ECO and cEO;</li> <li>- Issuing of site instructions to the Contractor for corrective actions required;</li> <li>- Will issue all non-compliances to contractors; and</li> <li>- Ratify the Monthly Environmental Report.</li> </ul>
Environmental Control Officer (ECO)	<p><u>Role</u> The ECO should have appropriate training and experience in the implementation of environmental management specifications. The primary role of the ECO is to act as an independent quality controller and monitoring agent regarding all environmental concerns and associated environmental impacts. In this respect, the ECO is to conduct periodic site inspections, attend regular site meetings, pre-empt problems and suggest mitigation and be available to advise on incidental issues that arise. The ECO is also required to conduct compliance audits, verifying the monitoring reports submitted by the cEO. The ECO provides feedback to the DSS and Project Manager regarding all environmental matters. The Contractor, cEO and dEO are answerable to the Environmental Control Officer for non-compliance with the Performance Specifications as set out in the EA and EMPr.</p> <p>The ECO provides feedback to the DSS and Project Manager, who in turn reports back to the Contractor and potential and Registered Interested &amp; Affected Parties' (RI&amp;AP's), as required. Issues of non-compliance raised by the ECO must be taken up by the Project Manager, and resolved with the Contractor as per the conditions of his contract. Decisions regarding environmental procedures, specifications and requirements which have a cost implication (i.e. those that are deemed to be a</p>

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

Responsible Person(s)	Role and Responsibilities
	<ul style="list-style-type: none"> <li>- Assisting in the resolution of conflicts;</li> <li>- Facilitate training for all personnel on the site – this may range from carrying out the training, to reviewing the training programmes of the Contractor;</li> <li>- 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;</li> <li>- Maintenance, update and review of the EMPr;</li> <li>- Communication of all modifications to the EMPr to the relevant stakeholders.</li> </ul>
<p>developer Environmental Officer (dEO)</p>	<p><u>Role</u></p> <p>The dEOs will report to the Project Manager and are responsible for implementation of the EMPr, environmental monitoring and reporting, providing environmental input to the Project Manager and Contractor's Manager, liaising with contractors and the landowners as well as a range of environmental coordination responsibilities.</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> <li>- Be fully conversant with the EMPr;</li> <li>- Be familiar with the recommendations and mitigation measures of this EMPr, and implement these measures;</li> <li>- Ensure that all stipulations within the EMPr are communicated and adhered to by the Employees, Contractor(s) ;</li> <li>- Confine the development site to the demarcated area;</li> <li>- Conduct environmental internal audits with regards to EMPr and authorisation compliance (on cEO);</li> <li>- Assist the contractors in addressing environmental challenges on site;</li> <li>- Assist in incident management:</li> <li>- Reporting environmental incidents to developer and ensuring that corrective action is taken, and lessons learnt shared;</li> <li>- Assist the contractor in investigating environmental incidents and compile investigation reports;</li> <li>- Follow-up on pre-warnings, defects, non-conformance reports;</li> </ul>

Responsible Person(s)	Role and Responsibilities
	<ul style="list-style-type: none"> <li>- Measure and communicate environmental performance to the Contractor;</li> <li>- Conduct environmental awareness training on site together with ECO and cEO;</li> <li>- Ensure that the necessary legal permits and / or licenses are in place and up to date;</li> <li>- Acting as Developer's Environmental Representative on site and work together with the ECO and contractor;</li> </ul>
Contractor	<p><u>Role</u></p> <p>The Contractor appoints the cEO and has overall responsibility for ensuring that all work, activities, and actions linked to the delivery of the contract are in line with the EMPr and that Method Statements are implemented as described. External contractors must ensure compliance with this EMPr while performing the onsite activities as per their contract with the Project Developer. The contractors are required, where specified, to provide Method Statements setting out in detail how the impact management actions contained in the EMPr will be implemented during the development or expansion of substation infrastructure for the transmission and distribution of electricity activities.</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> <li>- project delivery and quality control for the development services as per appointment;</li> <li>- 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;</li> <li>- 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;</li> <li>- attend on site meeting(s) prior to the commencement of activities to confirm the procedure and designated activity zones;</li> <li>- 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.</li> </ul>

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



## 4. ENVIRONMENTAL DOCUMENTATION REPORTING AND COMPLIANCE

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

### 4.1 Document control/Filing system

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

### 4.2 Documentation to be available

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

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

### 4.3 Weekly Environmental Checklist

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

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

#### 4.4 Environmental site meetings

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

#### 4.5 Required Method Statements

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

The method statement must cover applicable details with regard to:

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

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

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

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

#### 4.6 Environmental Incident Log (Diary)

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

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

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

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

The Environmental Incident Log will be captured in the EAR.

#### 4.7 Non-compliance

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

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

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

#### 4.8 Corrective action records

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

#### 4.9 Photographic record

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

The Contractor shall:

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

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

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

14. Include relevant photographs in the Final Environmental Audit Report.

#### 4.10 Complaints register

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

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

#### 4.11 Claims for damages

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

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

#### 4.12 Interactions with affected parties

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

The ECOs shall:

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

4. Ensure that contact with affected parties is courteous at all times;

#### 4.13 Environmental audits

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

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

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

#### 4.14 Final environmental audits

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

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

**5. IMPACT MANAGEMENT OUTCOMES AND IMPACT MANAGEMENT ACTIONS**

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

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

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

**5.1 Environmental awareness training**

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

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> <li>- All staff must receive environmental awareness training prior to commencement of the activities;</li> <li>- The Contractor must allow for sufficient sessions to train all personnel with no more than 20 personnel attending each course;</li> <li>- Refresher environmental awareness training is available as and when required;</li> <li>- 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;</li> <li>- The Contractor must erect and maintain information posters at key locations on site, and the posters must include the following information as a minimum:               <ul style="list-style-type: none"> <li>a) Safety notifications; and</li> <li>b) No littering.</li> </ul> </li> <li>- Environmental awareness training must include as a minimum the following:               <ul style="list-style-type: none"> <li>a) Description of significant environmental impacts, actual or potential, related to their work activities;</li> <li>b) Mitigation measures to be implemented when carrying out specific activities;</li> </ul> </li> </ul>						



<p>c) Emergency preparedness and response procedures;</p> <p>d) Emergency procedures;</p> <p>e) Procedures to be followed when working near or within sensitive areas;</p> <p>f) Wastewater management procedures;</p> <p>g) Water usage and conservation;</p> <p>h) Solid waste management procedures;</p> <p>i) Sanitation procedures;</p> <p>j) Fire prevention; and</p> <p>k) Disease prevention.</p> <p>– A record of all environmental awareness training courses undertaken as part of the EMPr must be available;</p> <p>– Educate workers on the dangers of open and/or unattended fires;</p> <p>– A staff attendance register of all staff to have received environmental awareness training must be available.</p> <p>– Course material must be available and presented in appropriate languages that all staff can understand.</p>						
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**5.2 Site Establishment development**

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

development area.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> <li>- 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;</li> <li>- Location of camps must be within approved area to ensure that the site does not impact on sensitive areas identified in the environmental assessment or site walk through;</li> <li>- Sites must be located where possible on previously disturbed areas;</li> <li>- The camp must be fenced in accordance with <b>Section 5.5: Fencing and gate installation</b>; and</li> <li>- The use of existing accommodation for contractor staff, where possible, is encouraged.</li> </ul>						

**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
<ul style="list-style-type: none"> <li>- Identification of access restricted areas is to be informed by the environmental assessment, site walk through and any additional areas identified during development;</li> <li>- 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</li> <li>- Unauthorised access and development related activity inside access restricted areas is prohibited.</li> </ul>						

#### 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
<ul style="list-style-type: none"> <li>- An access agreement must be formalised and signed by the DPM, Contractor and landowner before commencing with the activities;</li> <li>- 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</li> <li>- All contractors must be made aware of all these access routes.</li> </ul>						

<ul style="list-style-type: none"> <li>- Any access route deviation from that in the written agreement must be closed and re-vegetated immediately, at the contractor's expense;</li> <li>- Maximum use of both existing servitudes and existing roads must be made to minimize further disturbance through the development of new roads;</li> <li>- In circumstances where private roads must be used, the condition of the said roads must be recorded in accordance with <b>section 4.9: photographic record</b>; prior to use and the condition thereof agreed by the landowner, the DPM, and the contractor;</li> <li>- Access roads in flattish areas must follow fence lines and tree belts to avoid fragmentation of vegetated areas or croplands</li> <li>- Access roads must only be developed on a pre-planned and approved roads.</li> </ul>						
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**5.5 Fencing and Gate installation**

<p><b>Impact management outcome:</b> Minimise impact to the environment and ensure safe and controlled access to the site through the erection of fencing and gates where required.</p>		
<p><b>Impact Management Actions</b></p>	<p><b>Implementation</b></p>	<p><b>Monitoring</b></p>

	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> <li>- Use existing gates provided to gain access to all parts of the area authorised for development, where possible;</li> <li>- Existing and new gates to be recorded and documented in accordance with <b>section 4.9: photographic record</b>;</li> <li>- All gates must be fitted with locks and be kept locked at all times during the development phase, unless otherwise agreed with the landowner;</li> <li>- At points where the line crosses a fence in which there is no suitable gate within the extent of the line servitude, on the instruction of the DPM, a gate must be installed at the approval of the landowner;</li> <li>- Care must be taken that the gates must be so erected that there is a gap of no more than 100 mm between the bottom of the gate and the ground;</li> <li>- Where gates are installed in jackal proof fencing, a suitable reinforced concrete sill must be provided beneath the gate;</li> <li>- Original tension must be maintained in the fence wires;</li> <li>- All gates installed in electrified fencing must be re-electrified;</li> <li>- All demarcation fencing and barriers must be maintained in good working order for the duration of the development activities;</li> <li>- Fencing must be erected around the camp, batching plants, hazardous storage areas, and all designated access restricted areas, where applicable;</li> <li>- Any temporary fencing to restrict the movement of life-stock must only be erected with the permission of the land owner.</li> <li>- All fencing must be developed of high quality material bearing the SABS mark;</li> </ul>						

<ul style="list-style-type: none"> <li>- The use of razor wire as fencing must be avoided;</li> <li>- 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;</li> <li>- On completion of the development phase all temporary fences are to be removed;</li> <li>- The contractor must ensure that all fence uprights are appropriately removed, ensuring that no uprights are cut at ground level but rather removed completely.</li> </ul>						
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**5.6 Water Supply Management**

**Impact management outcome:** Undertake responsible water usage.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> <li>- 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;</li> <li>- The Contractor must ensure the following:               <ul style="list-style-type: none"> <li>a. The vehicle abstracting water from a river does not enter or cross it and does not operate from within the river;</li> <li>b. No damage occurs to the river bed or banks and that the abstraction of water does not entail stream diversion activities; and</li> <li>c. All reasonable measures to limit pollution or sedimentation of the downstream watercourse are</li> </ul> </li> </ul>						

<p>implemented.</p> <ul style="list-style-type: none"> <li>- Ensure water conservation is being practiced by: <ul style="list-style-type: none"> <li>a. Minimising water use during cleaning of equipment;</li> <li>b. Undertaking regular audits of water systems; and</li> <li>c. Including a discussion on water usage and conservation during environmental awareness training.</li> <li>d. The use of grey water is encouraged.</li> </ul> </li> </ul>						
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**5.7 Storm and waste water management**

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

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> <li>- 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;</li> <li>- 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;</li> <li>- Natural storm water runoff not contaminated during the development and clean water can be discharged directly to watercourses and water bodies, subject to the Project Manager's approval and support by the ECO;</li> <li>- Water that has been contaminated with suspended solids,</li> </ul>						

<p>such as soils and silt, may be released into watercourses or water bodies only once all suspended solids have been removed from the water by settling out these solids in settlement ponds. The release of settled water back into the environment must be subject to the Project Manager's approval and support by the ECO.</p>						
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**5.8 Solid and hazardous waste management**

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

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> <li>- All measures regarding waste management must be undertaken using an integrated waste management approach;</li> <li>- Sufficient, covered waste collection bins (scavenger and weatherproof) must be provided;</li> <li>- A suitably positioned and clearly demarcated waste collection site must be identified and provided;</li> <li>- The waste collection site must be maintained in a clean and orderly manner;</li> <li>- Waste must be segregated into separate bins and clearly marked for each waste type for recycling and safe disposal;</li> <li>- Staff must be trained in waste segregation;</li> <li>- Bins must be emptied regularly;</li> </ul>						



<ul style="list-style-type: none"> <li>- General waste produced onsite must be disposed of at registered waste disposal sites/ recycling company;</li> <li>- Hazardous waste must be disposed of at a registered waste disposal site;</li> <li>- Certificates of safe disposal for general, hazardous and recycled waste must be maintained.</li> </ul>						
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**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
<ul style="list-style-type: none"> <li>- 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;</li> <li>- In the event of a spill, prompt action must be taken to clear the polluted or affected areas;</li> <li>- Where possible, no development equipment must traverse any seasonal or permanent wetland</li> <li>- No return flow into the estuaries must be allowed and no disturbance of the Estuarine functional Zone should occur;</li> <li>- Development of permanent watercourse or estuary crossing must only be undertaken where no alternative access to tower position is available;</li> </ul>						

<ul style="list-style-type: none"> <li>- There must not be any impact on the long term morphological dynamics of watercourses or estuaries;</li> <li>- Existing crossing points must be favored over the creation of new crossings (including temporary access)</li> <li>- When working in or near any watercourse or estuary, the following environmental controls and consideration must be taken: <ul style="list-style-type: none"> <li>a) Water levels during the period of construction; No altering of the bed, banks, course or characteristics of a watercourse</li> <li>b) During the execution of the works, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented e.g. including ensuring that construction equipment is well maintained;</li> <li>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</li> <li>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.</li> </ul> </li> </ul>						
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**5.10 Vegetation clearing**

<p><b>Impact management outcome:</b> Vegetation clearing is restricted to the authorised development footprint of the proposed infrastructure.</p>		
<p><b>Impact Management Actions</b></p>	<p><b>Implementation</b></p>	<p><b>Monitoring</b></p>

	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<p><b>General:</b></p> <ul style="list-style-type: none"> <li>- Indigenous vegetation which does not interfere with the development must be left undisturbed;</li> <li>- Protected or endangered species may occur on or near the development site. Special care should be taken not to damage such species;</li> <li>- 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;</li> <li>- Permits for removal must be obtained from the relevant CA prior to the cutting or clearing of the affected species, and they must be filed;</li> <li>- 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;</li> <li>- Trees felled due to construction must be documented and form part of the Environmental Audit Report;</li> <li>- Rivers and watercourses must be kept clear of felled trees, vegetation cuttings and debris;</li> <li>- Only a registered pest control operator may apply herbicides on a commercial basis and commercial application must be carried out under the supervision of a registered pest control operator, supervision of a registered pest control operator or is appropriately trained;</li> <li>- A daily register must be kept of all relevant details of</li> </ul>						

<p>herbicide usage;</p> <ul style="list-style-type: none"> <li>- No herbicides must be used in estuaries;</li> <li>- All protected species and sensitive vegetation not removed must be clearly marked and such areas fenced off in accordance to <b>Section 5.3: Access restricted areas</b>.</li> </ul> <p>Alien invasive vegetation must be removed and disposed of at a licensed waste management facility.</p>						
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**5.11 Protection of fauna**

**Impact management outcome:** Disturbance to fauna is minimised.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> <li>- No interference with livestock must occur without the landowner's written consent and with the landowner or a person representing the landowner being present;</li> <li>- The breeding sites of raptors and other wild birds species must be taken into consideration during the planning of the development programme;</li> <li>- 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;</li> <li>- Special recommendations of the avian specialist must be adhered to at all times to prevent unnecessary disturbance of birds;</li> <li>- No poaching must be tolerated under any circumstances.</li> </ul>						

<p>All animal dens in close proximity to the works areas must be marked as Access restricted areas;</p> <ul style="list-style-type: none"> <li>- No deliberate or intentional killing of fauna is allowed;</li> <li>- In areas where snakes are abundant, snake deterrents to be deployed on the pylons to prevent snakes climbing up, being electrocuted and causing power outages; and</li> <li>- 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.</li> </ul>						
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**5.12 Protection of heritage resources**

**Impact management outcome:** Impact to heritage resources is minimised.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> <li>- Identify, demarcate and prevent impact to all known sensitive heritage features on site in accordance with the No-Go procedure in <b>Section 5.3: Access restricted areas</b>;</li> <li>- Carry out general monitoring of excavations for potential fossils, artefacts and material of heritage importance;</li> <li>- 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</li> </ul>						

a systematic and professional investigation can be undertaken. Sufficient time must be allowed to remove/collect such material before development recommences.						
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**5.13 Safety of the public**

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

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> <li>- 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.;</li> <li>- All unattended open excavations must be adequately fenced or demarcated;</li> <li>- Adequate protective measures must be implemented to prevent unauthorised access to and climbing of partly constructed towers and protective scaffolding;</li> <li>- Ensure structures vulnerable to high winds are secured;</li> <li>- Maintain an incidents and complaints register in which all incidents or complaints involving the public are logged.</li> </ul>						

**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
<ul style="list-style-type: none"> <li>- Mobile chemical toilets are installed onsite if no other ablution facilities are available;</li> <li>- 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;</li> <li>- Where mobile chemical toilets are required, the following must be ensured:               <ul style="list-style-type: none"> <li>a) Toilets are located no closer than 100 m to any watercourse or water body;</li> <li>b) Toilets are secured to the ground to prevent them from toppling due to wind or any other cause;</li> <li>c) No spillage occurs when the toilets are cleaned or emptied and the contents are managed in accordance with the EMPr;</li> <li>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;</li> <li>e) Toilets are emptied before long weekends and workers holidays, and must be locked after working hours;</li> <li>f) Toilets are serviced regularly and the ECO must inspect toilets to ensure compliance to health standards;</li> </ul> </li> <li>- A copy of the waste disposal certificates must be maintained.</li> </ul>						

**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
<ul style="list-style-type: none"> <li>- Undertake environmentally-friendly pest control in the camp area;</li> <li>- Ensure that the workforce is sensitised to the effects of sexually transmitted diseases, especially HIV AIDS;</li> <li>- The Contractor must ensure that information posters on AIDS are displayed in the Contractor Camp area;</li> <li>- Information and education relating to sexually transmitted diseases to be made available to both construction workers and local community, where applicable;</li> <li>- Free condoms must be made available to all staff on site at central points;</li> <li>- Medical support must be made available;</li> <li>- Provide access to Voluntary HIV Testing and Counselling Services.</li> </ul>						

**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
<ul style="list-style-type: none"> <li>- Compile an Emergency Response Action Plan (ERAP) prior to the commencement of the proposed project;</li> <li>- The Emergency Plan must deal with accidents, potential spillages and fires in line with relevant legislation;</li> <li>- All staff must be made aware of emergency procedures as part of environmental awareness training;</li> <li>- The relevant local authority must be made aware of a fire as soon as it starts;</li> <li>- In the event of emergency necessary mitigation measures to contain the spill or leak must be implemented (see <b>Hazardous Substances section 5.17</b>).</li> </ul>						

**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
<ul style="list-style-type: none"> <li>- The use and storage of hazardous substances to be minimised and non-hazardous and non-toxic alternatives</li> </ul>						

<p>substituted where possible;</p> <ul style="list-style-type: none"> <li>- All hazardous substances must be stored in suitable containers as defined in the Method Statement;</li> <li>- Containers must be clearly marked to indicate contents, quantities and safety requirements;</li> <li>- All storage areas must be bunded. The bunded area must be of sufficient capacity to contain a spill / leak from the stored containers;</li> <li>- Bunded areas to be suitably lined with a SABS approved liner;</li> <li>- An Alphabetical Hazardous Chemical Substance (HCS) control sheet must be drawn up and kept up to date on a continuous basis;</li> <li>- All hazardous chemicals that will be used on site must have Material Safety Data Sheets (MSDS);</li> <li>- All employees working with HCS must be trained in the safe use of the substance and according to the safety data sheet;</li> <li>- Employees handling hazardous substances / materials must be aware of the potential impacts and follow appropriate safety measures. Appropriate personal protective equipment must be made available;</li> <li>- The Contractor must ensure that diesel and other liquid fuel, oil and hydraulic fluid is stored in appropriate storage tanks or in bowsers;</li> <li>- 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);</li> </ul>						
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<ul style="list-style-type: none"> <li>- The floor of the bund must be sloped, draining to an oil separator;</li> <li>- Provision must be made for refueling at the storage area by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained;</li> <li>- All empty externally dirty drums must be stored on a drip tray or within a bunded area;</li> <li>- No unauthorised access into the hazardous substances storage areas must be permitted;</li> <li>- No smoking must be allowed within the vicinity of the hazardous storage areas;</li> <li>- Adequate fire-fighting equipment must be made available at all hazardous storage areas;</li> <li>- Where refueling away from the dedicated refueling station is required, a mobile refueling unit must be used. Appropriate ground protection such as drip trays must be used;</li> <li>- 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;</li> <li>- The responsible operator must have the required training to make use of the spill kit in emergency situations;</li> <li>- An appropriate number of spill kits must be available and must be located in all areas where activities are being undertaken;</li> <li>- 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 <b>Section 5.7</b> for procedures concerning <b>storm and waste water management</b> and <b>5.8</b> for <b>solid and hazardous waste management</b>.</li> </ul>						
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**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
<ul style="list-style-type: none"> <li>- Where possible and practical all maintenance of vehicles and equipment must take place in the workshop area;</li> <li>- During servicing of vehicles or equipment, especially where emergency repairs are effected outside the workshop area, a suitable drip tray must be used to prevent spills onto the soil. The relevant local authority must be made aware of a fire as soon as it starts;</li> <li>- Leaking equipment must be repaired immediately or be removed from site to facilitate repair;</li> <li>- Workshop areas must be monitored for oil and fuel spills;</li> <li>- Appropriately sized spill kit kept onsite relevant to the scale of the activity taking place must be available;</li> <li>- 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;</li> <li>- Water drainage from the workshop must be contained and managed in accordance Section <b>5.7: Storm and waste water management</b>.</li> </ul>						

**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
<ul style="list-style-type: none"> <li>- Concrete mixing must be carried out on an impermeable surface;</li> <li>- Batching plants areas must be fitted with a containment facility for the collection of cement laden water.</li> <li>- Dirty water from the batching plant must be contained to prevent soil and groundwater contamination</li> <li>- Bagged cement must be stored in an appropriate facility and at least 10 m away from any water courses, gullies and drains;</li> <li>- A washout facility must be provided for washing of concrete associated equipment. Water used for washing must be restricted;</li> <li>- Hardened concrete from the washout facility or concrete mixer can either be reused or disposed of at an appropriate licenced disposal facility;</li> <li>- Empty cement bags must be secured with adequate binding material if these will be temporarily stored on site;</li> <li>- Sand and aggregates containing cement must be kept damp to prevent the generation of dust (Refer to <b>Section 5.20: Dust emissions</b>)</li> <li>- Any excess sand, stone and cement must be removed or</li> </ul>						

<p>reused from site on completion of construction period and disposed at a registered disposal facility;</p> <ul style="list-style-type: none"> <li>– Temporary fencing must be erected around batching plants in accordance with Section <b>5.5: Fencing and gate installation</b>.</li> </ul>						
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**5.20 Dust emissions**

<p><b>Impact management outcome:</b> Dust prevention measures are applied to minimise the generation of dust.</p>						
<p><b>Impact Management Actions</b></p>	<p><b>Implementation</b></p>			<p><b>Monitoring</b></p>		
	<p>Responsible person</p>	<p>Method of implementation</p>	<p>Timeframe for implementation</p>	<p>Responsible person</p>	<p>Frequency</p>	<p>Evidence of compliance</p>
<ul style="list-style-type: none"> <li>– Take all reasonable measures to minimise the generation of dust as a result of project development activities to the satisfaction of the ECO;</li> <li>– 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;</li> <li>– Excavation, handling and transport of erodible materials must be avoided under high wind conditions or when a visible dust plume is present;</li> <li>– 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;</li> <li>– Where possible, soil stockpiles must be located in sheltered</li> </ul>						

<p>areas where they are not exposed to the erosive effects of the wind;</p> <ul style="list-style-type: none"> <li>- Where erosion of stockpiles becomes a problem, erosion control measures must be implemented at the discretion of the ECO;</li> <li>- Vehicle speeds must not exceed 40 km/h along dust roads or 20 km/h when traversing unconsolidated and non-vegetated areas;</li> <li>- Straw stabilisation must be applied at a rate of one bale/10 m<sup>2</sup> and harrowed into the top 100 mm of top material, for all completed earthworks;</li> <li>- For significant areas of excavation or exposed ground, dust suppression measures must be used to minimise the spread of dust.</li> </ul>						
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**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
<ul style="list-style-type: none"> <li>- Any blasting activity must be conducted by a suitably licensed blasting contractor; and</li> <li>- Notification of surrounding landowners, emergency services site personnel of blasting activity 24 hours prior to such activity taking place on Site.</li> </ul>						

**5.22 Noise**

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

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> <li>- The Contractor must keep noise level within acceptable limits, Restrict the use of sound amplification equipment for communication and emergency only;</li> <li>- All vehicles and machinery must be fitted with appropriate silencing technology and must be properly maintained;</li> <li>- 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;</li> <li>- 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.</li> </ul>						



**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
<ul style="list-style-type: none"> <li>- Designate smoking areas where the fire hazard could be regarded as insignificant;</li> <li>- Firefighting equipment must be available on all vehicles located on site;</li> <li>- The local Fire Protection Agency (FPA) must be informed of construction activities;</li> <li>- Contact numbers for the FPA and emergency services must be communicated in environmental awareness training and displayed at a central location on site;</li> <li>- Two way swop of contact details between ECO and FPA.</li> </ul>						

**5.24 Stockpiling and stockpile areas**

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

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> <li>- All material that is excavated during the project development phase (either during piling (if required) or earthworks) must be stored appropriately on site in order to minimise impacts to watercourses, watercourses and water bodies;</li> <li>- All stockpiled material must be maintained and kept clear of weeds and alien vegetation growth by undertaking regular weeding and control methods;</li> <li>- Topsoil stockpiles must not exceed 2 m in height;</li> <li>- During periods of strong winds and heavy rain, the stockpiles must be covered with appropriate material (e.g. cloth, tarpaulin etc.);</li> <li>- Where possible, sandbags (or similar) must be placed at the bases of the stockpiled material in order to prevent erosion of the material.</li> </ul>						

**5.25 Civil works**

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

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

	person	implementation	implementation	person		compliance
<ul style="list-style-type: none"> <li>- Where terracing is required, topsoil must be collected and retained for the purpose of re-use later to rehabilitate disturbed areas not covered by yard stone;</li> <li>- Areas to be rehabilitated include terrace embankments and areas outside the high voltage yards;</li> <li>- Where required, all sloped areas must be stabilised to ensure proper rehabilitation is effected and erosion is controlled;</li> <li>- These areas can be stabilised using design structures or vegetation as specified in the design to prevent erosion of embankments. The contract design specifications must be adhered to and implemented strictly;</li> <li>- Rehabilitation of the disturbed areas must be managed in accordance with <b>Section 5.35: Landscaping and rehabilitation</b>;</li> <li>- All excess spoil generated during terracing activities must be disposed of in an appropriate manner and at a recognised landfill site; and</li> <li>- Spoil can however be used for landscaping purposes and must be covered with a layer of 150 mm topsoil for rehabilitation purposes.</li> </ul>						

**5.26 Excavation of foundation, cable trenching and drainage systems**



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

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> <li>- All excess spoil generated during foundation excavation must be disposed of in an appropriate manner and at a licensed landfill site, if not used for backfilling purposes;</li> <li>- Spoil can however be used for landscaping purposes and must be covered with a layer of 150 mm topsoil for rehabilitation purposes;</li> <li>- Management of equipment for excavation purposes must be undertaken in accordance with <b>Section 5.18: Workshop, equipment maintenance and storage</b>; and</li> <li>- Hazardous substances spills from equipment must be managed in accordance with <b>Section 5.17: Hazardous substances</b>.</li> </ul>						

**5.27 Installation of foundations, cable trenching and drainage systems**

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

Impact Management Actions	Implementation	Monitoring
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	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> <li>– Batching of cement to be undertaken in accordance with <b>Section 5.19: Batching plants</b>; and</li> <li>– Residual solid waste must be disposed of in accordance with <b>Section 5.8: Solid waste and hazardous management</b>.</li> </ul>						

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

Impact management outcome: No environmental degradation occurs as a result of installation of equipment.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> <li>– Management of dust must be conducted in accordance with Section <b>5.20: Dust emissions</b>;</li> <li>– Management of equipment used for installation must be conducted in accordance with Section <b>5.18: Workshop, equipment maintenance and storage</b>;</li> <li>– Management hazardous substances and any associated spills must be conducted in accordance with Section <b>5.17: Hazardous substances</b>; and</li> <li>– Residual solid waste must be recycled or disposed of in accordance with <b>Section 5.8: Solid waste and hazardous management</b>.</li> </ul>						

**5.29 Steelwork Assembly and Erection**

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

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> <li>- During assembly, care must be taken to ensure that no wasted/unused materials are left on site e.g. bolts and nuts</li> <li>- Emergency repairs due to breakages of equipment must be managed in accordance with <b>Section 5. 18: Workshop, equipment maintenance and storage</b> and <b>Section 5.16: Emergency procedures</b>.</li> </ul>						

**5.30 Cabling and Stringing**

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

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

<ul style="list-style-type: none"> <li>- Residual solid waste (off cuts etc.) shall be recycled or disposed of in accordance with <b>Section 6.8: Solid waste and hazardous Management;</b></li> <li>- Management of equipment used for installation shall be conducted in accordance with <b>Section 5.18: Workshop, equipment maintenance and storage;</b></li> <li>- Management hazardous substances and any associated spills shall be conducted in accordance with <b>Section 5.17: Hazardous substances.</b></li> </ul>						
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**5.31 Testing and Commissioning (all equipment testing, earthing system, system integration)**

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

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> <li>- Residual solid waste must be recycled or disposed of in accordance with <b>Section 5.8: Solid waste and hazardous management.</b></li> </ul>						

**5.32 Socio-economic**

**Impact management outcome:** enhanced socio-economic development.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> <li>- Develop and implement communication strategies to facilitate public participation;</li> <li>- Develop and implement a collaborative and constructive approach to conflict resolution as part of the external stakeholder engagement process;</li> <li>- Sustain continuous communication and liaison with neighboring owners and residents</li> <li>- Create work and training opportunities for local stakeholders; and</li> <li>- 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.</li> </ul>						

**5.33 Temporary closure of site**

<p><b>Impact management outcome:</b> Minimise the risk of environmental impact during periods of site closure greater than five days.</p>						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance



	person	implementation	implementation	person		compliance
<ul style="list-style-type: none"> <li>- Bunds must be emptied (where applicable) and need to be undertaken in accordance with the impact management actions included in <b>sections 5.17: Hazardous substances and 5.18: Workshop, equipment maintenance and storage</b>;</li> <li>- Hazardous storage areas must be well ventilated;</li> <li>- Fire extinguishers must be serviced and accessible. Service records to be filed and audited at last service;</li> <li>- Emergency and contact details displayed must be displayed;</li> <li>- Security personnel must be briefed and have the facilities to contact or be contacted by relevant management and emergency personnel;</li> <li>- Night hazards such as reflectors, lighting, traffic signage etc. must have been checked;</li> <li>- Fire hazards identified and the local authority must have been notified of any potential threats e.g. large brush stockpiles, fuels etc.;</li> <li>- Structures vulnerable to high winds must be secured;</li> <li>- Wind and dust mitigation must be implemented;</li> <li>- Cement and materials stores must have been secured;</li> <li>- Toilets must have been emptied and secured;</li> <li>- Refuse bins must have been emptied and secured;</li> <li>- Drip trays must have been emptied and secured.</li> </ul>						

**5.34 Dismantling of old equipment**

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

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> <li>- All old equipment removed during the project must be stored in such a way as to prevent pollution of the environment;</li> <li>- Oil containing equipment must be stored to prevent leaking or be stored on drip trays;</li> <li>- All scrap steel must be stacked neatly and any disused and broken insulators must be stored in containers;</li> <li>- Once material has been scrapped and the contract has been placed for removal, the disposal Contractor must ensure that any equipment containing pollution causing substances is dismantled and transported in such a way as to prevent spillage and pollution of the environment;</li> <li>- The Contractor must also be equipped to contain and clean up any pollution causing spills; and</li> <li>- Disposal of unusable material must be at a licensed waste disposal site.</li> </ul>						

**5.35 Landscaping and rehabilitation**

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

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> <li>- All areas disturbed by construction activities must be subject to landscaping and rehabilitation; All spoil and waste must be disposed of to a registered waste site;</li> <li>- 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</li> <li>- 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;</li> <li>- 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;</li> <li>- 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;</li> <li>- Rehabilitation of access roads outside of farmland;</li> <li>- Indigenous species must be used for with species and/grasses to where it compliments or approximates the original condition;</li> <li>- Stockpiled topsoil must be used for rehabilitation (refer to <b>Section 5.24: Stockpiling and stockpiled areas</b>);</li> <li>- Stockpiled topsoil must be evenly spread so as to facilitate seeding and minimise loss of soil due to erosion;</li> <li>- Before placing topsoil, all visible weeds from the placement area and from the topsoil must be removed;</li> <li>- Subsoil must be ripped before topsoil is placed;</li> </ul>						

<ul style="list-style-type: none"> <li>- The rehabilitation must be timed so that rehabilitation can take place at the optimal time for vegetation establishment;</li> <li>- Where impacted through construction related activity, all sloped areas must be stabilised to ensure proper rehabilitation is effected and erosion is controlled;</li> <li>- 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;</li> <li>- Spoil can be used for backfilling or landscaping as long as it is covered by a minimum of 150 mm of topsoil.</li> <li>- 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: <ul style="list-style-type: none"> <li>a) Annual and perennial plants are chosen;</li> <li>b) Pioneer species are included;</li> <li>c) Species chosen must be indigenous to the area with the seeds used coming from the area;</li> <li>d) Root systems must have a binding effect on the soil;</li> <li>e) The final product must not cause an ecological imbalance in the area</li> </ul> </li> </ul>						
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**6 ACCESS TO THE GENERIC EMPr**

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

**PART B: SECTION 2**

**7 SITE SPECIFIC INFORMATION AND DECLARATION**

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

7.1.1 Details of the applicant:

Name of applicant:

Tel No:

Fax No:

Postal Address:

Physical Address:

7.1.2 Details and expertise of the EAP:

Name of applicant:

Tel No:

Fax No:

E-mail address:

Expertise of the EAP (Curriculum Vitae included):

7.1.3 Project name:

7.1.4 Description of the project:

7.1.5 Project location:

NO	FARM NAME( if applicable)	FARM NUMBER( if applicable)	PORTION NAME	PORTION NUMBER	LATITUDE	LONGITUDE

**7.2 Sub-section 2: Development footprint site map**

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

**7.3 Sub-section 3: Declaration**

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

Signature Proponent/applicant/ holder of EA

Date:

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

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

## PART C

### 8 SITE SPECIFIC ENVIRONMENTAL ATTRIBUTES

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

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

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

## 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.







# Annexure D

## Management of Soils: Guidelines

### Topsoil

- Source of topsoil
  - Topsoil must be stripped from all areas that are to be utilised during the construction period and where permanent structures and access is required. These areas will include temporary and permanent access roads, construction camps, and lay down areas. Topsoil must be stripped after clearing of woody vegetation and before excavation or construction commences.
  - The topsoil is regarded as the top 300mm of the soil profile irrespective of the fertility appearance, structure, agricultural potential, fertility and composition of the soil.
  
- Topsoil stripping
  - Soil must be stripped to a minimum depth of 150mm and maximum depth of 300mm or to the depth of bedrock where soil is shallower than 300mm. Herbaceous vegetation, overlying grass and other fine organic matter must not be removed from the stripped soil.
  - No topsoil which has been stripped must be buried or in any other way be rendered unsuitable for further use by mixing with spoil or by compaction using machinery.
  - Topsoil must preferably be stripped when it is in a dry condition in order to prevent compaction.
  
- Topsoil stockpiling
  - The Consulting Engineer or Environmental Control Officer must stockpile stripped topsoil in areas, which have been approved. Soil stockpiles must take the form of windrows.
  - To prevent erosion, material stockpiled for long periods (2 weeks) must be retained in a bermed area.
  - Topsoil, mulch and subsoil stockpiles must be placed in higher-lying areas of the site, and must not be positioned within stormwater channels or areas of ponding.
  - Topsoil stripped from different soil types must be stockpiled separately and clearly identified as such. Under no circumstances must topsoil obtained from different soil types be mixed.
  - Soil stockpiles must not be higher than 2m or stored for a period longer than one year. The slopes of soil stockpiles must not be steeper than 1 vertical to 2.5 horizontal.
  - No vehicles must be allowed access onto the stockpiles after they have been placed. Topsoil stockpiles must be clearly demarcated in order to prevent vehicle access and for later identification when required.
  - Soil stockpiles must not become contaminated with oil, diesel, petrol, garbage or any other material, which may inhibit the later growth of vegetation in the soil.

- After topsoil removal has been completed, the Contractor must apply soil conservation measures to the stockpiles where and as directed by the Consulting Engineer or Environmental Control Officer. This must include the use of erosion control fabric or grass seeding.
- Topsoil replacement
  - Topsoil must be replaced to a minimum depth of 75mm over all areas where it has been stripped and over disused borrow pits, after construction in those areas has ceased. Topsoil placement must follow as soon as construction in an area has ceased.
  - All areas onto which topsoil is to be spread must be graded to the approximate original landform with maximum slopes of 1:25 and must be ripped prior to topsoil placement. The entire area must be ripped parallel to the contours to a minimum depth of 300mm.
  - Topsoil must be placed in the same soil one from which it had been stripped. However, if there is insufficient topsoil available from a particular soil one to produce the minimum specified depth, topsoil must be brought from other soil ones at the approval of the Consulting Engineer or Environmental Control Officer.
  - Where topsoil that has been stripped by the Contractor is insufficient to provide the minimum specified depth, the Contractor must obtain suitable substitute material from other sources at no cost to the employer. The suitability of the substitute material must be determined by means of soil analyses, which are acceptable to the Consulting Engineer or Environmental Control Officer.
  - No vehicles must be allowed access onto or through topsoil after it has been reinstated.
  - After topsoil reinstatement is complete, cleared and stockpiled vegetative matter must be spread randomly by hand over the top soiled area. The vegetative material must be replaced on the areas from where it has been removed.

# Annexure E

## Eskom Requirements for Work in or near Eskom Servitudes

1. Eskom's rights and services must be acknowledged and respected at all times.
2. Eskom shall at all times retain unobstructed access to and egress from its servitudes.
3. Eskom's consent does not relieve the developer from obtaining the necessary statutory, land owner or municipal approvals.
4. Any cost incurred by Eskom as a result of non-compliance to any relevant environmental legislation will be charged to the developer.
5. If Eskom has to incur any expenditure in order to comply with statutory clearances or other regulations as a result of the developer's activities or because of the presence of his equipment or installation within the servitude restriction area, the developer shall pay such costs to Eskom on demand.
6. The use of explosives of any type within 500 metres of Eskom's services shall only occur with Eskom's previous written permission. If such permission is granted the developer must give at least fourteen working days prior notice of the commencement of blasting. This allows time for arrangements to be made for supervision and/or precautionary instructions to be issued in terms of the blasting process. It is advisable to make application separately in this regard.
7. Changes in ground level may not infringe statutory ground to conductor clearances or statutory visibility clearances. After any changes in ground level, the surface shall be rehabilitated and stabilised so as to prevent erosion. The measures taken shall be to Eskom's satisfaction.
8. Eskom shall not be liable for the death of or injury to any person or for the loss of or damage to any property whether as a result of the encroachment or of the use of the servitude area by the developer, his/her agent, contractors, employees, successors in title, and assignees. The developer indemnifies Eskom against loss, claims or damages including claims pertaining to consequential damages by third parties and whether as a result of damage to or interruption of or interference with Eskom's services or apparatus or otherwise. Eskom will not be held responsible for damage to the developer's equipment.
9. No mechanical equipment, including mechanical excavators or high lifting machinery, shall be used in the vicinity of Eskom's apparatus and/or services, without prior written permission having been granted by Eskom. If such permission is granted the developer must give at least seven working

days' notice prior to the commencement of work. This allows time for arrangements to be made for supervision and/or precautionary instructions to be issued by the relevant Eskom Manager

**Note:** Where an electrical outage is required, at least fourteen work days are required to arrange it.

10. Eskom's rights and duties in the servitude shall be accepted as having prior right at all times and shall not be obstructed or interfered with.
11. Under no circumstances shall rubble, earth or other material be dumped within the servitude restriction area. The developer shall maintain the area concerned to Eskom's satisfaction. The developer shall be liable to Eskom for the cost of any remedial action which has to be carried out by Eskom.
12. The clearances between Eskom's live electrical equipment and the proposed construction work shall be observed as stipulated by *Regulation 15 of the Electrical Machinery Regulations of the Occupational Health and Safety Act, 1993 (Act 85 of 1993)*.
13. Equipment shall be regarded electrically live and therefore dangerous at all times.
14. In spite of the restrictions stipulated by Regulation 15 of the Electrical Machinery Regulations of the Occupational Health and Safety Act, 1993 (Act 85 of 1993), as an additional safety precaution, Eskom will not approve the erection of houses, or structures occupied or frequented by human beings, under the power lines or within the servitude restriction area.
15. Eskom may stipulate any additional requirements to highlight any possible exposure to Customers or Public to coming into contact or be exposed to any dangers of Eskom plant.
16. It is required of the developer to familiarise himself with all safety hazards related to Electrical plant.
17. Any third party servitudes encroaching on Eskom servitudes shall be registered against Eskom's title deed at the developer's own cost. If such a servitude is brought into being, its existence should be endorsed on the Eskom servitude deed concerned, while the third party's servitude deed must also include the rights of the affected Eskom servitude.

John Geeringh (Pr Sci Nat)  
Senior Consultant Environmental Management  
Eskom GC: Land Development

## **Annexure E**

### Heritage Management Guidelines and Plan

## GENERAL MANAGEMENT GUIDELINES

1. **In the event that an area previously not included in an archaeological or cultural resources survey is to be disturbed, the SAHRA needs to be contacted. An enquiry must be lodged with them into the necessity for a Heritage Impact Assessment.**
2. In the event that a further heritage assessment is required it is advisable to utilise a qualified heritage practitioner, preferably registered with the Cultural Resources Management Section (CRM) of the Association of Southern African Professional Archaeologists (ASAPA).

This survey and evaluation must include:

- (a) The identification and mapping of all heritage resources in the area affected;
  - (b) An assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6 (2) or prescribed under section 7 of the National Heritage Resources Act;
  - (c) An assessment of the impact of the development on such heritage resources;
  - (d) An evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;
  - (e) The results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;
  - (f) If heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and
  - (g) Plans for mitigation of any adverse effects during and after the completion of the proposed development.
3. It is advisable that an information section on cultural resources be included in the SHE training given to contractors involved in surface earthmoving activities. These sections must include basic information on:
    - a. Heritage;
    - b. Graves;
    - c. Archaeological finds; and
    - d. Historical Structures.

This module must be tailor made to include all possible finds that could be expected in that area of construction.

Possible finds include:

- a. Open air Stone Age scatters, disturbed during vegetation clearing. This will include stone tools.
  - b. Palaeontological deposits such as bone, and teeth in fluvial riverbank deposits.
4. In the event that a possible find is discovered during construction, all activities must be halted in the area of the discovery and a qualified archaeologist contacted.
  5. The archaeologist needs to evaluate the finds on site and make recommendations towards possible mitigation measures.
  6. If mitigation is necessary, an application for a rescue permit must be lodged with SAHRA.



7. After mitigation, an application must be lodged with SAHRA for a destruction permit. This application must be supported by the mitigation report generated during the rescue excavation. Only after the permit is issued may such a site be destroyed.
8. If during the initial survey sites of cultural significance are discovered, it will be necessary to develop a management plan for the preservation, documentation or destruction of such a site. Such a program must include an archaeological/palaeontological monitoring programme, timeframe and agreed upon schedule of actions between the company and the archaeologist.
9. In the event that human remains are uncovered, or previously unknown graves are discovered, a qualified archaeologist needs to be contacted and an evaluation of the finds made.
10. If the remains are to be exhumed and relocated, the relocation procedures as accepted by SAHRA need to be followed. This includes an extensive social consultation process.



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