BIOTHERM ENERGY

Proposed Construction of the Tlisitseng 1 132kV Substation and Power Line near Lichtenburg, North West Province

Draft Environmental Management Programme

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For:	SiVEST Environmental Division

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PROPOSED CONSTRUCTION OF THE TLISITSENG 1 132KV SUBSTATION AND POWER LINE NEAR LICHTENBURG, NORTH WEST PROVINCE

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

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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 Zone, 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:

DEA	Department of Environmental Affairs
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	Equator Principles
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
SAHRA	South African Heritage Resources Agency

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PROPOSED CONSTRUCTION OF THE TLISITSENG 1 132KV SUBSTATION AND POWER LINE NEAR LICHTENBURG, NORTH WEST PROVINCE

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

1 INTRODUCTION

BioTherm Energy (Pty) Ltd (hereafter referred to as BioTherm) intends to develop the Tlisitseng 1 132kV Substation and 132kV power line (hereafter referred to as the "proposed development") near Lichtenburg in the North West Province of South Africa. SiVEST Environmental Division has been appointed as independent environmental assessment practitioner (EAP) to undertake the Basic Assessment (BA) for the proposed development. The overall objective of the project is to feed the electricity generated at the Tlisitseng 1 solar photovoltaic (PV) energy facility (part of a separate ongoing process) back into the National Grid by constructing the proposed Tlisitseng 1 substation and power line.

The proposed Tlisitseng 1 substation and power line will connect the proposed Tlisitseng 1 solar PV energy facility to the existing Eskom Watershed substation. The Tlisitseng 1 solar PV energy facility is currently subject to a separate ongoing Environmental Impact Assessment (EIA) process, the reference number for which is 14/12/16/3/3/2/974. This proposed PV energy facility forms one (1) of two (2) PV energy facilities with a 75MW export capacity that BioTherm are proposing to develop on Portion 25 of the Farm Houthaalboomen No 31. Although the two (2) proposed Tlisitseng solar PV energy facilities and the two (2) proposed substations and power lines will be assessed separately, a single public participation process is being undertaken to consider all four (4) proposed developments.

The objective of the projects is to develop the required electrical infrastructure in order to feed the generated electricity into the national grid. The project is also in-line with the government's commitment to provide renewable energy as an alternative energy source to those currently utilised.

This EMPr has been compiled in line with the recommendations in the above-mentioned EIA, as well as from issues identified by SiVEST. More details will be provided by the contractors and engineers once the detailed design has been completed.

1.1 Details of the EAP

As per the requirements of the NEMA (2014), the details and level of expertise of the persons who prepared the EMPr are provided in Table 1 below.

Table 1: Consultant Team

Environmental Practitioner	SiVEST (Pty) Ltd – Andrea Gibb
Contact Details	andreag@sivest.co.za
Qualifications	BSc Landscape Architecture and BSc (Hons) Environmental Management
Expertise to carry out the EMPr	Andrea has 9 years' work experience and specialises in undertaking and managing Environmental Impact Assessments (EIAs) and Basic Assessment (BAs), primarily related to energy generation and electrical distribution projects. She also specialises in undertaking visual impact and landscape assessments, by making use of ArcGIS technology and field surveys. She has extensive experience in overseeing public participation and stakeholder engagement processes and has been involved in environmental baseline assessments, fatal flaw / feasibility assessments and environmental negative mapping / sensitivity analyses. From a business and administrative side, Andrea is actively involved in maintaining good client relationships, mentoring junior staff and maintaining financial performance of the projects she leads. **Environmental Impact Assessments and Basic Assessments:** ▪ EIA for the proposed construction of a 75MW Solar Photovoltaic (PV) Power Plant near Dennilton, Limpopo Province. ▪ EIA for the proposed development of the Dwarsrug Wind Farm near Loeriesfontein, Northern Cape Province. ▪ BA for the proposed construction of two 132kV power lines and associated infrastructure from the Redstone Solar Thermal Power Project site to the Olien MTS near Lime Acres, Northern Cape Province. ▪ BA for the proposed construction of two 132kV power lines and associated infrastructure from Silverstreams DS to the Olien MTS near Lime Acres, Northern Cape Province. ▪ BA for the proposed Construction of the SSS1 5MW Solar Photovoltaic (PV) Plant on the Western Part of Portion 6 (Portion of Portion 5) of Farm Spes Bona 2355 near Bloemfontein, Free State Province. ▪ BA for the proposed Construction of the SSS2 5MW Solar Photovoltaic (PV) Plant on the Eastern Part of Portion 6 (Portion of Portion 5) of Farm Spes Bona 2355 near Bloemfontein, Free State Province. ▪ BA for the proposed Mookodi Integration Phase 2: Proposed Construction of a 132kV power line from the proposed Bophirima Substation to the

	existing Schweizer-Reneke Substation, North West Province. ▪ BA for the proposed Mookodi Integration Phase 2: Proposed Construction of a 132kV power line from the Mookodi Substation to the existing Magopela Substation, North West Province. ▪ BA for the proposed Mookodi Integration Phase 2: Proposed Construction of the Mookodi - Ganyesa 132kV power line, proposed Ganyesa Substation and Havelock LILO, North West Province. ▪ Amendment of the Final Environmental Impact Report for the Proposed Mookodi 1 Integration Project near Vryburg, North West Province. ▪ BA for the proposed 132kV power line and associated infrastructure for the proposed Redstone Solar Thermal Energy Plant near Lime Acres, Northern Cape Province. ▪ BA for the proposed construction of a 132kV power line and substation associated with the 75MW Photovoltaic (PV) Plant on the Farm Droogfontein (PV 3) in Kimberley, Northern Cape Province. ▪ BA for the proposed establishment of a Learning and Development Retreat and an Executive Staff and Client Lodge at Mogale's Gate, Gauteng Province. ▪ Amendment application in order to increase the output of the proposed 40MW PV Facility on the farm Mierdam to 75MW, Northern Cape Province. ▪ BA for the proposed construction of a power line and substation near Postmasburg, Northern Cape Province. ▪ BA for the proposed West Rand Strengthening Project – 400kV double circuit power line and substation extension in the West Rand, Gauteng. ▪ EIA for the proposed construction of a wind farm and PV plant near Prieska, Northern Cape Province. ▪ Public Participation assistance as part of the EIA for the proposed Thyspunt Transmission Lines Integration Project – EIA for the proposed construction of 5 x 400kV transmission power lines between Thyspunt to Port Elizabeth, Eastern Cape Province. ▪ EIA assistance for the proposed construction of three Solar Power Plants in the Northern Cape Province. ▪ Public Participation as part of the EIA for the proposed Delareyille Kopela Power Line and Substation, North West Province. ▪ Public Participation as part of the EIA for the Middelburg Water Reclamation Project, Mpumalanga Province.
Environmental Consultant	SiVEST (Pty) Ltd – Veronique Evans
Contact Details	veroniquee@sivest.co.za

Qualifications	BSc Environmental Conservation and Ecology, Zoology and Geography, BSc (Hons), Environmental Science in Conservation and Ecology, MSc Environmental Science in Conservation and Ecology
Expertise to carry out the EMPr	▪ Veronique has 5 years of experience and has been public participation aspect on numerous projects including Environmental Impact Assessments, Water Use License applications and amendment impact assessments. She has been involved in the compilation of Environmental Impact Assessment (EIA) and Basic Assessments (BA) and Environmental Management Plans primarily related to energy generation and electrical distribution projects. She also assists and undertakes visual impact assessments, by making use of ArcGIS technology and undertaking field surveys. ▪ Basic Assessment (BA) and Environmental Management Plan (EMPr) for the Ermelo-Richards Bay Coal Line Upgrade Project: Proposed Development of the Duma 400kv Main Transmission Station and Associated 88kv and 400kv turn in Power Lines Near Ulundi, Kwazulu-Natal Province (2013/2015) SiVEST - Graduate Environmental Consultant; ▪ Basic Assessment (BA) and Environmental management Plan (EMPr) for the Ermelo-Richards Bay Coal Line Upgrade Project: Proposed Development of the New Nzalo (Mqwabe) 400/88 Kv, 160mva Substation With Associated 88kv And 400kv Turn-In Power Lines East of Vryheid, Kwazulu-Natal, South Africa (2013/2015) SiVEST - Graduate Environmental Consultant; ▪ Basic Assessment (BA) and Environmental management Plan (EMPr) for the Ermelo-Richards Bay Coal Line Upgrade Project: Proposed Development of the Vryheid Traction Station and the Associated Eskom Turn In Power Lines In Kwazulu- Natal, South Africa (2013/2015) SiVEST - Graduate Environmental Consultant; ▪ Basic Assessment (BA) and Environmental management Plan (EMPr) for the Ermelo-Richards Bay Coal Line Upgrade Project: Proposed Development of the Sheepmoor Traction Station and Two New Associated 88/25kv Turn In Lines with 20mva Transformer Bays, Mpumalanga Province, South Africa (2013/2015) SiVEST - Graduate Environmental Consultant; ▪ Basic Assessment (BA) and Environmental management Plan (EMPr) for theErmelo-Richards Bay Coal Line Upgrade Project: Proposed Rebuild of the 88kv Power Line from Uitkoms Substation to Antra T-Off, Approximately 3.5km in length, Mpumalanga Province, South Africa (2013/2015) SiVEST - Graduate Environmental Consultant; ▪ Basic Assessment (BA) and Environmental management Plan (EMPr) for the Ermelo-Richards Bay Coal Line Upgrade Project: Proposed Upgrade

	of the 24 Km Twin Wolf Power Lines from Normandie To Hlungwana Substation in Mpumalanga and Kwazulu-Natal, South Africa (2013/2015) SiVEST - Graduate Environmental Consultant; ▪ Basic Assessment (BA) and Environmental management Plan (EMPr) for the Ermelo-Richards Bay Coal Line Upgrade Project: Proposed Upgrade of 11.27km of the Umfolozi to Eqwasha Twin Wolf Eskom Power Line and 0.5km of the Umfolozi to Dubula Twin Wolf Eskom Power Line in Kwazulu-Natal, South Africa (2013/2015) SiVEST - Graduate Environmental Consultant; ▪ Basic Assessment (BA) and Environmental management Plan (EMPr) for the proposed construction of a 132kv Power Line, Substation and the extension of Homestead Substation associated with the Concentrating Photovoltaic (CPV) / Photovoltaic (Pv) Plant (PV 3) on the Farm Droogfontein in Kimberley, Northern Cape Province (2012/2013) SiVEST - Graduate Environmental Consultant; ▪ Basic Assessment (BA) and Environmental Management Programme (EMPr) for the Proposed Mookodi Integration Phase 2 132kv Power Lines and Ganyesa Substation Near Vryburg, North West Province (2012) SiVEST - Graduate Environmental Consultant; ▪ Basic Assessment (BA) for the upgrade of the Silver Lakes outfall sewer pipeline (2012) SiVEST - Graduate Environmental Consultant; ▪ Basic Assessment (BA) and Environmental Management Programme (EMPr) for the Proposed construction of the Sheepmoor traction substation with two 20MVA transformer bays and a new associated 88kV turn-in power line, Mpumalanga Province (2013) SiVEST - Graduate Environmental Consultant; ▪ Basic Assessment (BA) and Environmental Management Programme (EMPr) for the Proposed rebuild of the 88kV power line from Uitkoms substation to Antra T-off, Mpumalanga Province (2013) SiVEST - Graduate Environmental Consultant; ▪ EIA for the proposed 25 MW Community Wind Farm in St Helena Bay, Western Cape Province. The EIA includes the scoping process and detailed environmental impact assessment. The project includes detailed specialist studies such as social, visual and biophysical as well as a full public participation process. Junior Environmental Scientist. Just Energy, 2011 -2012, closed. ▪ EIA for the proposed 300 MW Caledon Wind Farm, Western Cape Province. The EIA includes the scoping process and detailed environmental impact assessment. The project includes detailed specialist studies such as social, visual and biophysical as well as a full public participation process. Junior Environmental Scientist, GIBB. Caledon

	Wind, 2011 – 2012, closed. ▪ EIA and EMP for the proposed South African Nuclear Energy Corporation (Necsa) Dedicated Isotope Production Reactor (DIPR) at the Pelindaba Site near Hartebeespoort in the North West Province. The EIA includes the scoping process and detailed environmental impact assessment. The project includes detailed specialist studies such as social, visual and air quality as well as a full public participation process. Junior Environmental Scientist, GIBB. Necsa, 2011 -current. ▪ BA for the proposed 25 MW Community Wind Farm in St Helena Bay, Western Cape Province. The BA includes the scoping process and detailed environmental impact assessments. The project includes detailed specialist studies such as social, visual and biophysical as well as a full public participation process. Junior Environmental Scientist, GIBB. Just Energy, 2012 - current.

1.2 Site Locality and Description

1.2.1 Regional Locality

The proposed project is located within the North West Province approximately 8km north-west of Lichtenburg. It falls within the Ditsobotla Local Municipality that forms part of the Ngaka Modiri Molema District Municipality. (Figure 1). The proposed 132kV substation and power line will be accessed by the R505 which traverses the site.

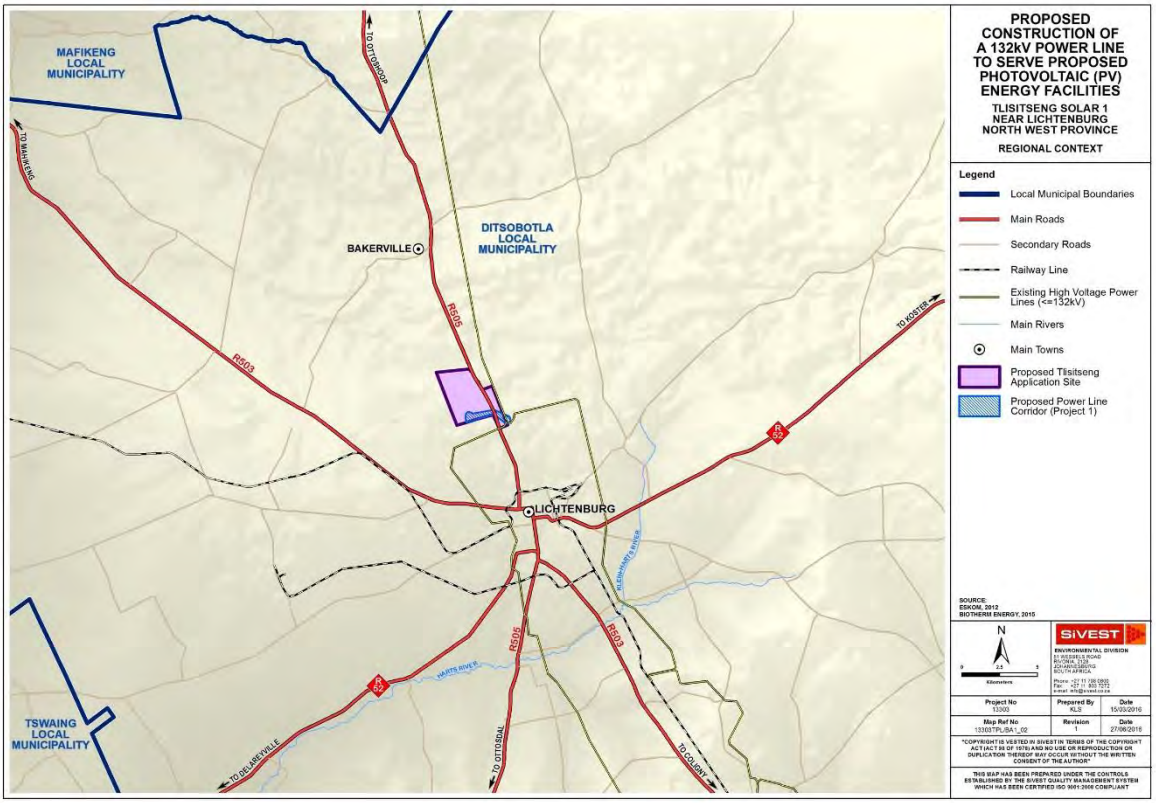


Figure 1: Regional Context Map

The Tlisitseng 1 substation and power line corridor alternatives are located on the following farms:

- Houthaalboomen number 31 portion 25, and
- Lichtenburg Town and Townlands number 27 portion 10 and the remainder of portion 1

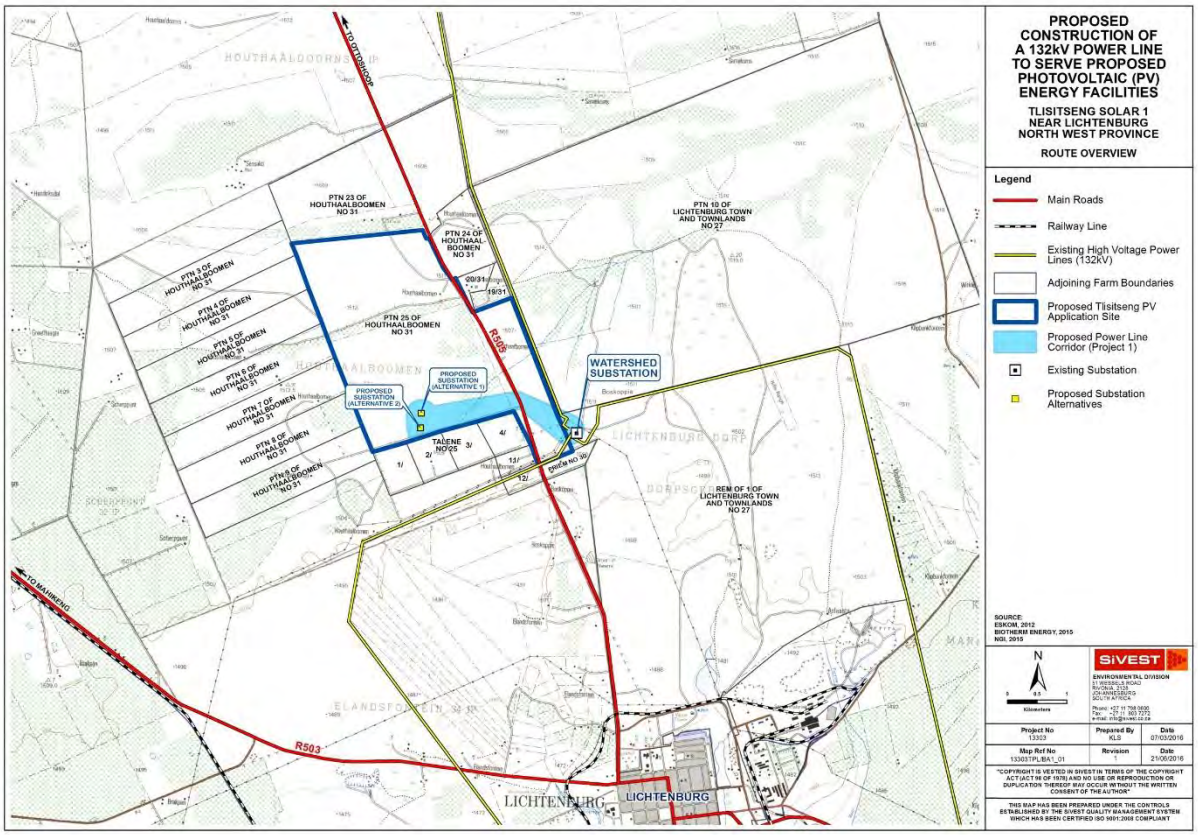


Figure 2: Locality Map

1.2.2 Study Site Description

The entire site is covered by the Carlton Dolomite Grassland vegetation type, which is characterised by low shrubland with an open tree layer and species rich grasslands. In certain parts of the surrounding area, man has had an impact on the natural vegetation, especially around farmsteads, where over many years tall exotic trees and other typical garden vegetation have been established. Much of the surrounding area however is still characterised by natural low shrubland and grassland with transformation present in the form of cultivated fields scattered throughout the area.

Much of the surrounding area is characterised by natural unimproved vegetation. As previously mentioned, cultivated land is largely concentrated to the west of the site. Maize is the main crop produced in the area with both dryland and irrigated farming practises evident.

Built form, in areas where cultivation occurs, is limited to isolated farmsteads, gravel access roads, ancillary farm buildings, telephone lines, windmills, fences and the remnants of old workers' dwellings.

The topography within and in the immediate vicinity of the proposed application site is characterised by a flat to gently undulating landscape.

1.2.3 Climate

The climate of the area (Kotze & Lonergan, 1984) can be regarded as warm to hot with moist summers and dry winters. The long-term average annual rainfall is 545 mm, of which 452 mm, or 83%, falls from October to March. The average evaporation over the same period is 2 335 mm. Temperatures vary from an average monthly maximum and minimum of 31.1ºC and 16.2ºC for January to 17.6ºC and 2.0°C for July respectively. The extreme high temperature that has been recorded is 36.0°C and the extreme low –4.1ºC.

1.3 Overview of the proposed project

The technical project details are included in the sections below:

1.3.1 Tlisitseng 1 substation and power line

The overall objective of the project is to feed electricity generated at the proposed Tlisitseng 1 solar PV energy facility into the National Grid at the existing Eskom Watershed substation.

The proposed project consists of the following main activities:

- Construction of 1 x 132kV substation (referred to as the Tlisitseng 1 substation)
- Construction of 1 x 132kV power line from the proposed Tlisitseng 1 substation to the existing Eskom Watershed substation.

The proposed power line will consist of a series of towers located approximately 200m to 250m apart. The type of power line towers which are being considered at this stage include self-supporting suspension monopole structures where the line is relatively straight and angle strain towers where the line deviates from zero degree with a large angle. The steel monopole tower type is between 18 and 25m in height. The height will vary based on the terrain, but will ensure minimum OHL line clearances with buildings and surrounding infrastructure. The exact location of the towers will be determined during the final design stages of the power line.

A power line corridor that ranges between approximately 285m and 500m wide is being proposed to allow flexibility when determining the final route alignment, however only a 31m wide servitude would be required for the proposed 132kV power line. As such, the 31m wide servitude would be positioned within the corridor.

The length of the power line will be approximately 4km. Two alternative sites for the proposed Tlisitseng 1 132kV substation will be assessed during the Basic Assessment. The size of the substation site will be

approximately 100m x 100m. The environmentally preferred site for the substation and power line corridor, is illustrated in Figure **3** below.

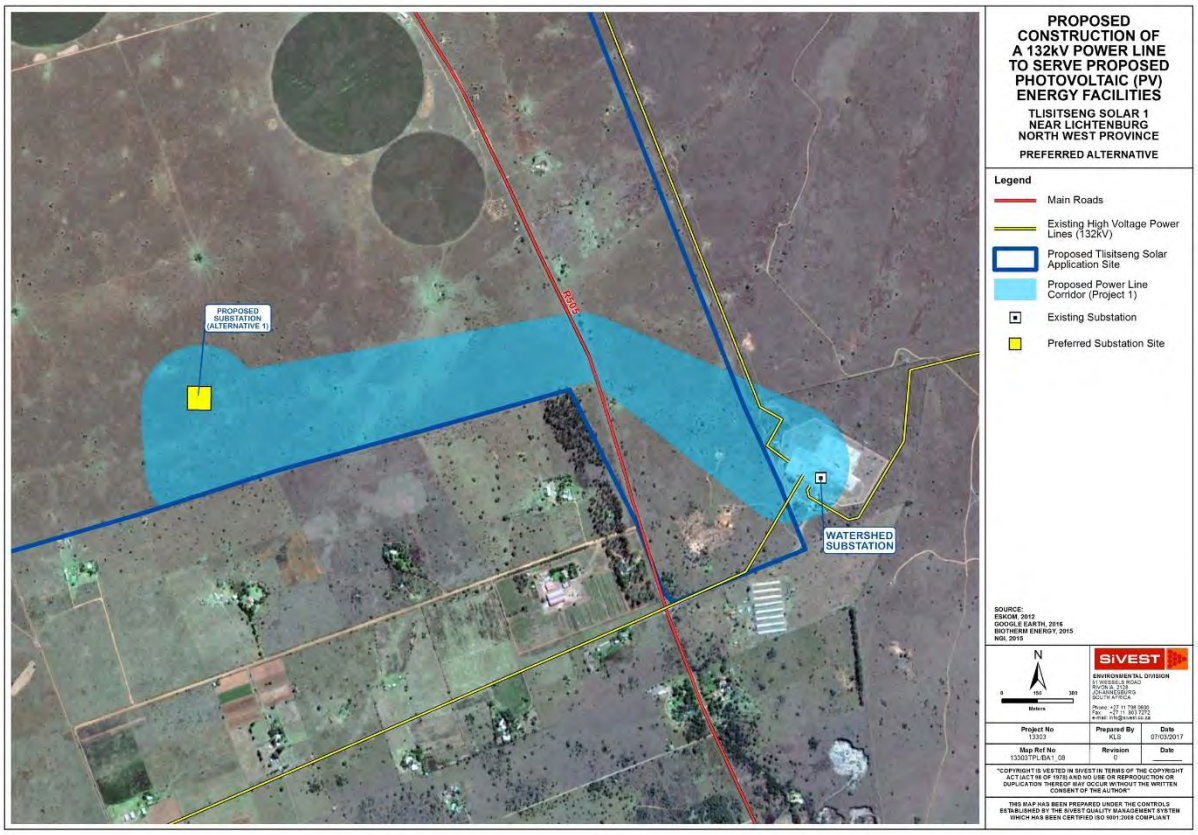


Figure 3: Final preferred Tlisitseng 1 substation and power line corridor showing sensitive areas

- **Substation and Power Line technical summary**

The proposed development will include the construction of a 132kV substation (namely Tlisitseng 1 substation), as well as a 132kV power line, which will connect the proposed Tlisitseng 1 PV facility to the national grid. The proposed development will include the following components:

- The proposed Tlisitseng 1 substation will occupy a footprint area of approximately up to 2.25ha;
- The capacity of the proposed on-site substation is anticipated to be up to 132kV;
- Two alternative sites for the proposed substation are being assessed;
- A power line(s) of up to 132kV is also proposed and will run from the proposed Tlisitseng 1 substation to the existing Watershed Main Transmission substation;
- A corridor of up to 500m is being assessed for the proposed power line, however the final servitude will only be 31m;
- The length of the power line will be approximately 4km;
- The Watershed Main Transmission substation is located approximately 2.4km to the south-east of the greater application site;
- The type of power line towers which are being considered at this stage include self-supporting suspension monopole structures where the line is relatively straight and angle strain towers where the line deviates from zero degree with a large angle.. The height will vary based on the terrain, but will ensure minimum overhead line (OHL) line clearances with buildings and surrounding infrastructure;
- Power line towers are expected to be situated approximately 200m to 250m apart, depending on the terrain;

Based on the feedback received from the public participation process the width of the proposed power line corridor was reduced to exclude portions 2, 3 and 4 of the farm Talene number 25. At the landowner Focus Group Meeting (FGM) the objection was raised that the alignment of the proposed power line corridor traverses through these agricultural holdings. It was noted that these agricultural holdings' properties are very small and the power line would hamper any future development on the property. It was suggested that the power line be constructed on the property where the solar development is being proposed. As a result the width of the proposed corridor now ranges between 280m – 500m.

Other associated infrastructure includes the following:

- Access roads to the substation and power line corridor.

1.4 Specific Conditions Pertaining to Authorisations

Should the Department of Environmental Affairs (DEA) issue an EA for the proposed project, this EMPr will be updated to include all the pre-construction, construction, operation and decommissioning conditions stipulated in the EA.

Specific conditions pertaining to regulatory processes, or Licensee / Holder of the Authorisation requirements, have not been included within the EMPr. These conditions are to be undertaken by the Licensee / Holder of the Authorisation prior to the commencement of construction related activities.

1.5 Project Responsibilities

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

1.5.1 The Project Company

The Project Company will be responsible for the overall control of the project site in environmental terms during the pre-construction, construction, operation, decommissioning and rehabilitation phases of the proposed project. These responsibilities include the following:

- Appointing an independent ECO for the duration of the Contract and notify the DEA of their contact details;
- Being fully familiar with the EIA Report, EA conditions and the EMPr;
- Notifying the DEA of changes in the developments that result in significant environmental impacts;
- Notifying the DEA within 30 days of change of ownership;
- Notifying the DEA of any change of address of the owner/Project Company;
- The overall implementation of the EMPr;
- Ensuring compliance, by all parties, and the imposition of penalties for non-compliance
- Implementing corrective and preventive actions, where required;
- Preventing pollution and actions that will harm or may cause harm to the environment;
- Ensuring the activity does not commence within 30 days of the EA being issued;
- Notifying the DEA within 30 days that construction activity will commence;
- Notifying the DEA in writing within 24 hours if any condition in the EA cannot be or is not adhered to; and

- Notifying the DEA 14 days prior to commencement of the operational phase.

1.5.2 Construction Team

Several professionals will form part of the construction team. The most important from an environmental perspective are the Project Manager (PM), the Contractor Project Manager (CPM), the Main Contractor (MC), the Environmental Control Officer (ECO), the Environmental Officer (EO) and the Community Liaison Officer (CLO).

The PM is responsible for the implementation of the EMPr on the site during the pre-construction and construction phases of the project.

The CPM is responsible for the establishment and management of contracts for the Main Contractor and the Sub-contractors.

The MC is responsible for abiding by the mitigation measures of the EMPr which are implemented by the Project Manager during the construction phase.

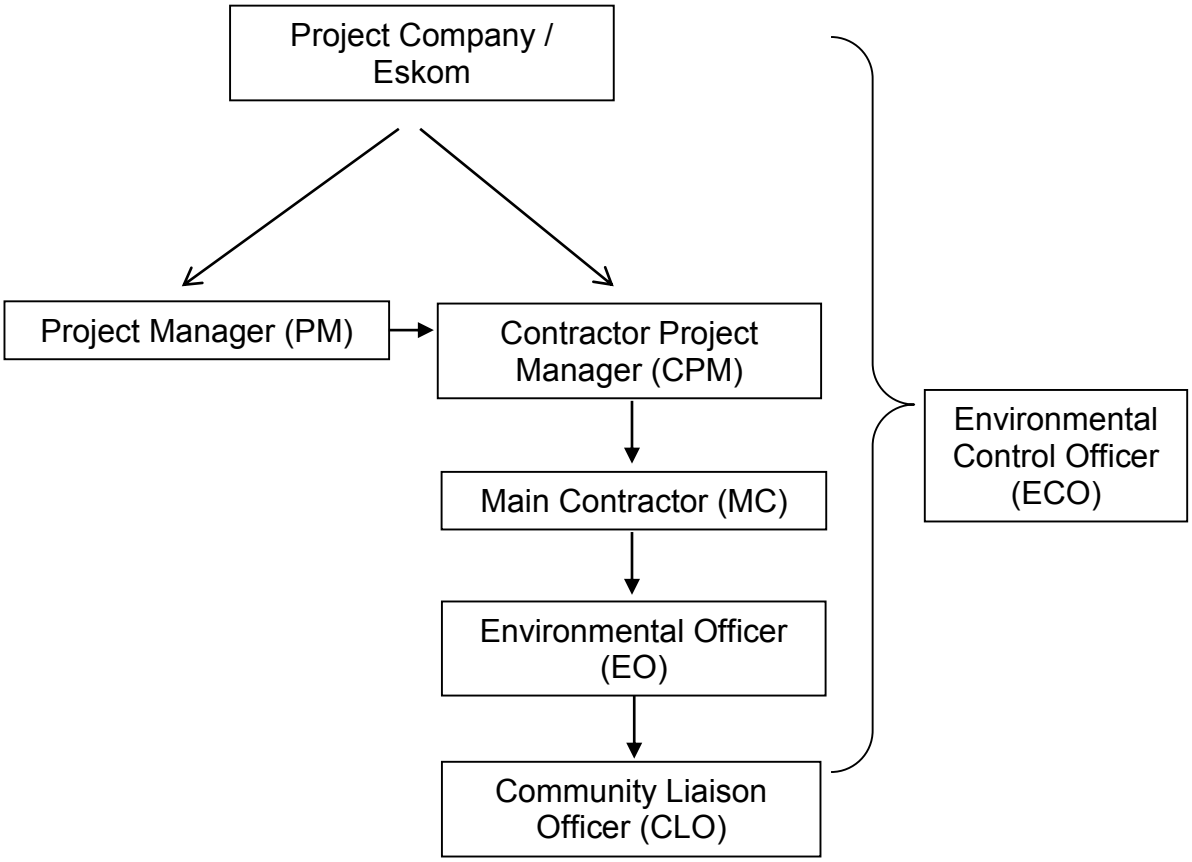
The MC is also responsible for the implementation of the EMPr during the operational and decommissioning phases of the project. However, it must be noted that the MC may change for each phase of the project. The EMPr will therefore be applicable to the relevant MC appointed for each phase of the project.

The ECO is responsible for monitoring the implementation of the EMPr during the design, pre-construction and construction phases of the project.

The EO is responsible for managing the daily onsite implementation of the EMPr.

The CLO is responsible for managing the daily on-site implementation of the social aspects of the EMPr.

Basic Organogram:



1.5.3 Project Manager

The PM is responsible for overall construction management of the project as well as the implementation of the EMPr. The following tasks will fall within his / her responsibilities:

- Be aware of the findings and conclusions of the Environmental Impact Assessment and the conditions stated within the EAs;
- Be familiar with the recommendations and mitigation measures of this EMPr, and implement these measures;
- Monitor site activities on a daily basis for compliance;
- Confine the construction site to the demarcated area; and
- Rectify transgressions through the implementation of corrective action.

The Project Manager will assume ultimate responsibility. However, the abovementioned tasks can be delegated to the on-site manager for daily management.

1.5.4 Contractor Project Manager

The CPM will undertake overall project contracts management between of the Main Contractor and the appointed Sub-Contractors. The following tasks will fall within his / her responsibilities:

- Responsible for establishing contractual agreements with the Main Contractor and Sub-Contractors, and ensuring that sub-contractors adhere to the EMPr;
- One of the key contracts will be for the supply, transport, erection and commissioning of the Solar Panel Arrays.

1.5.5 Main Contractor

The MC is responsible for the implementation and compliance with recommendations and conditions set out in the EMPr. This requires that the MC be familiar with the EIA report, EA conditions and the EMPr. This encompasses the following activities:

- Ensuring compliance with the EMPr at all times during construction;
    - Ensuring that all subcontractors have a copy of and understand the contents of the EMPr, to ensure environmental best practice.
- Preventing pollution and avoid actions that will impact or harm the surrounding environment;
- Responsible for the construction activities to be carried out for the duration of the project (with subcontractors and contract workers);
- Implementing corrective and preventive actions, where required;
- Maintain an environmental register which keeps a record of all incidents which occur on the site during construction. These incidents include:
    - Public involvement / complaints;
    - Health and safety incidents;
    - Hazardous materials stored on site; and
    - Non-compliance incidents.
- Development of specific method statements prior to commencment of environmentally sensitive constructions activities as identified in the EMPr.

1.5.6 Environmental Control Officer

The ECO is responsible for the implementation of the EMPr during the construction phase and liaison between the Contractor and the Landowners. The ECO should have a relevant environmental degree or relevant tertiary qualification. The ECO is also to be an independent party. The ECO will liaise and report

to the Contractor and authorities, thus the ECO should have effective communication and negotiating skills. The following tasks will fall within his / her responsibilities:

- Be aware of the findings and conclusions of the Environmental Impact Assessment and the conditions stated within the EAs.
- Work with the construction team to review relevant risk/ method statements from an environmental perspective;
- Be familiar with the recommendations and mitigation measures of this EMPr;
- Conduct monthly audits of the construction site according to the EMPr and EAs. A monthly report will be produced detailing the findings of the audit highlighting any non-compliance issues. Positive compliance with the EMPr will also be noted;
- Educate the construction team about the management measures of the EMPr and EAs.
- Regular liaison with the construction team and the project leader;
- Recommend corrective action for any environmental non-compliance incidents on the construction site;
- The affected parties shall always be kept informed about any changes to the construction programme should they be involved. If the ECO is not on site the Contractor should keep the affected parties informed. The contact numbers of the Contractor and the ECO shall be made available to the affected parties. This will ensure open channels of communication and prompt response to queries and claims; and
- Liaising with the heritage specialist in the case of unearthing of artefacts and/ or graves.

The ECO is responsible for providing an independent evaluation of compliance with the EMPr and not for enforcement of conditions of the EMPr. The Project Company is responsible for enforcement of the conditions of the EMPr.

The Contractor and the EO are accountable to the ECO for non-compliance with the EMPr. The ECO provides feedback to the Project Company and I&APs, as required. Issues of non-compliance raised by the ECO must be taken up by the Project Company's Representative and resolved with the Contractor as per the conditions of his/her contract.

The ECO will remain employed for the full duration of the contract until all snag items have been resolved, rehabilitation measures have been completed, and the site is handed over to the Operator, thereby indicating the start of the operational phase.

1.5.7 Environmental Officer

The EO must be appointed by the Contractor and is responsible for managing the daily onsite implementation of the EMPr, and for the compilation of weekly environmental monitoring reports. In addition, the EO must act as liaison and advisor on all environmental and related issues, seek advice from

the ECO when necessary, and ensure that any complaints received from I&APs are duly processed and addressed and that conflicts are resolved in an acceptable manner and timely manner. The EO shall be full time dedicated member of the Contractor's team and must be approved by the Project Company.

The following qualifications, qualities and experience are recommended for the individual appointed as the EO:

- A relevant environmental diploma or degree in natural sciences, as well as a minimum of three years' experience in construction site monitoring, excluding health and safety;
- A level-headed and firm person with above-average communication and negotiating skills. The ability to handle and address conflict management situations will be an advantage; and
- Relevant experience in environmental site management and EMPr compliance monitoring.

The EO's responsibilities include:

- Monitoring, on a daily basis, environmental specifications on site and compliance with the conditions of the EA, environmental legislation and EMPr;
- Keeping a register of compliance / non-compliance with the environmental specifications;
- Identifying and assessing previously unforeseen, actual or potential impacts on the environment;
- Ensuring that a brief weekly environmental monitoring report is submitted to the ECO;
- Conducting site inspections during the defects liability period, and bringing any environmental concerns to the attention of the ECO and Contractor;
- Advising the Contractor on the rectification of any pollution, contamination or damage to the construction site, rights of way and adjacent land;
- Attending site meetings (scheduled and *ad hoc*);
- Presenting the environmental awareness training course to all staff, Contractors and Sub contractors, and monitoring the environmental awareness training for all new personnel on-site, as undertaken by the Contractor;
- Ensuring that a copy of the EA and the latest version of the EMPr are available on site at all times;
- Ensuring that the Contractor is made aware of all applicable changes to the EMPr that are approved by the DEA;
- Assisting the Contractor in drafting environmental method statements and/or the Environmental Policy where such knowledge/expertise is lacking;
- Undertaking daily environmental monitoring to ensure the Contractor's activities do not impact upon the receiving environment. Such monitoring shall include dust, noise and water monitoring; and
- Maintaining the following on site:
    - A weekly site diary.
    - A non-conformance register.
    - An I&Ap communications register, and
    - A register of audits.

The EO will remain employed until all rehabilitation measures, as required for implementation due to construction damage, are completed and the site is handed over to the Operator.

1.5.8 Community Liaison Officer

The CLO shall be employed by the Contractor and will be responsible for managing the daily on-site implementation of the social aspects of the EMPr. The CLO shall liaise with landowners and relevant I&APs regarding construction activities for the duration of construction and will ensure that any discussions and complaints received from the public are addressed and that conflicts are resolved in an acceptable manner within 10 days.

The CLO(s) shall be full time dedicated member(s) of the Contractor's team and must be accepted by the Project Company. The CLO shall report to the Contractor's Project Manager, seeking advice from the ECO when necessary.

The CLO may be the same person as the EO, but will assume all the responsibilities of the dual role.

The following qualifications, qualities and experience are recommended for the individual appointed as the Contractor's CLO:

- A person with communication and negotiating skills;
- Report writing skills; and
- Fluency in English, Afrikaans and any other local language as and where required.

The responsibilities and functions of the Construction CLO will include:

- Implement and manage the daily social and communication aspects of the construction process according to the EMPr;
- Liaise and maintain good relations with I&APs;
- Monitor social aspects in terms of the specifications;
- Implement mitigation and corrective measures;
- Submit a monthly environmental report to the Contractor's Project Manager;
- Conduct site inspections during the defects notification period, and bring any social concerns to the attention of the Contractor;
- Attend site meetings (scheduled and ad hoc);
- Maintain a filing system meeting the project's quality management plan;
- Assist the Contractor in the drafting of social methods statements where such knowledge/expertise is lacking;
- Maintain the following on site:
    - A daily site diary;
    - A public complaints and communications register; and
    - A register of audits.
- Remain employed until the end of construction.

1.5.9 Responsible Parties and Auditing Process

As described above, Table 2 below provides a summary of the responsible parties and the auditing process to be carried out.

Table 2: Responsible Parties and Auditing Process

TITLE	PARTY	ROLE DURING CONSTRUCTION	ROLE DURING OPERATION
Project Company	Special Purpose Vehicle (SPV) to be confirmed once registered	Assume ultimate responsibility	N/A
Grid Connection Owner	Eskom	N/A	Assume ultimate responsibility
Project Manager	To be appointed by proponent	Construction management	N/A
Contractor's Project Manager	Balance of Plant Contractor	Project management	N/A
Main Contractor/s	There will be multiple contracts placed and managed by the Contractor's Project Manager for the construction phase. These will cover civil earthworks and concrete, structural mechanical and electrical / instrumentation (CI). Then there could also be the construction camp management contract.	Main Contractor will undertake day to day construction activities covering aspects such as civil earthworks and concrete, structural mechanical and electrical / instrumentation (CI).	N/A
Environmental Officer	To be appointed by Main Contractors	Day to day environmental responsibility, point of contact for ECO	N/A
Environmental Control Officer	To be appointed by proponent	Monthly audits	Annual audits

Community Liaison Officer	To be appointed by Main Contractors	Day to day environmental responsibility, point of contact for landowners and I&APs's	Monthly Audits
Determining Authority	National Department of Environmental Affairs (DEA)	Conduct site visits when necessary.	Conduct site visits when necessary

The following are the environmental management responsibilities (Table 3) of the various parties during construction and operational phases. Unless otherwise stated, the EMPr will be adhered to as follows:

- The EO will be the responsible party for all daily compliance of this EMPr during the construction phase;
- The monitoring party will be the ECO;
- Method of record keeping will be monthly audits undertaken by the ECO;
- Audit Technique will be the review of records and documentation (including EMPr/EA) that will be kept on site by the EO and/ or site inspections; and
- The Project Company will bear ultimate responsibility during the construction phase.
- The Eskom will bear ultimate responsibility during the operational phase.

Table 3: Environmental Management Responsibilities

ITEM	PROJECT COMPONENT AND ACTIVITY	RESPONSIBLE PARTY	MONITORING PARTY	AUDIT TECHNIQUE
1.1	PRE-CONSTRUCTION (SITE ESTABLISHMENT)			
1.1.1	Site preparation	PROJECT COMPANY, MC, EO, ECO	PROJECT COMPANY, ECO	SITE VISIT
1.1.2	Consultation	MC, CLO	EO, ECO	SITE VISIT
1.1.3	Cumulative impacts	MC,	EO, ECO	SITE VISIT
1.1.4	Social and Environmental Management Systems	MC,	EO, ECO, CLO	SITE VISIT
2.1	CONSTRUCTION ACTIVITIES			
2.1.1	Site Clearing	MC,	EO, ECO	SITE VISIT
2.1.2	Construction traffic and access	MC, EO	ECO	SITE VISIT
2.1.3	Construction Camp	MC, EO, ECO	ECO	SITE VISIT
2.1.4	Environmental Education and Training	PROJECT COMPANY, MC	PROJECT COMPANY	SITE VISIT
2.1.5	Soils and Geology	MC, EO	ECO	SITE VISIT
2.1.6	Erosion Control	EO	ECO	SITE VISIT
2.1.7	Water Use and Quality	EO	ECO	SITE VISIT
2.1.8	Surface and Groundwater	EO	ECO	RECORDS REVIEW
2.1.9	Waste Management	EO	ECO	SITE VISIT
2.1.10	Flora	EO	ECO	SITE VISIT
2.1.11	Fauna	EO	ECO	RECORDS REVIEW, SITE VISIT
2.1.12	Air Quality	EO	ECO	RECORDS REVIEW
2.1.13	Noise and Vibrations	EO	ECO	RECORDS REVIEW
2.1.14	Energy use	EO	ECO	RECORDS REVIEW
2.1.15	Climate Change	EO	ECO	RECORDS REVIEW
2.1.16	Agricultural Potential	EO	ECO	RECORDS REVIEW

2.1.17	Employment	PROJECT COMPANY, MC	ECO	RECORDS REVIEW
2.1.18	Occupational Health and Safety	MC, EO	CLO	SITE VISIT
2.1.19	Health and Safety	MC, EO	CLO	SITE VISIT
2.1.20	Security	MC, EO	ECO	SITE VISIT
2.1.21	Social Environment	PROJECT COMPANY, MC, CLO	ECO	RECORDS REVIEW, SITE VISIT
2.1.22	Community Engagement	CLO	ECO	SITE VISIT
2.1.23	Visual Impact	EO	ECO	SITE VISIT
2.1.24	Heritage Impact	PROJECT COMPANY, MC, EO	ECO	SITE VISIT
2.1.25	Avi-fauna Impact	PROJECT COMPANY, MC, EO	ECO	SITE VISIT
3.1	OPERATION ACTIVITIES			
3.1.1	Construction Site Decommissioning	PROJECT COMPANY	ECO	RECORDS REVIEW
3.1.2	Operation and Maintenance	ESKOM	ECO	RECORDS REVIEW
3.1.3	Surface and Groundwater	ESKOM	ECO	RECORDS REVIEW
3.1.6	Pollution Control	ESKOM	ECO	RECORDS REVIEW
3.1.7	Biodiversity	ESKOM	ECO	RECORDS REVIEW
3.1.8	Waste Management	ESKOM	ECO	RECORDS REVIEW
3.1.9	Health and Safety	ESKOM	ECO	RECORDS REVIEW
3.1.10	Visual Impact	ESKOM	ECO	RECORDS REVIEW
3.1.11	Avi-fauna Impact	ESKOM	ECO	RECORDS REVIEW AND SITE VISIT
4.1	DECOMMISSIONING ACTIVITIES OF PROPOSED DEVELOPMENT			

4.1.1	Ongoing Stakeholder involvement	ESKOM, CLO	ESKOM	SITE VISIT
4.1.2	Community health and safety	ESKOM, CLO	ESKOM	RECORDS REVIEW
4.1.3	Waste management	ESKOM, EO	ESKOM, ECO	RECORDS REVIEW AND SITE VISIT
4.1.4	Surface and groundwater	ESKOM, EO	ESKOM, ECO	RECORDS REVIEW AND SITE VISIT
4.1.5	Biodiversity	ESKOM, EO	ESKOM, ECO	RECORDS REVIEW AND SITE VISIT
4.1.6	Air quality	ESKOM, EO	ESKOM, ECO	RECORDS REVIEW AND SITE VISIT

1.5.10 Environmental Audits

Table 4 below provides an outline of the generic process involved in the auditing process. It briefly describes the activities of the process initially beginning with defining the objectives and scope of the auditing process as well as the responsibilities of the various parties. The procedure for the auditing process is explained through to the production of audit findings and the compliance (or non-compliance) of the audit findings.

Table 4: Example of Procedure for Conducting Audits

Objective	To ensure that formal audits of the EMPr are scheduled and performed so as to verify compliance with the requirements of the EMPr.
Scope	This procedure describes the sequence of events required to perform a compliance audit and the verification of implemented corrective action.
Responsibilities	The ECO or a person authorised and appointed by him, is responsible for the maintenance of the Environmental Audit System The ECO is responsible for the scheduling and execution of the audit, as well as the verification of the implementation of corrective action. At his/her discretion, this authority may be delegated to responsible company

	personnel or to an independent Environmental Auditing Authority to perform the audit on his/her behalf. Auditors shall have no direct responsibility in the area/ system being audited. They will be trained in techniques for auditing environmental management systems. The head of department (HOD)/ supervisor for an area/system to be audited (or a responsible person nominated by him/ her) will assist the audit team in the execution of the audit. The HOD will also be responsible for timely corrective actions based on the findings of the audit.
Planning the audit	The ECO or his authorised delegate, shall plan the audit of a particular environmental area or system as follows: ▪ He shall inform, in writing, the contractor to be audited of the intention to conduct an audit at least two weeks prior to the audit. This notification should include the audit objective, scope and duration and any assistance required from the contractor. ▪ On completion of the construction audit, an audit findings report shall be prepared and submitted to the Project Company, project manager and construction team. ▪ Corrective actions shall be implemented, within four weeks after the audit, where possible.
Audit Check List	Auditing will be performed by collecting evidence for verification through interviews, relevant documentation and observation of activities and conditions. Instances of non-conformity to EMPr criteria should be recorded. An environmental audit checklist can be used as a guide to address all relevant issues.
Audit Compliance	See below.
Audit Findings and Reporting of non-compliances	The audit team shall review all evidence of their audit findings to decide on non-compliance. Audit findings of non-compliance must be documented and supported by evidence in the Audit Findings Report.

	The non-compliance findings will be communicated to the Project Manager and his representatives during an audit feedback meeting.

1.6 Layout of Environmental Management Programme

1.6.1 Introduction

This EMPr addresses both generic issues as well as specific issues. The generic and specific issues are each separated into different phases. Each phase has specific issues unique to that period of the development and operation of the solar energy facility as well as associated infrastructure. The impact is identified and given a brief description. The phases of the development are then identified as below:

- Pre-construction (Site Establishment)
- Construction (including associated rehabilitation of affected environment)
- Operation Phase
- Decommissioning

This EMPr seeks to manage and keep to a minimum the negative impacts of a development and at the same time, enhance the positive and beneficial impacts.

The EMPr specifies mitigation measures for the following environmental aspects:

1.6.2 Pre-construction (Site establishment)

- Site preparation
- Consultation
- Site clearing
- Social and Environmental Management Systems

1.6.3 Construction

- Construction Camp
- Construction Traffic and Access

- Environmental Education and Training
- Soils and Geology
- Erosion Control
- Water Use and Quality
- Surface and Groundwater
- Waste Management
- Flora
- Fauna
- Air Quality
- Noise and Vibrations
- Energy Use
- Employment
- Occupational Health and Safety
- Security
- Social Environment
- Cultural and Heritage Artefacts
- Community Engagement
- Visual Impact

1.6.4 Operation

- Construction Site Decommissioning
- Operation and Maintenance
- Surface and Groundwater
- Biodiversity
- Waste Management
- Health and Safety
- Visual Impact
- Avifauna
- Social

1.6.5 Decommissioning Phase

- Ongoing Stakeholder involvement
- Community health and safety
- Waste Management
- Surface and Groundwater
- Biodiversity
- Air Pollution

1.7 Objectives of an EMPr

The objectives of this EMPr are to:

- Identify a range of mitigation measures which could reduce and mitigate the potential impacts to minimal or insignificant levels
- To identify measures that could optimise beneficial impacts
- To create management structures that address the concerns and complaints of I&APs with regards to the development
- To establish a method of monitoring and auditing environmental management practices during all phases of development
- Ensure that the construction and operational phases of the project continues within the principles of Integrated Environmental Management and Environmental Management System (EMS) ISO 14001 Principles
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project.
- Ensure that the safety recommendations are complied with.
- Propose mechanisms for monitoring compliance with the EMPr and reporting thereon.
- Specify time periods within which the measures contemplated in the EMPr are implemented, where appropriate.

The EMPr Seeks to highlight the following:

- Avoiding impacts by not performing certain actions
- Minimising impacts by limiting aspects of an action
- Rectifying impacts through rehabilitation, restoration, etc. of the affected environment
- Compensating for impacts by providing substitute resources or environments
- Minimising impacts by optimising processes, structural elements and other design features
- Provide ongoing monitoring and management of environmental impacts of a development and documenting of any digressions /good performances
- The EMPr is a legally binding document that all parties involved in the project must be made aware of.

1.7.1 Environmental monitoring

A monitoring programme will be implemented for the duration of the lifecycle of proposed development. This programme will include:

- **Monthly Audits During the Construction Phase**
    - According to the EMPr conditions which will be conducted by the ECO. These audits can be conducted randomly and do not require prior arrangement with the project manager.
    - Compilation of an audit report with a rating of the compliance with the EMPr. This report will be submitted to the relevant authorities.
- **Annual Audits During the Operational Phase**
    - Undertaken by the ECO.

The ECO shall keep a photographic record of any damage to areas outside the demarcated site area. The date, time of damage, type of damage and reason for the damage shall be recorded in full to ensure the responsible party is held liable. All claims for compensation emanating from damage should be directed to the ECO for appraisal. A register shall be kept of all complaints from the landowner or community (Annexure A). All complaints / claims shall be handled immediately to ensure timeous rectification / payment by the responsible party.

The EMPr will be made binding on all contractors operating on the site and must be included within the Contractual Clauses. Those responsible for environmental damage must pay the repair costs both to the environment and human health and the preventative measures to reduce or prevent further pollution and/or environmental damage (the polluter pays principle).

1.8 Applicable Legislation, Development Strategies and Guidelines

The following legislation applies:

- Constitution of South Africa (Act No. 108 of 1996)
- National Environmental Management Act (Act No 107 of 1998) – NEMA
- Environment Conservation Act (Act No 73 of 1989)
- National Heritage Resources Act (Act No 25 of 1999)
- National Water Act (Act No 36 of 1998)
- National Environmental Management: Biodiversity (Act No. 10 of 2004)
- National Forests Act, 1998 (Act No. 84 of 1998)
- Conservation of Agricultural Resources Act No. 43 of 1983)
- Subdivision of Agricultural Land (Act No. 70 of 1970, as amended)
- National Road Traffic (Act No. 93 of 1996, as amended)
- Civil Aviation Act (Act No.13 of 2009)
- Occupational Health and Safety Act No. 85 of 1993
- National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)
- National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
- Development Facilitation Act No. 67 of 1995

- National Protected Areas Act (Act No. 25 of 2003)

Several regulations will be applicable to the construction phase of the project. These guidelines are mentioned in the EMPr tables. Also of significance in this EMPr are:

- World Bank International Finance Corporation (IFC),
- EHS Guidelines and
- Equator Principles

1.8.1 The Equator Principles

The Equator Principles (2013) are a financial industry benchmark for determining, assessing and managing social & environmental risk in project financing. A number of banks, exchanges and organisations worldwide have adopted the Principles as requirements to be undertaken for project funding on application and approval. Furthermore, certain funding institutions have not formally adopted the Principles, but require clients to be compliant with them in order to qualify for loans.

Under Principle 3, the Equator Principles establish the International Finance Corporations (IFC) Performance Standards and associated General and Sector Specific Environmental, Health and Safety Guidelines as the applicable social and environmental standards that a project should comply with if the project is located in a non-OECD country or OECD country that is not designated as high income.

The social and environmental assessment that is undertaken for a project establishes whether or not the project is in compliance with the IFC Performance Standards[1].

According to these principles, the performance standards relevant to the proposed development are summarised in Table 5.

Table 5: IFC Performance Standards

Performance Standard	**Intent and objective**
Assessment and Management of Environmental and Social Risks and Impacts **(1)**	▪ Adverse and beneficial impacts should be identified within the projects Area of Influence. Emphasis on integrated assessment of social and environmental impacts. ▪ Compliance with national legislation and IFC PS and EHS guidelines as appropriate.

[1] **NB** A project does not seek compliance with the Equator Principles per se but the standards that the EP refers to. A financial institution that has adopted the EP must ensure that any projects it is financing meet the standards referred to and that it adopts an appropriate risk management system to ensure this.

	▪ Emphasis on avoidance of impacts wherever practical and where this is not feasible, minimizes, mitigate and compensate. ▪ To ensure effective and ongoing stakeholder engagement ▪ To assess specifically the capacity and commitment of clients to manage risks and opportunities over the course of the transaction.
Labour and Working Conditions **(2)**	▪ Looks at the working conditions by following these principles; ▪ To establish and maintain the worker- management relationship (including specifically a human resources policy). ▪ To promote fair treatment, non-discrimination and equal opportunity of employees (and some contractors) and meet national employment laws. ▪ To protect the workforce by addressing child labour and forced labour. ▪ To promote healthy and safe working conditions.
Resource Efficiency and Pollution Prevention **(3)**	▪ To avoid and minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities. ▪ To promote the reduction of emissions that contributes to climate change.
Community Health Safety and Security **(4)**	▪ To avoid or minimise risks to and impacts on the health and safety of the local community during the project life cycle from both routine and non-routine circumstances. ▪ To ensure that the use of security personnel is carried out in a legitimate manner that avoids or minimizes risks to the community's safety and security.
Land Acquisition and Involuntary Resettlement **(5)**	▪ To avoid or at least minimize involuntary resettlement wherever feasible by exploring alternative project designs. ▪ To mitigate adverse social and economic impacts from land acquisition or restrictions on affected persons' use of land by; (i) providing compensation for loss of assets at replacement cost, and (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected. ▪ To improve or at least restore the livelihoods and standards of living of displaced persons.

	▪ To improve living conditions among displaced persons through provision of adequate housing with security of tenure at resettlement sites.
Biodiversity Conservation and Sustainable Management of Living Natural Resources **(6)**	▪ To promote and conserve biodiversity. ▪ To avoid the introduction of alien invasive species. ▪ To promote sustainable management and use of natural resources (NRM).
Indigenous People **(7)**	▪ To foster full respect for the dignity, human rights, aspirations, cultures and natural resource-based livelihoods of Indigenous Peoples (IP). ▪ To avoid impacts or where avoidance is not feasible, minimize, mitigate and compensate in a culturally appropriate fashion and within the framework of successful good faith negotiation (a form of stakeholder engagement requiring approval of both parties). ▪ To establish and maintain effective relationships with IPs over the course of the project.
Cultural Heritage (**8)**	▪ To protect cultural heritage from adverse impacts of project activities and support its preservation. ▪ To promote the equitable sharing of benefits from the use of cultural heritage in business activities.

(Source; IFC Guidelines, 2012)

2 ENVIRONMENTAL DOCUMENTATION, REPORTING AND COMPLIANCE

2.1 Documentation

The Contractor must ensure the following documentation is kept on the project site for the full duration of the contract:

- Final Environmental Management Programme once approved by the DEA;
- EA issued by the DEA;
- Environmental Policy of the Contractor;
- Environmental method statements compiled by the Contractor;
- Weekly environmental monitoring records;
- Minutes and record of attendance of all environmental meetings;
- Environmental incident book;
- Communications register;
- Register of audits;
- Non-conformance reports; and
- Waste manifests.

2.1.1 Weekly Environmental Monitoring Report

The EO will be required to provide the Main Contractor with a brief weekly environmental monitoring report covering the onsite events which occurred during the past week. This will highlight key performance areas and provide feedback on corrective and preventive actions taken. The EO will have the weekly reports submitted by the Contractor's Manager prior to submission to The Project Company for monthly reporting.

2.1.2 Site Meetings

During the construction phase, weekly site meetings are undertaken which include environmental matters. This meeting shall be chaired by a Senior Site Representative with the Project Company, Contractor(s), the EO ('s), and CLO ('s) in attendance. Where practical or necessary, the ECO will need to attend if possible.

2.1.3 Method Statements

It is a statutory requirement to ensure the wellbeing of employees and of the environment. Therefore, the Contractor shall submit a Method Statement to the Project Company and the ECO for approval prior to the commencement of construction works.

A Method Statement is a document detailing how a particular process will be carried out. It should detail the possible dangers/risks associated with the particular part of the project and the methods of control to be established and to show how the work will be managed in a safe and environmentally responsible manner. The method statement shall also include the following information, where applicable:

- The type of construction activity;
- Timing and location of the activity;
- Construction procedures;
- Materials and equipment to be used;
- Transportation of the equipment to and from site;
- How the equipment/material will be moved while on site;
- Location and extent of construction site office and storage areas;
- Identification of impacts that might result from the construction activity;
- Population impacts;
- Community/institutional arrangements;
- Conflicts between local residents and newcomers;
- Individual and family level impacts;
- Community infrastructure needs;
- Intrusion impacts;
- Methodology and/or specifications for impact prevention or containment and for environmental monitoring;
- Emergency/disaster incident and reaction procedures (required to be demonstrated); and
- Rehabilitation procedures and continued maintenance of the impacted environment.

The Contractor will be accountable for all actions taken in non-compliance of the approved method statements. The Contractor shall keep all the method statements and subsequent revisions on file, copies of which must be distributed to all relevant personnel for implementation.

The Contractor will be required to submit, as a minimum, the relevant method statements as requested by the ECO which are to be compliant with the conditions of the EMPr for review prior to the start of that specific activity.

2.1.4 Communications Register

All complaints or communications that are received from I&APs or any other stakeholder must be recorded in a communications register. These complaints and communications will be brought to the attention of the Project Company / Eskom, whereupon it will be investigated and a response to the Complainant, I&APs or stakeholder will be given within 10 days. The communications register shall include the following information:

- Record the time and date of the complaint/communication;
- A detailed description of the complaint/communication;
- Action and resources used to correct the complaint;
- Photographic evidence of the complaint (where possible);
- A written response to the complainant indicating rectification of the complaint; and
- Information regarding the relevant authority that was contacted or notified in writing where applicable (person, time and date).

The relevant authorities include:

- Department of Water and Sanitation (e.g. for any incidents involving the contamination of water resources).
- DEA (e.g. for any significant incident of pollution of the soil and air).
- Department of Agriculture, Forestry and Fisheries (e.g. uses of appropriate herbicides for eradication of alien invasive species, and permits for trees of special concern).
- Department of Health (e.g. for incidents such as contamination of water resources, accidental spill of hazardous substances).
- Department of Transport (e.g. for the diversion of traffic due to construction activities).
- Department of Labour (e.g. for labour disputes).

2.1.5 Photographic Record

The EO and CLO will be required to compile a photographic record (dated) of all activities on site prior to construction related activities starting, during the construction process and on completion of construction related works. This photographic record will include:

- A pre-construction site record
- Monthly environmental audit reports;
- Weekly environmental monitoring reports;
- Corrective action;
- Progress of environmental works; and
- Incidences of non-conformance.

2.1.6 Waste Manifests

The Contractor shall ensure that all solid (including any hazardous) waste removed from site is disposed of at a registered landfill site or nearby waste transfer station with capacity to accept the project generated waste. The waste manifest shall be kept on record for auditing purposes.

2.1.7 Good Housekeeping

The Contractor is to practice good housekeeping throughout the construction phase. This should eliminate disputes about responsibility, facilitate efficient and timeous running of the project. Over and above practicing accepted construction methods in accordance with SANS 10120, this should include measures to preserve the environment inside the work area. Records of such actions taken to ensure the maintenance and management of housekeeping must be recorded.

The Contractor shall record and report upon environmental management measures undertaken to mitigate assessed impacts upon the environment.

2.1.8 Management and Control

The Contractor is to implement environmental management in a reasonable manner and should such management not prove effective, shall implement measures to the satisfaction of the Project Company. Appropriate measures shall include:

- Appointment of necessary resources to monitor and manage environmental requirements;
- Implement aspect-specific method statements to deal with emergency situations;
- Provision of adequate emergency response equipment to mitigate and manage an incident or emergency; and
- Provision of specific training related to implementation of environmental management requirements.

2.1.9 Recording And Reporting

The Contractor shall maintain detailed records of parameters monitored. These detailed records shall demonstrate the effectiveness of the management actions implemented to mitigate potential impacts. The Contractor shall submit a monthly database/report of management works implemented to the Project Company, as part of the Contractors monthly report.

2.1.10 Monitoring

The Contractor shall submit an Environmental Monitoring Method Statement which details the scope, nature, process, schedule and templates for environmental monitoring. The monitoring results shall be used to determine the effectiveness of the management programme. All complaints, compliments or other comments relating to environmental management parameters are to be recorded in the site issues register of the Contractor for inclusion in the project issues register held by the Project Company.

Monitoring results and the associated required management and mitigation actions for the coming monitoring period are to be presented in the monitoring section of the Contractors monthly report. The daily and weekly reports are to detail observations and information relating to requested management actions and their effectiveness.

The Contractor shall monitor and maintain the following on an ongoing basis:

- Re-growth of alien invasive vegetation;
- Validity of the pest control officer certificate;
- Fire break requirements associated to construction related activities;
- Stormwater systems;
- Topsoil and backfill volumes;
- Access road condition;
- Dust generated from stockpiles;
- Noise;
- Water quality;
- Erosion prevention; and
- Landscaping requirements for rehabilitation.

The Contractor shall submit a monthly database of inter alia the following works to the Project Company. This data base is to include as a minimum:

- Extent of alien invasive clearing operations;
- Volumes of herbicide used on the project;
- Stockpile volumes of chipped material, topsoil, fertile soil and subsoil;
- Volume of recyclable waste removed from site;
- Water volumes recycled and used for dust suppression; and
- Maintenance of chemical toilets.

All complaints, compliments or other comments relating to construction related works are to be recorded by the Contractor in the communications register of the receiving party for inclusion in the project issues register. Site clearance monitoring results and the associated required management and mitigation actions for the coming monitoring period are to be presented in the monitoring section of the Contractors monthly

report. The weekly report are to detail observations and information relating to requested management actions and their effectiveness.

2.2 Compliance with the EMPr

The Contractor/s is/are deemed not to have complied with the EMPr if:

- Within the boundaries of the site, site extensions and access roads there is evidence of contravention of clauses;
- If environmental damage ensues due to negligence;
- The contractor fails to comply with corrective or other instructions issued by the ECO or Authorities within a specified time; and
- The Contractor fails to respond adequately to complaints from the public.

The Project Company / Eskom is deemed not to have complied with the EMPr if:

- Within the boundaries of the site there is evidence of contravention of clauses;
- If environmental damage ensues due to negligence; and
- They fail to respond adequately to complaints from the public.

2.2.1 Non-Conformance Report

A Non-Conformance Report (NCR) will be issued to the Contractor as a final step towards rectifying a failure in complying with a requirement of the EMPr. This will be issued to the Contractor in writing. Preceding the issuing of the NCR, the Contractor will be presented with an opportunity to rectify the outstanding issue in a timely manner.

Preceding requirements to the submitting of the NCR will entail an issue that has been highlighted to the Contractor in the audits for corrective action. Should this issue not be corrected or completed to the satisfaction of the Project Company and ECO, the issue is escalated to an NCR.

Should the ECO assess an incident / issue and find it to be significant (e.g. non-repairable damage upon the environment), it will be reported to the DEA and immediately escalated to the level of an NCR. This will be done in consultation with the Project Company. The following information should be recorded in the NCR:

- Details of non-conformance;
- Any plant or equipment involved;

- Any chemicals or hazardous substances involved;
- Work procedures not followed;
- Any other physical aspects;
- Nature of the risk;
- Actions agreed to by all parties following consultation that should adequately address the identified non-conformance. This may take the form of specific control measures and should take the hierarchy of controls into account. This must accompany the NCR for filing purposes;
- The agreed timeframe by which the Contractor should have implemented the actions documented in the NCR; and
- The ECO should verify that the agreed actions have taken place on or soon after the agreed completion date. Where the actions are complete, the ECO and Contractor should sign the Close Out portion of the Non-Conformance Form and file it with the contract documentation.

2.2.2 Environmental Emergency Response

The Contractor's environmental emergency procedures must ensure that there will be an appropriate response to unexpected or accidental actions or incidents that could cause environmental impacts. Such incidents may include:

- Accidental discharges to water (i.e. into a water resource) and land;
- Accidental spillage of hazardous substances (typically oil, petrol, and diesel);
- Accidental toxic emissions into the air;
- Specific environmental and ecosystem effects from accidental releases or incidents;
- The Environmental Emergency Response Plan is separate to the Health and Safety Plan as it is aimed at responding to environmental incidents and must ensure and include the following:
    - Construction employees shall be adequately trained in terms of incidents and emergency situations;
    - Details of the organisation (manpower) and responsibilities, accountability and liability of personnel;
    - A list of key personnel and contact numbers;
    - Details of emergency services (e.g. the fire department, spill cleanup services) shall be listed;
    - Internal and external communication plans, including prescribed reporting procedures;
    - Actions to be taken in the event of different types of emergencies;
    - Incident recording, progress reporting and remediation measures to be implemented; and
    - Information on hazardous materials, including the potential impact associated with each, and measures to be taken in the event of accidental release.

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

2.2.3 Non- compliance

Non-conformance will be issued to the Contractor for incidents of non-compliance. The Contractor (through the Environmental Officer) shall also take the necessary steps (e.g. training) to prevent a recurrence of the infringement. The Contractor is also advised that the imposition of non-conformance does not replace any legal proceedings the authorities, landowners and/or members of the public may institute against the Contractor. The Contractor shall be required to make good any damage caused as a result of the infringement at his own expense. A preliminary list of infringements for which non-conformance will be imposed is as follows:

- Using areas outside the working areas without permission/accessing “no-go areas”;
- Clearing and/or leveling area outside of the working areas;
- Littering on the site and surrounds;
- Burying/burning waste on site and surrounds;
- The undertaking of informal ablutions
- Making fires on site;
- Spillage onto the ground or water bodies of oil, diesel, or any other potential pollutants;
- Picking/damaging plant material, especially that from the residual areas of natural bush on the site;
- Damaging/killing wild or domestic animals/birds;
- Discharging effluent and/or stormwater onto the ground or into surface water;
- Repeated contravention of the specification or failure to comply with instruction;
- Mixing cement directly on soil or bare ground outside designated batching plant;
- Keeping animals as pets on site.

The Senior Site Supervisor, on recommendation from the ECO, may also order the Contractor to suspend part or all the works if the Contractor repeatedly causes damage to the environment by not adhering to the EMPr (i.e. more than 3 cases of infringements). The suspension will be enforced until such time as the offending actions, procedure or equipment is corrected. No extension of time will be granted for such delays and all costs will be borne by the Contractor.

2.2.4 Training and awareness

The Main Contractor 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 Contractor to make sure that all their staff and subcontractors fully comprehend the contents of the EMPr. The Contractor shall organise environmental awareness training programmes, which should, be targeted at the two levels of employment: management and labour.

2.2.4.1 Training of construction workers

The construction workers 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 appraised of the EMPr's requirements. Environmental awareness training programmes need to be formulated for these 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 training (in a first language) on-site regarding environmental aspects that are unclear to the construction personnel. A translator may be required and requested to assist in this additional training. The cost for the translator will be borne by the Contractor.

2.2.4.2 Contractor performance

The Main Contractor must ensure that the conditions of the EMPr are adhered to. Should the Main Contractor require clarity on any aspect of the EMPr, the Main Contractor must contact the Environmental Control Officer for advice.

3 MITIGATION GUIDELINES

3.1 Introduction

Mitigation guidelines are addressed through four phases namely Pre-construction (Site Establishment) Phase; Construction Phase (and associated rehabilitation of affected environment); Operational Phase (Post-Construction) as well as Decommissioning Phase. Each phase has specific issues unique to that period of the development and operation of the substation and power line. The impact is identified and given a brief description. The four phases of the development are then identified as below:

3.2 Pre-construction (Site Establishment)

Requirements for the pre-construction phase

- Proper and continuous liaison between the ECO, the Contractor and Landowners to ensure all parties are appropriately informed at all times.
- The Contractor must adhere to all conditions of the contract including the Environmental Management Programme.
- Adequate planning of the construction programme to allow for disruptions due to rain and very wet conditions.
- Where existing private roads are in a bad state of repair, such roads' condition shall be documented before they are used for construction purposes. This will allow for easy assessment of any damage to the roads which may result from the construction process. If necessary some repairs should be done to prevent damage to equipment. All roads no matter what the condition need to be documented prior to construction.
- Proper documentation and record keeping of all complaints and actions taken.
- Appointment of an Environmental Control Officer to implement this EMPr.
- Regular site inspections by the ECO and good control over the construction process throughout the construction period.
- Independent Environmental Audits to be carried out during and upon completion of construction.
  A formal communications protocol should be set up during the construction phase. The aim of the protocol should be to ensure that effective communication on key issues that may arise during this phase be maintained between key parties such as the ECO, project manager and contractor. The protocol should also ensure that concerns / issues raised by I&APs are formally recorded and considered and where necessary acted upon. If necessary, a forum for communicating with key stakeholders on a regular basis may need to be set up. This could be done through an Environmental Monitoring Committee that would meet on a regular basis. The communications protocol should be maintained throughout the construction phase.

3.3 Pre-Construction Phase

3.3.1 Site Preparation

Table 6: Site preparation

IMPACT	SITE PREPARATION **This section deals with the preparation of the site and actions that need to be implemented before construction commences**	RESPONSIBILITY
PHASE	**SITE ESTABLISHMENT**	**MC, ELO, ECO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Appoint construction team and suitable manager** 1. Appoint an Environmental Control Officer and Environmental Liaison Officer. The ELO is appointed on the contractor's behalf while the ECO is appointed on the proponent's behalf. 2. The Contractor must draw up method statements for relevant construction activities. The ECO must approve all of the method statements before they become operational. **Site demarcation and compliance** 3. Before construction begins, the areas to be excavated for the pylons and stay wires should be barricaded with fencing or orange construction barrier. 4. All tower positions must be pegged by a qualified surveyor prior to the onset of construction. 5. All existing boreholes within the power line alignment have to be identified and surveyed. 6. All Construction Camps are to be fenced off in such a manner that unlawful entry is prevented and access is controlled. Signage shall be erected at all access points in compliance with all applicable occupational health and safety requirements. All access points to the Construction Camp should be controlled by a guard or otherwise monitored, to prevent unlawful access. 7. The contractor and ECO must ensure compliance with conditions described in the EA.	

IMPACT	SITE PREPARATION This section deals with the preparation of the site and actions that need to be implemented before construction commences	RESPONSIBILITY
PHASE	**SITE ESTABLISHMENT**	**MC, ELO, ECO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	8. All no-go areas on the servitude must be properly fenced off and signage placed prior to the onset of construction. If this is not practical (such as where the area is too large to fence off), the area should be demarcated with barrier tape and signage should be erected. 9. Records of compliance / non-compliance with the conditions of the authorisation must be kept and be available on request. 10. Records of all environmental incidents must be maintained and a copy of these records be made available to provincial department on request throughout the project execution. 11. Identify suitable licensed landfill site, which will accept the type of waste material to be generated. 12. Identify suitable site/borrow pit (if applicable) to obtain soil. **Labour** 13. All unskilled labourers should be drawn from the local market and where possible use should be made of local semiskilled and skilled personnel where possible. 14. Labour intensive methods must be used where feasibly, cost effective and not time constraining.	
SPECIFIC MITIGATION MEASURES		
	15. Compile a rehabilitation programme. 16. Compile an Alien Plant Management Plan, including monitoring, to ensure minimal impacts on surrounding areas. 17. If any listed plants are located during the pre-construction survey, a Plant Rescue Plan would be required to manage the process of attempting to rescue such individuals. 18. A pre-construction walk-through survey will be required to locate any listed plants.	

3.3.2 Consultation

Table 7: Consultation

IMPACT	CONSULTATION This section deals with the public consultation of the site and actions that need to be implemented before construction commences	RESPONSIBILITY
PHASE	**PRE-CONSTRUCTION**	**MC, ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Consultation** 1. Engage in thorough, open, and constructive consultation with any and all land owners. 2. The Landowners shall be informed of the starting date of construction as well as the phases in which the construction shall take place. 3. Provide a mechanism through which information could be exchanged between the project proponent and stakeholders. 4. Surrounding communities must be kept informed, through the identified and agreed consultation channels, of the commencement of construction. 5. Solicit views and concerns from the public and allow them to suggest mitigations and enhancement measures.	

3.3.3 Site Clearing

Table 8: Site Clearing

IMPACT	SITE CLEARING This section deals with site clearing and actions that need to be implemented before construction commences	RESPONSIBILITY
PHASE	**PRE-CONSTRUCTION**	**MC, EO, ECO**

ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION/ METHOD STATEMENT	**Site clearing** 1. The area cleared should be as small as feasibly possible 2. Site clearing must take place in a phased manner, as and when required. 3. Areas which are not to be constructed on within two months must not be cleared to reduce erosion risks. 4. The area to be cleared must be clearly demarcated and this footprint strictly maintained. 5. Spoil that is removed from the site must be removed to an approved spoil site or a licensed landfill site. 6. The necessary silt fences and erosion control measures must be implemented in areas where these risks are more prevalent. 7. Conduct construction walk down prior to construction to conduct a search and rescue exercise. 8. Demarcation of sensitive areas prior to construction activities starting. 9. In terms of surface water, potential negative impacts are related primarily to vegetation clearing activities in the riparian habitat, wetlands and drainage lines. Mitigation measures should be strictly implemented.	
SPECIFIC MITIGATION MEASURES		
	10. If any threatened species are found (only *Brachystelma incanum* listed for this area), the infrastructure layout would need to be adjusted to allow in situ conservation of affected plants as well as a suitable buffer zone. An Ecological Management Plan would need to be compiled to manage the locality where it occurs.	

3.4 Construction Phase

3.4.1 Construction Camp

Table 9: Construction Camp

IMPACT	CONSTRUCTION CAMP **This section deals with construction camp and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC, ELO, ECO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Site of construction camp** 1. Choice of site for the Contractor's camp requires the Project Manager and ECO's permission and must take into account location of local residents and / or ecologically sensitive areas, including flood zones. A site plan must be submitted to the Project Manager for approval. 2. The size of the construction camp should be minimized (especially where natural vegetation or grassland has had to be cleared for its construction). 3. Adequate parking must be provided for site staff and visitors. The Contractor must attend to drainage of the camp site to avoid standing water and / or sheet erosion. 4. Suitable control measures over the Contractor's yard, plant and material storage to mitigate any visual impact of the construction activity must be implemented. **Construction Camp** 5. The ECO and Contractor must inspect the Construction Camp site to confirm and note any environmental sensitivity. 6. The construction camp layout plan must be provided to the ECO for approval prior to the construction of the camp. 7. The construction camp must be fenced off and on-site security should be put in place prior to commencing with the construction activities. 8. The Contractor shall supply a wastewater management system that will comply with legal requirements and be acceptable to the Project Company if this does not already exist on the site.	

IMPACT	CONSTRUCTION CAMP This section deals with construction camp and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC, ELO, ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	9. Site establishment shall take place in an orderly manner and all required amenities shall be installed at camp sites before the main workforce move onto site. 10. All construction equipment must be stored within this construction camp or the farm under lease. 11. No oil changes and servicing should take place on the construction site. All associated oil changes must take place on a sealed surface such as a concrete slab or a similar appropriate surface. 12. All Construction Camps shall be provided with portable fire extinguishing equipment, in accordance with all relevant legislation and must be readily accessible. 13. The Contractor must provide sufficient ablution facilities (1 toilet per every 15 workers), in the form of portable / VIP toilets, at the Construction Camps, and shall conform to all relevant health and safety standards and codes. No pit latrines, French drain systems or soak away systems shall be allowed and toilets may not be situated within 50 meters of any surface water body or 1:100 year flood line. A sufficient number of toilets shall be provided to accommodate the number of personnel working in the area. 14. The Contractor shall inform all site staff to make use of supplied ablution facilities and under no circumstances shall indiscriminate sanitary activities be allowed. 15. No fires will be allowed and the Contractor must make alternative arrangements for heating. LP Gas may be used, provided that all required safety measures are in place. The Contractor shall take specific measures to prevent the spread of veld fires, caused by activities at the campsites. These measures may include appropriate instruction of employees about fire risks and the construction of firebreaks around the site perimeter. 16. Should an area for cooking be required, it must be inspected and approved by the ECO prior to use.	

IMPACT	CONSTRUCTION CAMP This section deals with construction camp and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC, ELO, ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	Storage of materials (including hazardous materials) 17. 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. 18. Choice of location for storage areas must take into account prevailing winds, distances to water bodies, general onsite topography and water erosion potential of the soil. Impervious surfaces must be provided where necessary. 19. Storage areas must be designated, demarcated and fenced if necessary. 20. Storage areas should be secure so as to minimize the risk of crime. They should also be safe from access by unauthorised persons i.e. children / animals etc. 21. Fire prevention facilities must be present at all storage facilities. 22. Proper storage facilities for the storage of oils, 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 temporary storage area(s). These pollution prevention measures for storage should include a bund wall high enough to contain at least 110% of any stored volume, and this should be sited away from drainage lines in a site with the approval of the ECO. 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 stormwater events. 23. All fuel storage areas must be bunded to avoid creation of dirty stormwater 24. 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.	

IMPACT	CONSTRUCTION CAMP This section deals with construction camp and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC, ELO, ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	25. Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site. Where possible the available, MSDSs should additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes. 26. Storage areas containing hazardous substances / materials must be clearly signposted. 27. An approved waste disposal contractor must be employed to remove and recycle waste oil, if practical. The contractor must ensure that its staff dealing with these materials / substances are made aware of the health risks associated with any hazardous substances used and have been provided with the appropriate protective clothing/equipment in case of spillages or accidents and have received the necessary training. 28. All excess cement and concrete mixes are to be contained within a bunded area on the construction site prior to disposal off site. 29. All major spills as specified in the contractor emergency response procedure of any materials, chemicals, fuels or other potentially hazardous or pollutant substances must be cleaned immediately, and the cause of the spill investigated. Preventative measures must be identified and submitted to the ECO for information. Emergency response procedures to be followed and implemented. **Drainage of construction camp** 30. Surface drainage measures must be established in the Construction Camps so as to prevent ▪ Ponding of water; ▪ Erosion as a result of accelerated runoff; and, ▪ Uncontrolled discharge of polluted runoff.	

3.4.2 Construction traffic and access

Table 10: Construction Traffic and Access

IMPACT	CONSTRUCTION TRAFFIC AND ACCESS This section deals with construction traffic and access and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC, EO, ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Construction traffic** 1. All equipment moved onto site or off site during a project is subject to the legal requirements. 2. The Contractor shall meet these safety requirements under all circumstances. All equipment transported shall be clearly labelled as to their potential hazards according to specifications. All the required safety labelling on the containers and trucks used shall be in place. 3. The Contractor shall ensure that all the necessary precautions against damage to the environment and injury to persons are taken in the event of an accident. 4. Construction routes and required access roads must be clearly defined. Roads not to be used shall be marked with a “NO ENTRY for construction vehicles" sign. 5. No new access roads to be created through wetlands and drainage lines. Existing tracks must be used. 6. Delivery of equipment must be undertaken with the minimum amount of trips to reduce the carbon footprint of these activities. 7. Access of all construction and material delivery vehicles should be strictly controlled, especially during wet weather to avoid compaction and damage to the topsoil structure. 8. Damping down of the un-surfaced roads or use of r a biodegradable soil stabilisation agent must be implemented to reduce dust and nuisance. 9. Vehicles and equipment shall be serviced regularly to avoid the contamination of soil from oil and hydraulic fluid leaks etc. 10. Servicing must be done in dedicated service areas on site or else off site if no such area exists. 11. Oil changes must take place on a concrete platform and or over a drip tray to avoid pollution.	

IMPACT	CONSTRUCTION TRAFFIC AND ACCESS This section deals with construction traffic and access and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC, EO, ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	12. Soils compacted by construction shall be deep ripped to loosen compacted layers and re-graded to even running levels. 13. Any temporary access roads to be rehabilitated prior to contractors leaving the site. **Access** 14. The main routes on the site must be clearly signposted and printed delivery maps must be issued to all suppliers and Sub-Contractors. 15. Planning of access routes to the site for construction purposes shall be done in conjunction with the Contractor and the Landowner. All agreements reached should be documented and no verbal agreements should be made. **Road maintenance** 16. The ECO must establish and agree maintenance responsibilities with the landowner. 17. Contractors should ensure that access roads are maintained in good condition by rehabilitating damaged areas and attending to potholes, corrugations and storm water damages as soon as these develop. 18. If necessary, staff must be employed to clean surfaced roads adjacent to construction sites where materials have spilt. **General** 19. The contractor shall meet safety requirements under all circumstances. All equipment transported shall be clearly labelled as to their potential hazards according to specifications. All the required safety labelling on the containers and trucks used shall be in place.	

IMPACT	CONSTRUCTION TRAFFIC AND ACCESS This section deals with construction traffic and access and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC, EO, ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	20. The Contractor shall ensure that all the necessary precautions against damage to the environment and injury to persons are taken. 21. Care for the safety and security of community members crossing access roads should receive priority at all times.	
SPECIFIC MITIGATION MEASURES		
	22. Construction activity should be restricted to the immediate footprint of the infrastructure. 23. Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species. 24. Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum. 25. Make use of existing gravel access roads where possible. 26. Limit the number of vehicles and trucks travelling to and from the proposed site. 27. As far as possible, limit the number of maintenance vehicles which are allowed to access the substation site and power line access roads.	

3.4.3 Environmental Education and Training

Table 11: Environmental Education and Training

IMPACT	ENVIRONMENTAL EDUCATION AND TRAINING This section deals with the environmental training of construction employees.	RESPONSIBILITY
PHASE	CONSTRUCTION	PROJECT COMPANY, PM, EO, ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Environmental training** 1. The project manager must appoint an ECO prior to construction 2. Ensure that all site personnel have a basic level of environmental awareness training. The Contractor must submit a proposal for this training to the ECO for approval. Topics covered should include: ▪ What is meant by "Environment" ▪ Why the environment needs to be protected and conserved ▪ How construction activities can impact on the environment ▪ What can be done to mitigate against such impacts ▪ Awareness of emergency and spills response provisions ▪ Social responsibility during construction e.g. being considerate to local residents ▪ Specific mitigation measures stipulated in the EMPr and EA. 3. Environmental awareness training for all construction staff must be undertaken by the ECO prior to construction starting. Translators are to be used where necessary. The topics covered should include, but not be limited to the following: ▪ Use of the appropriate fire-fighting equipment ▪ The need for a "clean site" policy ▪ The prevention of accidental spillage of hazardous chemicals and oil ▪ Pollution of water resources (both surface and groundwater) ▪ Air pollution and litter control ▪ The need to refrain from indiscriminant waste disposal and/or pollution of local soil and water resources	

IMPACT	ENVIRONMENTAL EDUCATION AND TRAINING This section deals with the environmental training of construction employees.	RESPONSIBILITY
PHASE	CONSTRUCTION	PROJECT COMPANY, PM, EO, ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	▪ General safety 4. Training of new staff that did not receive the initial training is the responsibility of the ECO. 5. All stakeholders and key personnel should undergo an archaeological induction course, as part of their overall training. The course should highlight the appropriate communication channels to managers and educate workers with regard to recognising artefacts, features and significant sites. Project manager shall ensure that the training and capabilities of the Contractor's site staff are adequate to carry out the designated tasks. Use should be made of environmental awareness posters on site. 6. Staff operating equipment (such as cranes, etc.) shall be adequately trained and sensitized to any potential hazards associated with their tasks. No operator shall be permitted to operate critical items of mechanical equipment without having been trained by the Contractor and certified competent by the Project Manager. 7. No operator shall be permitted to operate critical items of mechanical equipment without having been trained by the Contractor and certified competent by the Project Manager. **Monitoring of environmental training** 8. The Contractor must monitor the performance of construction workers to ensure that the points relayed during their introduction have been properly understood and are being followed. If necessary, the ECO and / or a translator should be called to the site to further explain aspects of environmental or social behaviour that are unclear. Toolbox talks are recommended.	

3.4.4 Soils and Geology

General guidelines for management of soils are provided in Annexure B

Table 12: Soils and Geology

IMPACT	SOILS AND GEOLOGY This section deals with soils and geology and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC, EO, ECO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**General** 1. Minimise disturbance of natural vegetation on the sites. 2. Access routes must ideally be planned on areas less susceptible to erosion/ destabilization/ compaction or appropriate action must be taken to minimise impact, e.g. planning of new access routes along contour lines and minimizing of cutting and filling operations. 3. Rehabilitate soil and vegetation. 4. Implement effective erosion control measures. 5. The ECO shall ensure that all agreements reached with the Landowner are fulfilled, and that such areas be rehabilitated once construction is completed. Should any claim be instituted against the Project Company, due to the actions of the Contractor at a batching plant site, the Project Company shall hold the Contractor fully responsible for the claim until such time that the Contractor can prove otherwise with the necessary documentation. Use of berms and drainage channels to direct water away from the construction areas where necessary. **Topsoil** 6. The contractor should, prior to the commencement of earthworks determine the average depth of topsoil, and agree on this with the ECO. Due to the length of the line, this will have to be undertaken in a number of locations due to the likely variability of soils along the route.	

IMPACT	SOILS AND GEOLOGY This section deals with soils and geology and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC, EO, ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	7. The full depth of topsoil should be stripped from areas affected by construction (substation site and tower positions) and related activities prior to the commencement of major earthworks. This should include the building footprints, working areas and storage areas. 8. At any tower sites where conventional foundations are installed, the Contractor shall remove the topsoil separately and store it for later use during rehabilitation of such tower sites. During backfilling operations, the Contractor shall take care not to dump the topsoil in the bottom of the foundation and then put spoil on top of that. **Soil Stripping** 9. No soil stripping must take place on areas within the site that the contractor does not require for construction works or areas of retained vegetation. 10. Subsoil and overburden in all construction and lay down areas should be stockpiled separately to be returned for backfilling in the correct soil horizon order. 11. Construction vehicles must only be allowed to utilize existing tracks or pre-planned access routes. 12. Preserve topsoil separate from the subsoils. **Soil Stockpiles** 13. Stockpiles should not be situated such that they obstruct natural water pathways. 14. Stockpiles should not exceed 2m in height unless otherwise permitted by the Engineer. 15. If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by vegetation or geofabric, depending on the duration of the project. Stockpiles may further be protected by the construction of berms or low brick walls around their bases.	

IMPACT	SOILS AND GEOLOGY This section deals with soils and geology and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC, EO, ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	16. 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 should be attained and given to the project manager. **Fuel storage** 17. Topsoil and subsoil to be protected from contamination. This should be monitored on a monthly basis by a visual inspection of diesel/oil spillage and pollution prevention facilities. 18. Fuel and material storage must be away from stockpiles. 19. Any storage tanks containing hazardous materials must be placed in bunded containment areas with sealed surfaces. These areas should be roofed to avoid contamination of stormwater. 20. Use and or storage of materials, fuel and chemicals which could potentially leak into the ground must be controlled. 21. The Contractor (monitored by the ECO and ELO) should be responsible for ensuring that potentially harmful materials are properly stored in a dry, secure, ventilated environment, with concrete or sealed flooring and a means of preventing unauthorised entry. 22. Contaminated wastewater must be managed by the Contractor to ensure existing water resources on the site are not contaminated. All wastewater from general activities in the camp shall be collected and removed from the site for appropriate disposal at a licensed commercial facility. 23. An oil holding dam must be installed or the existing one expanded to accommodate for the potential leakage events. **Concrete mixing** 24. The concrete batching plant must be contained within a bunded area.	

IMPACT	SOILS AND GEOLOGY This section deals with soils and geology and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC, EO, ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	25. Concrete mixing must only take place within designated areas and may not take place on the ground. 26. Ready mixed concrete must be utilised where possible. 27. If a batching plant is necessary, run-off should be managed effectively to avoid contamination of other areas of the site. Run-off from the batch plant must not be allowed to enter the storm water system. **Washing** 28. No vehicles transporting concrete to the site may be washed on site. **Earthworks** 29. Soils compacted during construction should be deeply ripped to loosen compacted layers and re-graded to even running levels. Topsoil should be re-spread over landscaped areas. 30. If earthworks are required then storm water control and wind screening should be undertaken to prevent soil erosion.	

3.4.5 Erosion Control

Table 13: Erosion Control

IMPACT	EROSION CONTROL This section deals with erosion and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC, EO, ECO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	1. The use of silt fences and sand bags must be implemented in areas that are susceptible to erosion, if any. 2. Other erosion control measures that can be implemented are as follows: ▪ Brush packing with cleared vegetation ▪ Mulch or chip packing ▪ Planting of vegetation ▪ Hydroseeding / hand sowing 3. Sensitive areas need to be identified prior to construction so that the necessary precautions can be implemented. 4. All erosion control mechanisms need to be regularly maintained. 5. Seeding of topsoil and subsoil stockpiles to prevent wind and water erosion of soil surfaces. 6. Retention of vegetation where possible to avoid soil erosion 7. Re-vegetation of disturbed surfaces should occur immediately after construction activities are completed. This should be done through seeding with indigenous grasses that were present on the site prior to construction. 8. No impediment to the natural water flow other than approved erosion control works is permitted. 9. To prevent stormwater damage, the increase in stormwater run-off resulting from construction activities must be estimated and the drainage system assessed accordingly. A drainage plan must be submitted	

IMPACT	EROSION CONTROL This section deals with erosion and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC, EO, ECO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	to the Engineer for approval and must include the location and design criteria of any temporary stream crossings. 10. Implement site drainage and landscaping, to prevent surface ponding, where subsequent ingress into foundations has the potential to cause destabilisation over time. 11. Convey all runoff away from the substation and off the site. 12. Stockpiles not used in three (3) months after stripping must be seeded to prevent dust and erosion. **Run-off** 13. Culverts should be constructed under roadways that cross the natural flow of water in order to prevent damming. 14. Oil traps should be installed to remove the bulk of the oil from the water, which water can then be used on haul roads for dust suppression or as wash down water in the wash bays.	
SPECIFIC MITIGATION MEASURES		
	15. Ensure that physical disturbance caused by soil removal and/or re-distribution is kept to a minimum. In such an area of low rainfall and hot conditions, vegetation is fragile and often difficult to re-establish. 16. The loamy nature of the soils means that if exposed, there is only a small hazard of soil removal by wind erosion, especially in the drier winter months. However, to combat this, any bare soil should be re-vegetated as soon as possible and preventative measures, such as soil covering and windbreaks, may also be required.	

3.4.6 Water Use and Quality

Table 14: Water Use and Quality

IMPACT	WATER USE AND QUALITY This section deals with water use and quality and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC, EO, ECO, CLO**
MITIGATION / METHOD STATEMENT	**Water Use** 1. Develop a sustainable water supply management plan to minimize the impact to natural systems by managing water use, avoiding depletion of aquifers and minimizing impacts to water users. 2. No water may be abstracted from a natural water body unless authorised under a General Authorisation under the National Water Act, or unless authorised by the Department of Water Affairs through a water use licence if such a licence is required. 3. No water may be abstracted from a borehole without the required license. 4. Water must be reused, recycled or treated where possible. 5. Water saving measures must be implemented. 6. Consultation with key stakeholders to understand any conflicting water use demands and the communities' dependency on water resources and conservation requirements within the area. 7. A water use licence is likely to be required with regards to water uses (c) and (i) of the NWA. (Recommended from the specialists report) **Water Quality**. 8. Discharge to surface water should not result in contaminant concentrations in excess of DWA standards. 9. Efficient oil and grease traps or sumps should be installed and maintained at refuelling facilities, workshops, fuel storage depots, and containment areas and spill kits should be available with emergency response plans. **Stormwater**	Engineer

IMPACT	WATER USE AND QUALITY This section deals with water use and quality and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC, EO, ECO, CLO
	10. The site must be managed in order to prevent pollution of drains, downstream watercourses or groundwater, due to suspended solids and silt or chemical pollutants. 11. Silt fences should be used to prevent any soil entering the stormwater drains. 12. Temporary cut off drains and berms may be required to capture stormwater and promote infiltration. 13. Promote a water saving mind set with construction workers in order to ensure less water wastage. 14. New stormwater systems must be developed strictly according to specifications from engineers in order to ensure efficiency. 15. Hazardous substances must be stored at least 20m from any water bodies on site to avoid pollution. 16. The installation of the stormwater system must take place as soon as possible to attenuate stormwater from the construction phase as well as the operation phase. 17. Earth, stone and rubble is to be properly disposed of, or utilized on site so as not to obstruct natural water path ways over the site. i.e. these materials must not be placed in stormwater channels, drainage lines or rivers. 18. There should be a periodic checking of the site's drainage system to ensure that the water flow is unobstructed. 19. If a batching plant is necessary, run-off should be managed effectively to avoid contamination of other areas of the site. Untreated runoff from the batch plant must not be allowed to get into the storm water system or nearby streams, rivers or erosion channels or dongas.	

3.4.7 Surface and Groundwater

Table 15: Surface and Groundwater

IMPACT	SURFACE WATER AND GROUNDWATER This section deals with surface and groundwater and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC, ECO, EO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	1. Site staff shall not be permitted to use any other open water body or natural water source adjacent to or within the designated site for the purposes of bathing, washing of clothing or for any construction or related activities. 2. Municipal water (or another source approved by the ECO) should instead be used for all activities such as washing of equipment or disposal of any type of waste, dust suppression, concrete mixing, compacting, etc. 3. Relevant departments and other emergency services should be contacted in order to deal with spillages and contamination of aquatic environments. 4. Ensure that stream flow can bypass construction site. **5.** Ensure that contaminants are safely stored and away from surface water features. **6.** Storm water management must be enforced by monitoring runoff levels. At the start of erosion, accelerated run-off must be diverted away from bare soil.	
	SITE SPECIFIC MITIGATION MEASURES	
	7. An appropriate storm water management plan formulated by a suitably qualified professional must accompany the proposed development to deal with increased run-off in the designated construction areas.	

3.4.8 Waste Management

Table 16: Waste Management

IMPACT	WASTE MANAGEMENT This section deals with waste management and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC, EO, ECO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	1. A waste management plan should be developed and adhered to in order to effectively manage all construction waste. **Litter management** 2. The contractor should take steps to ensure that littering by construction workers does not occur. 3. Refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction site. 4. The Contractor shall supply waste collection bins where such is not available and all solid waste collected shall be disposed of at registered/licensed landfill. 5. A housekeeping team should be appointed to regularly maintain the litter and rubble situation on the construction site. 6. All waste generated on site must be separated into glass, plastic, paper, metal and wood and recycled. An independent contractor can be appointed to conduct this recycling. 7. In general, any litter must be cleared immediately. 8. Littering by the employees of the Contractor shall not be allowed under any circumstances. The ECO shall monitor the neatness of the work sites as well as the Contractor campsite. 9. Skip waste containers should be maintained on site. These should be kept covered and arrangements made for them to be collected regularly.	

IMPACT	WASTE MANAGEMENT This section deals with waste management and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC, EO, ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	10. All waste must be removed from the site and transported to a landfill site promptly to ensure that it does not attract vermin or produce odours. 11. Where a registered waste site is not available close to the construction site, the Contractor shall provide a method statement with regard to waste management. 12. The Contractor must have a certificate of disposal which should be kept on file. 13. Under no circumstances may solid waste be burnt on site. 14. It is important that the contractors (and sub-contractors by implication) and workers must be informed of the facilities and procedures available for the disposal of waste. **Hazardous waste** 15. All waste hazardous materials must be carefully stored as advised by the ECO, and then disposed of off-site at a licensed landfill site, where practical. 16. Contaminants must be stored safely to avoid spillage. 17. Machinery must be properly maintained to keep oil leaks in check. 18. All necessary precaution measures shall be taken to prevent soil or surface water pollution from hazardous materials used during construction and any spills shall immediately be cleaned up and all affected areas rehabilitated. **Sanitation** 19. Male and females must be accommodated separately. 20. Toilets must be serviced weekly and the ECO must inspect toilets regularly.	

IMPACT	WASTE MANAGEMENT This section deals with waste management and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC, EO, ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	21. Toilets should be no closer than 50m from any natural water bodies or boreholes or above the 1:100 year flood line from any natural or manmade water bodies or drainage lines or alternatively located in a place approved of by the Engineer. 22. Under no circumstances may open areas, neighbours fences or the surrounding bush be used as a toilet facility. 23. The construction of “Long Drop” toilets is forbidden. Toilets connected to the sewage treatment plant or chemical toilets are preferable. 24. Potable water must be provided for all construction staff. **Remedial actions** 25. Depending on the nature and extent of the spill, contaminated soil must be either excavated or treated on-site. 26. Excavation of contaminated soil must involve careful removal of soil using appropriate tools/machinery to storage containers until treated or disposed of at a licensed hazardous landfill site. 27. The ECO must determine the precise method of treatment for polluted soil. This could involve the application of soil absorbent materials as well as oil-digestive powders to the contaminated soil. 28. If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent material. 29. If necessary, oil absorbent sheets or pads must be attached to leaky machinery or infrastructure. 30. Materials used for the remediation of petrochemical spills must be used according to product specifications and guidance for use.	

IMPACT	WASTE MANAGEMENT This section deals with waste management and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC, EO, ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	31. Contaminated remediation materials must be carefully removed from the area of the spill so as to prevent further release of petrochemicals to the environment, and stored in adequate containers until appropriate disposal.	

3.4.9 Biodiversity

Table 17: Biodiversity

IMPACT	BIODIVERSITY (incl Avifauna) This section deals with flora and fauna actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC, EO, ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	Existing vegetation 17. Vegetation removal must be limited to the 31m servitude. 18. Vegetation removal must be phased in order to reduce impact of construction. 19. Vegetation clearing on tower sites must be kept to a minimum. 20. Big trees with large root systems shall be cut manually and removed, as the use of a bulldozer will cause major damage to the soil when the root systems are removed. Stumps shall be treated with herbicide. 21. Smaller vegetation can be flattened with a machine, but the blade should be kept above ground level to prevent scalping. Any vegetation cleared on a tower site shall be removed or flattened and not be pushed to form an embankment around the tower.	

IMPACT	BIODIVERSITY (incl Avifauna) This section deals with flora and fauna actions that need to be implemented during construction	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC, EO, ECO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	22. Trees and vegetation not interfering with the statutory clearance to the conductors can be left under the line. Dense vegetation under the line which could cause a fire hazard, particularly in the middle third of the span in the vicinity of the lowest point of the conductors, will be considered as a separate case. **23.** Upon completion of the stringing operations and before handover, the servitude must be inspected and all vegetation interfering with the safe operation of the line shall be removed / cut down. 24. Materials should not be delivered to the site prematurely which could result in additional areas being cleared or affected. **Fauna occurring in the study area** 25. Rehabilitation to be undertaken as soon as possible after construction has been completed. 26. No trapping or snaring to fauna on the construction site is allowed. 27. No faunal species must be harmed by maintenance staff during any routine maintenance at the development. 28. Pits and excavations must be regularly checked for animals that may have fallen in. 29. Animals occurring on site must be left alone. The ECO must be consulted and before removing any animals obstructing construction activities. The ECO will provide assistance in their removal. 30. No animals are to be kept as pets. **Demarcation of construction and laydown areas** 31. All plants not interfering with the construction shall be left undisturbed. Species of special concern shall be clearly marked. 32. Construction site office and laydown areas must be clearly demarcated and no encroachment must occur beyond demarcated areas.	

IMPACT	BIODIVERSITY (incl Avifauna) This section deals with flora and fauna actions that need to be implemented during construction	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC, EO, ECO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	33. Soils must be kept free of petrochemical solutions that may be kept on site during construction. Spillage can result in a loss of soil functionality thus limiting the re-establishment of flora. **Utilisation of resources** 34. 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. **Exotic vegetation** 35. All exotic vegetation must be removed from the site (if present). 36. Alien vegetation on the site will need to be controlled. 37. The contractor should 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. 38. The spread of exotic species occurring throughout the site should be controlled. Emergence of alien invasive species must be avoided. **Vegetation removal** 39. Herbicide use shall only be allowed according to contract specifications. The application shall be according to set specifications and under supervision of a qualified technician. The possibility of leaching into the surrounding environment shall be properly investigated and only environmentally friendly herbicides shall be used. 40. The use of pesticides and herbicides on the site must be discouraged as these impact on important pollinator species of indigenous vegetation.	

IMPACT	BIODIVERSITY (incl Avifauna) This section deals with flora and fauna actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC, EO, ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
SPECIFIC MITIGATION MEASURES		
	41. Permits should be obtained for all protected plants and trees that will be lost. 42. Permits should be obtained for all sedentary animals that will be lost. 43. Protected plants lost to the development should be rescued and planted in appropriate places in surrounding areas. 44. Construction activity should be restricted to the immediate footprint of the infrastructure. 45. Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority bird species. 46. Measures to control noise and dust should be applied according to current best practice in the industry. 47. Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum. 48. Minimise vegetation clearing and rehabilitate cleared areas as soon as possible, in accordance with the recommendations of the biodiversity specialist. 49. Where possible, protect existing local trees and maintain natural vegetation outside the development footprint.	

3.4.10 Air Quality

Table 18: Air Quality

IMPACT	AIR QUALITY This table deals with mitigation measures to prevent air pollution	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC, EO, ECO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Dust control** 1. Wheel washing and damping down of un-surfaced and un-vegetated areas must occur in areas close to potential receptors of dust pollution. The ECO and ELO must identify these areas prior to construction starting in that particular area or prior to construction traffic needing to move along un-surfaced roads in certain areas. 2. Vegetation must be retained where possible in order to reduce dust travel. 3. Excavations and other clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighbouring areas. 4. The Contractor shall be responsible for dust control on site to ensure no nuisance is caused to sensitive receptors such as landowners and neighbouring communities. 5. Dust generation must be kept to a minimum and suppressed on access roads and construction areas during dry periods. 6. Speed limits on un-surfaced roads must not be exceeded. 7. Speed limits for construction vehicles must be clearly signposted and must be monitored by the ELO and ECO. 8. Any complaints or claims emanating from the lack of dust control shall be attended to immediately by the ELO under the supervision of the ECO.	
SPECIFIC MITIGATION MEASURES		

IMPACT	AIR QUALITY This table deals with mitigation measures to prevent air pollution	RESPONSIBILITY
	9. Ensure that dust suppression techniques are implemented on gravel access roads, where possible. 10. Ensure that dust suppression is implemented in all areas where vegetation clearing has taken place. 11. Ensure that dust suppression techniques are implemented on all soil stockpiles. 12. Re-vegetate all reinstated cable trenches with the same vegetation that existed prior to the cable being laid.	

3.4.11 Noise and Vibrations

Table 19: Noise and Vibrations

IMPACT	NOISE This section deals with noise and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC, EO, ECO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	1. The construction phase must aim to adhere to the relevant noise regulations and limit noise to within standard working hours in order to reduce disturbance of dwellings in close proximity to the development. 2. Truck traffic should be routed away from noise sensitive areas, where possible. 3. Noise levels must be kept within acceptable limits as recommended by SANS 10103:2003. 4. Noisy operations should be combined so that they occur where possible at the same time. 5. Construction activities are to be contained to reasonable hours during the day and early evening. Night-time activities near noise sensitive areas must not be allowed. 6. Construction workers to wear necessary ear protection gear.	

IMPACT	NOISE This section deals with noise and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC, EO, ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	7. Noisy activities should take place during normal working hours (06h00 to 17h00) Monday to Saturday. 8. Noise from labourers must be controlled. 9. Noise suppression measures must be applied to all construction equipment. Construction equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order. Should the vehicles or equipment not be in good working order, the contractor may be instructed to remove the offending vehicle or machinery from site. 10. The contractor must take measures to discourage labourers from loitering in the area and causing noise disturbance. Where possible labour shall be transported to and from the site by the contractor or his Sub-Contractors by the contractors own transport. 11. Apply regular and thorough maintenance schedules to equipment and processes. An increase in noise emission levels very often is a sign of the imminent mechanical failure of a machine. 12. Should blasting be required, the contractor will need to obtain a blasting permit. Moreover, the contractor must make the public aware of when blasting is to take place as well as the specific times of blasting. Blasting activities must take place at reasonable times and during daily working hours.	
SPECIFIC MITIGATION MEASURES		
	13. Measures to control noise and dust should be applied according to current best practice in the industry.	

3.4.12 Energy Use

Table 20: Energy use

IMPACT	ENERGY USE This section deals with energy use and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC, EO, ECO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	1. Energy saving lighting must be implemented across the board. 2. Minimal lighting, while maintaining health and safety regulations, must be kept on during the night operations. 3. Equipment not in use must be switched off and unplugged to save on unnecessary energy costs and carbon footprint.	

3.4.13 Employment

Table 21: Employment

IMPACT	EMPLOYMENT This section deals with employment and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**PM, MC, EO, CLO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Labour** 1. The use of labour intensive construction measures should be used where appropriate. 2. Labour must be trained to benefit individuals. **Recruitment Plan**	

IMPACT	EMPLOYMENT This section deals with employment and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**PM, MC, EO, CLO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	3. The majority of unskilled labourers should be drawn from the local market and where possible use should be made of local semiskilled and skilled personnel. 4. Local suppliers to be used where possible. 5. The Project Manager must ensure that all staff working on the proposed project are in possession of a South African Identity Document or a relevant work permit. 6. Ensure adequate advertising in the project community areas, local papers for labour. Adverts are to be placed in each area where the public meetings were conducted. 7. Local community key stakeholders must be utilised to source labour where possible. 8. The recruitment process must be equitable and transparent. A concerted effort will be made to guard against nepotism and/or any form of favouritism during the process 9. The recruitment of skilled labour will follow standard advertising process in national newspapers and interview based selection 10. A record of official complaints by employees is to be maintained.	
SPECIFIC MITIGATION MEASURES		
	11. Where possible and feasible, local labour procurement should be practised. In addition, if feasible, goods and services should be procured from local small businesses. This will increase the benefit to the local community. 12. Implement public consultation and information sessions to limit the influx of migrant job seekers.	

**Please note: The recruitment plan may slightly change from time to time as the main construction contractors have not been selected.*

3.4.14 Occupational Health and Safety

Table 22: Occupational Health and Safety

IMPACT	HEALTH AND SAFETY This section deals with health and safety and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC, EO, ECO, CLO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Worker safety** 1. Safety measures for work procedures must be implemented. 2. First aid kits must be available and accessible on site. 3. A health and safety plan in terms of the Occupational Health and Safety Act (Act No. 85 of 1993) must be drawn up by the Contractor and approved by the ECO to ensure worker safety. 4. Workers should be thoroughly trained in using potentially dangerous equipment. 5. Contractors must ensure that all equipment is maintained in a safe operating condition. 6. A safety officer must be appointed. 7. A record of health and safety incidents must be kept on site. 8. Any health and safety incidents must be reported to the Project Manager immediately. 9. First aid facilities must be available on site at all times and a number of employees trained to carry out first aid procedures. 10. Workers have the right to refuse work in unsafe conditions. 11. The Contractor must take all the necessary precautions against the spreading of disease such as measles, foot and mouth, etc. especially under livestock. 12. A record must be kept of drugs administered to construction staff or precautions taken and the time and dates when this was done. This can then be used as evidence in court should any claims be instituted against the Project Company or the Contractor.	

IMPACT	HEALTH AND SAFETY This section deals with health and safety and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC, EO, ECO, CLO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	13. The contractor must ensure that all construction workers are well educated about HIV/ AIDS and the risks surrounding this disease. The location of the local clinic where more information and counselling is offered must be indicated to workers. 14. Material stockpiles or stacks must be stable and well secured to avoid collapse and possible injury to site workers / local residents. **Worker facilities** 15. Eating areas should be regularly serviced and cleaned to ensure the highest possible standards of hygiene and cleanliness. 16. Ablution facilities must be well maintained. **Hazardous substances** 17. Working areas should be provided with adequate ventilation and dust/fume extraction systems to ensure that inhalation exposure levels for potentially corrosive, oxidizing, reactive or siliceous substances are maintained and managed at safe levels. 18. Eye wash and emergency shower systems should be provided in areas where there exists the possibility of chemical containment of workers and the need for rapid treatment. **Electrical Safety and isolation** 19. Use of electrical safety devices on all final distribution circuits and appropriate testing schedules applied to such safety systems. 20. All sources of hazardous energy or hazardous substances should have written procedures for isolation, identifying how the system, plant or equipment can be made and kept safe.	

IMPACT	HEALTH AND SAFETY This section deals with health and safety and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC, EO, ECO, CLO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	Physical Hazards 21. Geotechnical safety - All structures must be planned, designed and operated such that the geotechnical risks are appropriately managed. **Machine and Equipment** 22. Use must be made of contrast colouring on equipment/machinery including the provision of reflective markings to enhance visibility. 23. Use must be made of moving equipment/machinery equipped with improved operator sight lines. 24. Workers must be issued with high visibility clothing. 25. Use must be made of reflective markings on structures, traffic junctions, and other areas with a potential for accidents. 26. Safety barriers must be installed in high risk locations. **Fitness for work** 27. Shift management systems must minimize risk of fatigue. Establish alcohol and other drug policy for the operation. **Travel and remote site health** 28. Develop programs to prevent both chronic and acute illnesses through appropriate sanitation and vector control systems. 29. Food preparation areas should be provided with adequate washing facilities.	

IMPACT	HEALTH AND SAFETY This section deals with health and safety and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC, EO, ECO, CLO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	30. Where food is prepared, food preparation storage and disposal should be reviewed regularly and monitored to minimise risk of illness. **Protective gear** 31. Personal Protective Equipment (PPE) must be made available to all construction staff and must be compulsory. Hard hats and safety shoes must be worn at all times and other PPE worn where necessary i.e. dust masks, ear plugs etc. 32. No person is to enter the site without the necessary PPE. **Site safety** 33. The construction camp must remain fenced for the entire construction period. 34. Potentially hazardous areas are to be demarcated and clearly marked. 35. Adequate warning signs of hazardous working areas must be in place. 36. Emergency numbers for local police and fire department etc. must be placed in a prominent area. 37. Suitable conspicuous warning signs in English and all other applicable languages must be placed at all entrances to the site. 38. All speed limits must be adhered to. **Construction equipment safety** 39. All equipment used for construction must be in good working order with up to date maintenance records. **Procedure in the event of a petrochemical spill**	

IMPACT	HEALTH AND SAFETY This section deals with health and safety and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC, EO, ECO, CLO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	40. The individual responsible for or who discovers the petrochemical spill must report the incident to the Project Manager, Contractor or ECO. 41. The problem must be assessed and the necessary actions required will be undertaken. 42. The immediate response must be to contain the spill. 43. The source of the spill must be identified, controlled, treated or removed wherever possible. **Fire management** 44. All flammable substances must be stored in dry areas which do not pose an ignition risk to the said substances. 45. Firefighting equipment must be placed in prominent easily accessible position across the site at all times. This includes fire extinguishers, a fire blanket as well as a water tank. 46. Smoking may only be conducted in demarcated areas. 47. Contact should be made with the local Fire Protection Agency (FPA) if one exists. **Safety of surrounding residents** 48. All I&AP's should be notified in advance of any known potential risks associated with the construction site and the activities on it. Examples of these are: ▪ Earthworks / earthmoving machinery on steep slopes above houses / infrastructure; ▪ Risk to residence along haulage roads / access routes. **Emergency evacuation plan**	

IMPACT	HEALTH AND SAFETY This section deals with health and safety and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC, EO, ECO, CLO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	49. Upon completion of the construction phase, an emergency evacuation plan must be drawn up to ensure the safety of the staff and surrounding land users in the case of an emergency. 50. All staff must undergo safety training. **Maintenance** 51. The corridor and surrounding areas are to be regularly maintained. A maintenance schedule must be drawn up and records of all maintenance kept.	

3.4.15 Security

Table 23: Security

IMPACT	SECURITY This section deals with security and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC, EO, ECO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	1. A security company should be employed to guard the construction site and monitor access. This company should also be utilised for the operation phase. 2. Labour should be transported to and from the site to discourage loitering in adjacent areas and possible increase in crime or disturbance.	

IMPACT	SECURITY This section deals with security and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC, EO, ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	3. Unsocial activities such as consumption or illegal selling of alcohol, drug utilisation or selling and prostitution on site shall be prohibited. Any persons found to be engaged in such activities should receive disciplinary or criminal action taken against them. 4. Only pre-approved staff must be permitted to stay within the staff accommodation in the event that staff accommodation will be provided. 5. The site shall be fenced, where necessary to prevent any loss or injury to persons during the construction phase. 6. During periods of temporary site closure, the site should be secured to ensure no access to the site. This applies to the construction camp as well. 7. No alcohol / drugs to be present on site. 8. No firearms allowed on site or in vehicles transporting staff to / from site (unless used by security personnel). 9. Construction staff is to make use of the facilities provided for them, as opposed to ad-hoc alternatives (e.g. fires for cooking, the use of surrounding bush as a toilet facility are forbidden). 10. Trespassing on private / commercial properties adjoining the site is forbidden. 11. All employees must undergo the necessary safety training and wear the necessary protective clothing. 12. The ELO must timeously inform affected landowners where construction is to occur from the onset of the construction process. 13. Driving under the influence of alcohol is prohibited. 14. The site must be secured in order to reduce the opportunity for criminal activity in the locality of the construction site.	

3.4.16 Social Environment

Table 24: Social Environment

IMPACT	SOCIAL ENVIRONMENT This section deals with social environment and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC, EO, ECO, CLO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	1. All contact with the affected parties shall be courteous at all times. The rights of the affected parties shall be respected at all times. 2. The successful completion of the project depends a lot on the good relations with the landowners. It would be preferable if the ELO is the liaison officer for the entire contract. 3. The ELO shall be available to investigate all problems arising on the work sites concerning the landowners. 4. All negotiations (if required) for any reason shall be conducted between the ECO the landowners and the Contractor (ELO) with the ECO present. 5. The landowners shall always be kept informed by the ELO about any changes to the construction programme should they be affected. 6. The contact numbers of the ELO and the ECO shall be made available to the landowners. This will ensure open channels of communication and prompt response to queries and claims. 7. A complaints register should be kept on site (A complaints record sheet is provided in annexure A). Details of complaints should be incorporated into the audits as part of the monitoring process. This should be in carbon copy format, with numbered pages. Any missing pages must be accounted for by the Contractor. 8. Damage to infrastructure shall not be tolerated and any damage shall be rectified immediately by the Contractor. A record of all damage and remedial actions shall be kept on site.	

IMPACT	SOCIAL ENVIRONMENT This section deals with social environment and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC, EO, ECO, CLO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	9. Care must be taken not to damage irrigation equipment, lines, channels and crops, as this could lead to major claims being instituted against the Project Company and the Contractor. 10. A policy on Contractor Health and Safety for the duration of the construction work on site, must apply, and be monitored. 11. A proper security strategy must be in place for site specific crimes.	
SPECIFIC MITIGATION MEASURES		
	12. Where possible and feasible, local procurement of labour should be applied to ensure the maximum benefit to the impacted community. 13. Public consultation and information sharing should be promoted to ensure that the proposed development is understood, enabling those individuals with fitting skills, if any, to make their services and/or knowledge available to the project proponent. 14. If possible, goods and services should be procured from local small businesses; this will stimulate indirect job creation. 15. Consultation with the directly affected land owners must be on-going to limit the effect on productive agriculture land and ability to farm with livestock. 16. The conditions set and requested by the directly affected land owner should be adhered to in order to limit the interruption to agricultural production. 17. During construction the rules and regulations must be clearly communicated to all workers, personal property must be respected and avoided. 18. Manage workers to ensure that they are only on site during the reasonable working hours.	

3.4.17 Community Engagement

Table 25: Community Engagement

IMPACT	COMMUNITY ENGAGEMENT This section deals with surrounding community and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**EO, ECO, CLO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION	1. A communication guideline to be drafted and agreed upon with authority representatives and affected communities. 2. Open and transparent community engagement to be followed as culturally appropriate. 3. Records (written) to be kept of all community engagements (e.g. complaints, resolutions, etc.)	

3.4.18 Visual Impact

Table 26: Visual Impact

IMPACT	VISUAL This section deals with visual issues and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC, EO, ECO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**General** 1. Construction activities must not occur outside of stipulated working hours and lighting should only be erected where absolutely necessary. 2. Construction camps and equipment storage facilities are to be shielded with shade netting. 3. Construction traffic must not deviate from designated routes or access roads.	

	4. Labour being transported to the site must take cognisance of litter and waste concerns. 5. Equipment being transported to the site must be covered with tarpaulins. 6. It is recommended that equipment be stored discreetly so as not to increase visual impacts. 7. Construction must be conducted in the shortest possible time in order to reduce visual impacts.	
SPECIFIC MITIGATION MEASURES		
	8. Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. 9. Vegetation clearing should take place in a phased manner. 10. Maintain a neat construction site by removing rubble and waste materials regularly. 11. Make use of existing gravel access roads where possible. 12. Limit the number of vehicles and trucks travelling to and from the proposed site. 13. Ensure that dust suppression techniques are implemented on gravel access roads, where possible. 14. Ensure that dust suppression is implemented in all areas where vegetation clearing has taken place. 15. Ensure that dust suppression techniques are implemented on all soil stockpiles. 16. Non-reflective surfaces should be utilised where possible. 17. Establish erosion control measures on areas which will be exposed for long periods of time. This is to reduce the potential impact heavy rains may have on the bare soil. 18. Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting. 19. Where possible, laydown areas and temporary construction equipment and camps should be placed in already in disturbed areas in order to minimise vegetation clearing.	

3.4.19 Heritage and Cultural Resources

Table 27: Heritage and Cultural Resources

IMPACT	HERITAGE AND CULTURAL RESOURCES This section deals with heritage and cultural issues as well as actions that need to be implemented during construction	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC, EO, ECO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	1. A responsible archaeologist must be appointed to inspect the operational areas of the site in order to identify any significant material being unearthed, and to make the correct judgment on actions to be taken. 2. A permit in terms of section 34 of the National Heritage Resources Act 1999 (Act 25 of 1999) must be obtained, if any archaeological resources, such as built structures older than 60 years, sites of cultural significance associated with oral histories, burial grounds or graves and cultural landscapes, are discovered during the construction phase of the project and which will be damaged, destroyed, altered, or disturbed as a result of the project. 3. A destruction permit will be required under the Section 34 of the NHRA (if applicable). 4. An archaeologist must immediately be appointed should any artefacts be unearthed during construction. 5. Should substantial fossils be uncovered they should be left *in situ,* safeguarded by the Environmental Control Officer and reported to SAHRA and a professional palaeontologist. 6. A poster reminding workers of the possibility of finding archaeological sites, should be kept on site. 7. An archaeological monitoring and feedback strategy must be developed to ensure effective monitoring of the site and to provide feedback reports to the client and SAHRA.	
SPECIFIC MITIGATION MEASURES		
	8. Mitigation through paleontological excavations and collection if the Geotechnical Survey indicates necessity for mitigation.	

	9. Monitoring during construction by palaeontologist if fossils are exposed during excavation of more than 1.5m of soil cover. 10. Palaeontological monitoring reports must be submitted to SAHRA upon completion of the construction phase. 11. 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 during the proposed development, SAHRA APM Unit (Natasha Higgitt/John Gribble 021 462 5402) must be alerted. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Mimi Seetelo 012 320 8490), must be alerted immediately. A professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the findings. 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.	

3.5 Operation Phase

3.5.1 Construction Site Decommissioning

Table 28: Construction Site Decommissioning

IMPACT	CONSTRUCTION SITE DECOMMISSIONING This section deals with the demolishing of the construction camp and the actions that need to be implemented	RESPONSIBILITY
PHASE	OPERATION	MC, ECO, EO, ESKOM
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Removal of equipment** 1. All structures comprising the construction camp are to be removed from site. 2. The area that previously housed the construction camp is to be checked for spills of substances such as oil etc., and these shall be remediated. 3. All hardened surfaces within the construction camp area should be ripped, all imported materials removed, and the area shall be top soiled and regressed using the guidelines set out in the re-vegetation that forms part of this document. **Temporary services** 4. The Contractor must arrange the cancellation of all temporary services. 5. A copy of all weigh-bridge certificates from waste disposed are to be presented to the ECO. 6. Temporary roads must be closed and access across these, blocked. 7. All areas where temporary services were installed are to be rehabilitated to the satisfaction of the ECO. **Associated infrastructure** 8. Surfaces are to be checked for waste products from activities such as concreting or asphalting and cleared in a manner approved by the Engineer.	

IMPACT	CONSTRUCTION SITE DECOMMISSIONING This section deals with the demolishing of the construction camp and the actions that need to be implemented	RESPONSIBILITY
PHASE	OPERATION	MC, ECO, EO, ESKOM
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	9. All surfaces hardened due to construction activities are to be ripped and imported material thereon removed. 10. All rubble is to be removed from the site to an approved disposal site as approved by the ECO. Burying of rubble on site is prohibited. 11. The site is to be cleared of all litter. 12. The Contractor is to check that all watercourses are free from building rubble, spoil materials and waste materials. 13. Fences, barriers and demarcations associated with the construction phase are to be removed from the site unless stipulated otherwise by the Engineer. 14. All residual stockpiles must be removed to spoil or spread on site as directed by the Engineer. 15. All leftover building materials must be returned to the depot or removed from the site. 16. The Contractor must repair any damage that the construction works has caused to neighbouring properties, specifically, but not limited to, damage caused by poor storm water management. **Rehabilitation plan** 17. Rehabilitate and re-vegetate cleared areas with indigenous plant species that were present on the site prior to construction. 18. All roads utilised during the construction phase must be rehabilitated to an acceptable standard after construction is complete.	

3.5.2 Rehabilitation and Maintenance

Table 29: Rehabilitation and Maintenance

IMPACT	**REHABILITATION** **This section deals with the issues relating to rehabilitation after construction**	**RESPONSIBILITY**
PHASE	**OPERATION**	**ESKOM**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Rehabilitation** 1. All damaged areas shall be rehabilitated upon completion of the contract 2. A mixture of vegetation seed can be used provided the mixture is carefully selected to ensure the following: ▪ Annual and perennial species are chosen. ▪ Pioneer species are included. ▪ All the species shall not be edible. ▪ Species chosen will grow in the area under natural conditions. ▪ Root systems must have a binding effect on the soil. ▪ The final product should not cause an ecological imbalance in the area. 3. To get the best results in a specific area, it is advisable to consult with a vegetation specialist. Seed distributors can also give valuable advice as to the mixtures and amount of seed necessary to seed a certain area. 4. All natural areas impacted during construction must be rehabilitated with locally indigenous grasses that were present on the site prior to construction. 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 that were present on the site prior to construction. 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.	

IMPACT	REHABILITATION This section deals with the issues relating to rehabilitation after construction	RESPONSIBILITY
PHASE	OPERATION	ESKOM
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	8. Planting of indigenous tree species in areas not to be cultivated or built on must be encouraged. **Maintenance** 9. The servitude needs to be monitored every three (3) months for the first year to identify the emergence of alien species and any erosion concerns.	

3.5.3 Operation and Maintenance

Table 30: Operation and Maintenance

IMPACT	OPERATION AND MAINTENANCE This section deals with the potential impacts that could result from the operation and maintenance of the line and substation.	RESPONSIBILITY
PHASE	OPERATION	ESKOM
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Maintenance** 1. All applicable standards, legislation, policies and procedures must be adhered to during operation. 2. Regular ground inspection of the servitude must take place to monitor their status. 3. Landowner conditions for accessing the servitude must be adhered to, and all gates must be kept open / closed subject to landowner requirements. 4. Only authorised Eskom personnel must access the servitude and properties that are required to be traversed in order to access the servitude	

	Public awareness 5. The emergency preparedness plan must be ready for implementation at all times should an emergency situation arise.	
SPECIFIC MITIGATION MEASURES		
	6. Strict rules of conduct and access control procedures should be enforced at all times to ensure that the personal property of the land owners on and surrounding the site is respected by all workers/contractors of the project proponent. 7. The conditions set and requested by the directly affected land owner should be adhered to in order to limit the interruption to agricultural production. 8. Ensure clear communication of the project information and effective public participation processes to minimise the influx of migrant job seekers. 9. Manage workers to ensure that they are only on site during the reasonable working hours.	

3.5.4 Air Quality

Table 31: Air Quality

IMPACT	**AIR POLLUTION** **This section deals with the issues relating to air pollution during operation**	**RESPONSIBILITY**
PHASE	**OPERATION**	**ESKOM**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Dust management** 1. Any dirt roads utilised to access the sites must be regularly maintained and dust mitigation measures to be enforced to ensure that dust levels are controlled. **Litter management** 2. Remove unwanted materials and litter on a regular basis to avoid potential odours.	

3.5.5 Biodiversity

Table 32: Biodiversity

IMPACT	BIODIVERSITY (FAUNA, FLORA AND AVIFAUNA) This section details with the issues relating to biodiversity during operation	RESPONSIBILITY
PHASE	**OPERATION**	**ESKOM**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Vegetation** 1. Indigenous vegetation must be maintained and all exotics removed as they appear and disposed of appropriately. 2. Vegetative re-establishment shall, as far as possible, make use of indigenous or locally occurring plant varieties within the servitude. 3. No streams, wetlands or riparian areas outside of agreed access routes must be traversed as part of operational work unless emergency access to the servitude in the areas is required. 4. Herbicides to clear emergent bushy vegetation under the lines must not be used; instead vegetation control must be through mechanical means. No herbicides must be used within 150m of any surface water feature. **Other fauna** 5. No faunal species must be harmed by maintenance staff during any routine maintenance at the development.	
SPECIFIC MITIGATION MEASURES		
	6. An alien management plan should be compiled and implemented.	

IMPACT	BIODIVERSITY (FAUNA, FLORA AND AVIFAUNA) This section details with the issues relating to biodiversity during operation	RESPONSIBILITY
PHASE	OPERATION	ESKOM
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	7. During operational maintenance, Eskom should monitor the power line servitude and substation site to detect alien invasions as early as possible, so that they can be controlled. Control measures should be implemented. 8. The power line and substation should be inspected at least once a quarter for a minimum of one year by the avifaunal specialist to establish if there is any significant collision mortality. Thereafter the frequency of inspections will be informed by the results of the first year. The protocol to be followed for the inspections should be compiled by the avifaunal specialist, prior to the first inspection. 9. The line should be marked with Bird Flight Diverters (BFDs) for their entire length on the earth wire of the line, 5m apart, alternating black and white.	

3.5.6 Surface Water Resources

IMPACT	SURFACE WATER This section deals with the issues relating to surface water during operation	RESPONSIBILITY
PHASE	OPERATION	ESKOM
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Site Access** 1. It is crucial that existing roads are used so that damage is limited. Where new service roads are required in the watercourses and the necessary environmental authorisations and water use licences are obtained, these roads must be limited in extent (i.e. go directly to the desired tower) and will need to be maintained for erosion. 2. Vehicles must be restricted to smaller not heavy vehicles where possible. Activity must be limited to a narrow track or “Right of Way” (ROW) only.	

	3. Ideally, if service roads are required inside the watercourses, coarse gravel should be used as the infill. This material will not erode away after rainfall events and will provide a relatively solid foundation when surface water accumulates. Additionally, erosion will be limited by this material as opposed to exposed dirt roads. 4. If dirt roads will be the means of access, these will have to be regularly checked for erosion. This should be done on a weekly to monthly basis and after short or long periods of heavy rainfall or after long periods of sustained rainfall. 5. Sanitary facilities must be available for workers to use to prevent urine and faecal waste entering the surface water resources and the associated buffer zones. **Erosion control** 6. Where erosion begins to take place, this must be dealt with immediately to prevent severe erosion damage to the wetlands. Should severe erosion occur, a rehabilitation plan will be required and Input from a suitably qualified wetland or aquatic specialist must be obtained. **Avifaunal safety** 7. During the construction phase, it is critical that the stretches of power lines that have been authorised and permitted to course through or near to the drainage line and associated riparian corridors, and wetland areas are fitted with flight deviators or bird anti-collision devices (whichever is more appropriate) to prevent impacts to avi-fauna. The fitment of the anti-collision devices or flight deviators must take place on the ground before stringing the power lines to the towers in order to prevent the use of machinery or vehicles in the activity.	

3.5.7 Health and Safety

Table 33: Health and Safety

IMPACT	HEALTH AND SAFETY This section deals with the issues relating to health and safety during operation	RESPONSIBILITY
PHASE	**OPERATION**	**ESKOM**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Emergency evacuation plan** 1. Upon completion of the construction phase, an emergency evacuation plan must be drawn up to ensure the safety of the staff and surrounding land users in the case of an emergency. **Maintenance** 2. The servitude is to be regularly maintained. A maintenance schedule must be drawn up and records of all maintenance kept. **Storage and handling of hazardous waste** 3. A spill kit needs to be kept on site to address any unforeseen spillages. 4. Transport of all hazardous substances must be in accordance with the relevant legislation.	

3.5.8 Visual Impact

Table 34: Visual Impact

IMPACT	VISUAL IMPACT This section deals with the issues relating to visual impacts during operation	RESPONSIBILITY
PHASE	**OPERATION**	**ESKOM**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	***Maintenance and lighting*** 12. High standards of maintenance and management of the landscaping should be carried out in accordance with the best possible practice to ensure that the landscaping ensures that the power line blends in with the current visual environment, by enhancing natural features such as trees and vegetation as much as possible. 13. The servitude and surrounds must be kept clean, tidy and well maintained to reduce negative visual impacts. 14. Rehabilitation of surrounding areas must take place with indigenous species that were present on the site prior to construction. 15. Regular maintenance of the associated infrastructure must be undertaken.	
SPECIFIC MITIGATION MEASURES		
	16. Light fittings for security at night should reflect the light toward the ground and prevent light spill. 17. As far as possible, limit the amount of security and operational lighting present at the on-site substation. 18. If possible, light sources should be shielded by physical barriers (walls, vegetation, or the structure itself); 19. Make use of minimum lumen or wattage in fixtures; 20. Limiting mounting heights of lighting fixtures, or alternatively using foot-light or bollard level lights; 21. If possible, make use of motion detectors on security lighting. 22. As far as possible, limit the number of maintenance vehicles which are allowed to access the substation site and power line access roads. 23. Ensure that dust suppression techniques are implemented on gravel access roads, where possible.	

IMPACT	VISUAL IMPACT This section deals with the issues relating to visual impacts during operation	RESPONSIBILITY
	24. Only clear vegetation which is required to be cleared for the correct operation of the development. 25.	

3.6 Decommissioning phase

Mitigation measures implemented during construction with regards to the construction camp and equipment will remain the same for the decommissioning phase when a construction camp will need to be established again.

3.6.1 Ongoing Stakeholder involvement

This is the process that is recommended if the substations sites are decommissioned.

Table 35: Ongoing Stakeholder involvement

IMPACT	**ONGOING STAKEHOLDER INVOLVEMENT** **This section relates to the stakeholder involvement that needs occur during decommissioning**	**RESPONSIBILITY**
PHASE	**DECOMMISSIONING**	**ESKOM, CLO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	1. Community to be notified, as culturally appropriate, timeously of the planned decommissioning, e.g.: • Proposed decommissioning start date; and • Process to be followed. 2. Recommend that a meeting with community leader(s) be held before decommissioning commence to inform them: • What activities will take place during the decommissioning phase. • How these activities will impact upon the communities and/or their properties. • Regarding the timeframes of scheduled activities 3. Regular interaction between Eskom and community leader(s) during the decommissioning phase 4. A reporting office / channel to be established should community members experience problems with contractors / sub-contractors during the decommissioning phase.	

	5. A register to be kept of problems reported by community members and the steps taken to address / resolve it.	

3.6.2 Community health and safety

Table 36: Community health and safety

IMPACT	**COMMUNITY HEALTH AND SAFETY** **This section deals with the issues relating to health and safety during decommissioning**	**RESPONSIBILITY**
PHASE	**DECOMMISSIONING**	**ESKOM, CLO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	1. Demarcated routes to be established to ensure the safety of communities, especially in terms of road safety and communities to be informed of these demarcated routes. 2. Excavated areas to be fenced off and regularly inspected to ensure that humans and animals do not have access to the site. 3. Any infrastructure that would not be decommissioned, must be appropriately locked and/or fenced off to ensure that it does not pose any danger to the community.	

3.6.3 Waste Management

Table 37: Waste Management

IMPACT	**WASTE MANAGEMENT** **This section deals with the issues relating to waste management during decommissioning**	**RESPONSIBILITY**
PHASE	**DECOMMISSIONING**	**ESKOM, EO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	1. All contaminated soils to be removed from the property and to be disposed of as hazardous waste.	

3.6.4 Surface and Groundwater

Table 38: Surface and Groundwater

IMPACT	**SURFACE AND GROUNDWATER** **This section deals with the issues relating to surface and groundwater during decommissioning**	**RESPONSIBILITY**
PHASE	**DECOMMISSIONING**	**ESKOM, EO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	1. Remove of any historically contaminated soil as hazardous waste. 2. Removal of all substances which can result in groundwater (or surface water) contamination. 3. Re-vegetation of exposed soil surfaces to ensure no erosion in these areas. 4. A site-specific post-construction wetland rehabilitation plan compiled by a suitably qualified wetland specialist will be required to rehabilitate and monitor the affected wetlands where construction impacts have been caused.	

3.6.5 Biodiversity

Table 39: Biodiversity

IMPACT	BIODIVERSITY This section deals with the issues relating to biodiversity during decommissioning	RESPONSIBILITY
PHASE	**DECOMMISSIONING**	**ESKOM, EO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	1. Rehabilitation of exposed surfaces with indigenous species that were present on the site prior to construction, preferably large trees. 2. Adherence to surface and groundwater mitigation measures to prevent secondary impacts on biodiversity. 3. Prevent expansion of the current footprint(s). 4. Retain large trees to keep nesting and roosting habitat.	
SPECIFIC MITIGATION MEASURES		
	5. De-commissioning activity should be restricted to the immediate footprint of the infrastructure. 6. Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority bird species. 7. Measures to control noise and dust should be applied according to current best practice in the industry. 8. Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum.	

3.6.6 Air Quality

Table 40: Air Pollution

IMPACT	**AIR POLLUTION** **This section deals with the issues relating to air quality during decommissioning**	**RESPONSIBILITY**
PHASE	**DECOMMISSIONING**	**ESKOM, EO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	1. Maintain equipment to reduce exhaust emissions.	

4 ADDITIONAL MANAGEMENT PLANS

4.1 Alien Invasive Management Plan

Table 41: Alien Invasive Management Plan

ALIEN INVASIVE MANAGEMENT PROGRAMME	
MITIGATION MEASURES	1. Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding. 2. Alien vegetation and the spread of exotic species on the site will need to be controlled. 3. The contractor should 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. 4. Herbicide use shall only be allowed according to contract specifications. The application shall be according to set specifications and under supervision of a qualified technician. The possibility of leaching into the surrounding environment shall be properly investigated and only environmentally friendly herbicides shall be used. 5. The use of pesticides and herbicides along the power line route must be discouraged as these can impact on important pollinator species of indigenous vegetation. 6. Six monthly checks of the area should take place for the emergence of invader species. 7. Mitigation measures mentioned for the construction phase above must be implemented for any maintenance of the development that may be undertaken during the operation phase. 8. Correct rehabilitation with locally indigenous species. 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. 10. Constant maintenance of the area to ensure re-colonisation of floral species. 11. Regular removal of alien species which may jeopardise the proliferation of indigenous species.

The proposed Tlisitseng 1 power line and substation project is intrinsically linked to the proposed Tlisitseng 1 PV facility, as the power line and substation will link the proposed Tlisitseng PV facility to the national grid at the existing Watershed substation. Additionally, most of the power line corridor occurs on the application site for the proposed Tlisitseng 1 PV Facility. As such, it must be noted that a detailed Alien Invasive Management

has been compiled and included in the Tlisitseng 1 PV Facility's EMPr (currently undergoing a separate EIA process with the DEA reference no as 14/12/16/3/3/2/974).

4.2 Plant Rescue and Protection Plan

Table 42: Plant Rescue and Protection Plan

PLANT RESCUE PROTECTION PLAN	
MITIGATION MEASURES	1. 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 to the substation and along the power line servitude. If necessary, shift infrastructure to avoid impacts on species or specific features. 2. Vegetation clearing should 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. 3. Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared. 4. Vegetation removal must be limited to the wind farm construction site. 5. Vegetation to be removed as it becomes necessary rather than removal of all vegetation throughout the site in one step. 6. Materials should not be delivered to the site prematurely which could result in additional areas being cleared or affected. 7. No vegetation to be used for firewood. 8. 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. 9. Only vegetation within the study area must be removed. 10. Vegetation removal must be phased in order to reduce impact of construction. 11. Construction site office and laydown areas must be clearly demarcated and no encroachment must occur beyond demarcated areas. 12. All natural areas impacted during construction must be rehabilitated with locally indigenous plant species.

	13. A buffer zone should be established in areas where construction will not take place to ensure that construction activities do not extend into these areas. 14. Construction areas must be well demarcated and these areas strictly adhered to. 15. The use of pesticides and herbicides in the study area must be discouraged as these impacts on important pollinator species of indigenous vegetation. 16. Soils must be kept free of petrochemical solutions that may be kept on site during construction. Spillage can result in a loss of soil functionality thus limiting the re-establishment of flora. 17. The grid access power line must span rocky areas in order to avoid transformation in these areas. 18. 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.

The proposed Tlisitseng 1 power line and substation project is intrinsically linked to the proposed Tlisitseng 1 PV facility, as the power line and substation will link the proposed Tlisitseng PV facility to the national grid at the existing Watershed substation. Additionally, most of the power line corridor occurs on the application site for the proposed Tlisitseng 1 PV Facility. As such, it must be noted that a detailed Plant Rescue and Protection Plan has been compiled and included in the Tlisitseng 1 PV Facility's EMPr (currently undergoing a separate EIA process with the DEA reference no as 14/12/16/3/3/2/974).

4.3 Re-Vegetation and Habitat Rehabilitation Plan

Table 43: Re-Vegetation and Habitat Rehabilitation Plan

RE-VEGETATION AND HABITAT REHABILITATION PLAN	
MITIGATION MEASURES	1. 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. 2. Re-vegetation of disturbed surfaces should occur immediately after construction activities are completed. This should be done through seeding with indigenous grasses. 3. All damaged areas shall be rehabilitated upon completion of the contract. 4. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction.

	5. All natural areas impacted during construction must be rehabilitated with locally indigenous species typical of the representative botanical unit. 6. Rehabilitation must take place in a phased approach as soon as possible. 7. Rehabilitation process must make use of species indigenous to the area. Seeds from surrounding seed banks can be used for re-seeding. 8. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas. 9. Planting of indigenous tree species in areas not to be cultivated or built on must be encouraged. 10. Habitat destruction should 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 should be applied strictly. Personnel should be adequately briefed on the need to restrict habitat destruction, and must be restricted to the actual construction area. 11. 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 proposed Tlisitseng 1 power line and substation project is intrinsically linked to the proposed Tlisitseng 1 PV facility, as the power line and substation will link the proposed Tlisitseng PV facility to the national grid at the existing Watershed substation. Additionally, most of the power line corridor occurs on the application site for the proposed Tlisitseng 1 PV Facility. As such, it must be noted that a detailed Revegetation and Habitat Rehabilitation has been compiled and included in the Tlisitseng 1 PV Facility's EMPr (currently undergoing a separate EIA process with the DEA reference no as 14/12/16/3/3/2/974).

4.4 Erosion Management Plan

Table 44: Erosion Management Plan

EROSION MANAGEMENT PLAN	
MITIGATION MEASURES	1. To prevent erosion, material stockpiled for long periods (2 weeks) should be retained in a bermed area. 2. Areas which are not to be constructed on within two months must not be cleared to reduce erosion risks. 3. The area to be cleared must be clearly demarcated and this footprint strictly maintained.

	4. The necessary silt fences and erosion control measures must be implemented in areas where these risks are more prevalent. 5. Wind screening and stormwater control should be undertaken to prevent soil loss from the site. 6. The use of silt fences and sand bags must be implemented in areas that are susceptible to erosion. 7. Other erosion control measures that can be implemented are as follows: a. Brush packing with cleared vegetation b. Mulch or chip packing c. Planting of vegetation d. Hydroseeding / hand sowing 8. Sensitive areas need to be identified prior to construction so that the necessary precautions can be implemented. 9. All erosion control mechanisms need to be regularly maintained. 10. Seeding of topsoil and subsoil stockpiles to prevent wind and water erosion of soil surfaces. 11. Retention of vegetation where possible to avoid soil erosion. 12. Vegetation clearance should be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time. 13. Re-vegetation of disturbed surfaces should occur immediately after construction activities are completed. This should be done through seeding with indigenous grasses that were present on site prior to construction. 14. No impediment to the natural water flow other than approved erosion control works is permitted. 15. To prevent stormwater damage, the increase in stormwater run-off resulting from construction activities must be estimated and the drainage system assessed accordingly. 16. Stockpiles not used in three (3) months after stripping must be seeded to prevent dust and erosion.

4.5 Storm Water Management Plan

The DEA requested in their comments on the DBAR, dated 25 April 2017, that a Storm Water Management Plan be compiled for the construction and operation phases of the facility. A Storm Water Management Plan cannot be compiled until the detailed design stages on the proposed development are complete, which will only take place if the proposed Tlisitseng 1 substation and power line developments are authorised by the

DEA. However, it is stipulated that a Storm Water Management Plan must be compiled before any construction commences and implemented during the construction and operation phase of the proposed development. Refer to Section 3.4.7.

4.6 Open Space Management Plan

Table 45: Open Space Management Plan

OPEN SPACE MANAGEMENT PLAN	
MITIGATION MEASURES	1. A buffer zone should be established in areas where construction will not take place to ensure that construction activities do not extend into these areas. 2. Vehicle movement should be restricted to authorised access roads. 3. Before construction begins, all areas to be developed must be clearly demarcated with fencing or orange construction barrier where applicable. 4. All Construction Camps are to be fenced off in such a manner that unlawful entry is prevented and access is controlled. Signage shall be erected at all access points in compliance with all applicable occupational health and safety requirements. All access points to the Construction Camp should be controlled by a guard or otherwise monitored, to prevent unlawful access. 5. The contractor and ECO must ensure compliance with conditions described in the EA. 6. Records of compliance/ non-compliance with the conditions of the authorisation must be kept and be available on request. 7. Records of all environmental incidents must be maintained and a copy of these records be made available to provincial department on request throughout the project execution. 8. Site establishment shall take place in an orderly manner and all required amenities shall be installed at camp sites before the main workforce move onto site. 9. All construction equipment must be stored within this construction camp. 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 11. The Contractor must provide sufficient ablution facilities, in the form of portable / VIP toilets, at the Construction Camps, and shall conform to all relevant health and safety standards and codes. No pit latrines, French drain systems or soak away systems shall be allowed and toilets may not be situated within 100 meters of any

	surface water body or 1:100 year flood line. A sufficient number of toilets shall be provided to accommodate the number of personnel working in the area. 12. The Contractor shall inform all site staff to make use of supplied ablution facilities and under no circumstances shall indiscriminate sanitary activities be allowed. 13. No fires will be allowed and the Contractor must make alternative arrangements for heating. LP Gas may be used, provided that all required safety measures are in place. The Contractor shall take specific measures to prevent the spread of veld fires, caused by activities at the campsites. These measures may include appropriate instruction of employees about fire risks and the construction of firebreaks around the site perimeter. 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 shall ensure that the training and capabilities of the Contractor's site staff are adequate to carry out the designated tasks. 16. Staff should 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

4.7 Monitoring System

Table 46: Monitoring System

MONITORING SYSTEM	
MITIGATION MEASURES	1. Monitoring should be undertaken to evaluate the success of mitigation measures. Monitoring methods must be in accordance with features that need to be monitored. 2. 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. 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.

	4. Spillage packs must be available at construction areas. 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 temporary storage area(s). These pollution prevention measures for storage should include a bund wall high enough to contain at least 110% of any stored volume, and this should 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 should be attained and given to the project manager. 9. Topsoil and subsoil to be protected from contamination. This should 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 should be made to contain spillages or overflows into the soil. 11. Relevant departments and other emergency services should be contacted in order to deal with spillages and contamination of aquatic environments. 12. Soils must be kept free of petrochemical solutions that may be kept on site during construction. Spillage can result in a loss of soil functionality thus limiting the re-establishment of flora.

4.8 Traffic Management Plan

Table 47: Traffic Management Plan

TRAFFIC MANAGEMENT PLAN	
MITIGATION MEASURES	1. A designated transport coordination manager should be appointed to oversee and manage the traffic safety officers. Additionally, the designated transport coordination manager should inform and keep up-to-date the interested and affected parties of all the activities taking place that may have a direct impact on them. 2. A traffic safety officer shall be nominated to make all the necessary arrangements to maintain the required traffic measures for the duration of the project. The safety officer shall liaise daily with the transportation coordination manager to keep them apprised of the state of all the traffic arrangements. 3. All construction traffic shall comply with the legal load requirements as outlined in the National Road Traffic Act and National Road Traffic Regulations. 4. Construction traffic entering the site along busy public roads should be limited to times when peak hour traffic can be avoided. The peak traffic occurs during 7h00 to 8h30, and 16h00 to 17h30. Construction traffic can also be restricted further to avoid travelling on public holidays, long weekends, or at night. 5. 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. 6. 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. 7. Any damage caused by the construction vehicles to the existing road infrastructure shall be repaired in kind, prior to the completion of the project. 8. A dust suppression system for the gravel roads shall be in place to prevent excessive dust from the traffic polluting the air. 9. Trucks should to stop at regular intervals to allow queuing vehicles to pass.

4.9 Transportation Management Plan

Table 48: Transportation Management Plan

TRANSPORTATION MANAGEMENT PLAN	
MITIGATION MEASURES	1. For each convoy of abnormal vehicles/loads a designated safety officer shall be nominated. 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. 3. For any vehicles that operate under an exemption permit, a roadworthy certificate may not be required; however the exemption permit will require that the vehicle is fit for operation on public roadways. 4. All vehicles travelling to and from the site shall adhere to all laws imposed by the law enforcement agencies, and shall comply with any requests made by the law enforcement officials. 5. All construction vehicles that are entering the site shall 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. 6. During the delivery of the power line and substation components, the person in charge shall be in communication with transport coordination manager, so that he/she may keep track and document the progress of the vehicles to facilitate any issues that may arise during the transportation phase. 7. All vehicles shall comply with the posted speed limits on public roads as well as the speed limits within the development. 8. All abnormal vehicles and loads to be transported are required to have a valid permit before any trip is begun. 9. SANRAL Western & Southern Region will need to be contacted in order to obtain consent for the abnormal load transport on their roadways. 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. 11. Construction vehicles delivering raw materials to the site shall be covered to prevent any debris along the roads.

The proposed Tlisitseng 1 power line and substation project is intrinsically linked to the proposed Tlisitseng 1 PV facility, as the power line and substation will link the proposed Tlisitseng PV facility to the national grid at the existing Watershed substation. As such, it must be noted that a detailed Traffic Study and Impact Assessment was conducted by Hermanus Steyn of Aurecon has been conducted and included in the Tlisitseng 1 PV Facility's EMPr (currently undergoing a separate EIA process with the DEA reference no as 14/12/16/3/3/2/974).

4.10 Fire Management Plan

The intent of a Fire Management Plan (FMP) is to guide through fire safety requirements, the construction and operation of the proposed Tlisitseng power line and substation, which is defensible from wildfire and, in turn, does not represent 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.

BioTherm relies 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 together with the procedural ramifications in case of an emergency.

This management plan is also a reflection of BioTherm Energy'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.

4.10.1 Fire and Maintenance of Access Roads

- 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 need to be visible at all the entrance gates for anyone to familiarise themselves 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) .

4.10.2 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.

4.10.3 Principles of Fire Safety

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

- 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

4.10.4 Requirements in Terms of the South African Bureau of Standards (SABS)

All buildings erected within the boundaries of South Africa, from a fire safety point of view should 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 shall 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 of 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 adapted.

4.10.5 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 is adequately trained in fire procedures.
- Ensure that all staff is 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.

4.10.6 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:

- Take care of the fire detection and fire protection systems and equipment.
- Any other Contractor or subcontractor to co-operate and ensure that any duty or requirement imposed on BioTherm, as the employer, through legislation, is complied with.
- Carry out any lawful order given to him/her and obey the fire procedures laid down, or authorised thereto, by BioTherm 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 Safe and Healthy representative who will take the recommendation into consideration and if agreed upon then implemented.

4.10.7 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 years.

4.10.8 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 as well as 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 should be contacted to assist in extinguishing the fire.
- If the fire cannot be contained, workers should clear the site in an orderly manner lead 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.

4.10.9 Management Plan

The following will form the key elements of the FMP:

- 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, then determine the extent and impact.
  - Endeavour to eliminate fire hazards and alternatively develop control measures to contain the fires.

- Fire Safety, Health and Environmental Proficiency
  - Make employees conversant with the fire hazards to their health and safety and the precautionary measures required with respect to these hazards through regular awareness.
  - Incorporate and discuss Fire Safety into the daily Toolbox talks.

- Written Safe Word 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 as well as 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 should be provided for the protection of employees when necessary.
  - Corrective and/or fire preventative measures should 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 should 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 may 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.

4.11 Environmental Awareness Plan

Legislation requires that a company who prepares an environmental management program 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 may 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 mining and beneficiation activities.

4.11.1 Policy on Environmental Awareness

This Environmental Awareness Plan must serve as the basis for the induction of all new employees (as well as contractors pending the nature of their work on site) on matters as described herein and read in conjunction with the EMPr. 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.

4.11.2 Implementation of Environmental Awareness

General environmental awareness will be fostered among the project's workforce to encourage the implementation of environmentally sound practices throughout its duration. This will ensures 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 at the start of each day with all workers coming on site, 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 in the general assembly points.

4.11.3 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 EMPr. The MC shall organise environmental awareness training programmes, which should, be targeted at the two levels of employment: management and labour.

4.11.4 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 appraised of the EMPr's requirements. Environmental awareness training programmes need to be formulated for these 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 training (in a first language) on-site regarding environmental aspects that are unclear to the construction personnel. A translator may be required and requested to assist in this additional training. The cost for the translator will be borne by the MC.

An example of the Environmental Awareness Presentation to be given is included in Annexure H.

5 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.

5.1 Pre-Construction Phase

The first site activities before mobilization 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.

5.2 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 wastes generated, 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 EMPr. The contractor shall ensure that all staff have adequate protective clothing and are adequately trained.

5.3 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 EMPr.

5.4 Decommissioning Phase

As with any project, the facilities used in this project will have a lifetime after which they may no longer be cost effective to continue with operation. At that time, the project would be decommissioned, and the existing equipment removed.

Potential environmental impacts caused during decommissioning are those, which will be mitigated as provided by the Environmental Management Programme. These include: noise and emissions to the surrounding environment, removal of hazardous waste and substances, fire, oil spills, wastes and public safety.

The disposal of materials from the decommissioned facility is not viewed as high risk. Much of the material would be recyclable (steel structures etc.) or inert (concrete foundations, etc.). These materials would however, need to be disposed of at a formal waste disposal or recycling centre.

Based on the above information, it is unlikely that the Project will have significant adverse social and environmental impacts. Most adverse impacts will be of a temporary nature during the construction phase and can be managed to acceptable levels with implementation of the recommended mitigation measures for the Project such that the overall benefits from the Project will greatly outweigh the few adverse impacts.

All the negative impacts will either be moderate or lesser in rating and could be easily mitigated. Generally, the proposed power line and substation will result in appreciable benefits to the people in the project area of influence and bring opportunities for development to the country.

Annexure A

Environmental Incidents

LOG Environmental Incident Log

ENVIRONMENTAL INCIDENT LOG				
Date	**Env. Condition**	**Comments** *(Include any possible explanations for current condition and possible responsible parties. Include photographs, records etc. if available)*	**Corrective Action Taken** (*Give details and attach documentation as far as possible)*	**Signature**

Complaints Record Sheet

Complaints Record Sheet

COMPLAINTS RECORD SHEET	**File Ref:** **Page …. of ….**	**DATE:** ……
COMPLAINT RAISED BY:		
CAPACITY OF COMPLAINANT:		
COMPLAINT RECORDED BY:		
COMPLAINT:		
PROPOSED REMEDIAL ACTION:		
ECO: _____ Date: _____		
NOTES BY ECO:		
ECO: _____ Date: _____ Site Manager: _____ Date: _____		

Annexure B

Management of Soils: Guidelines

Topsoil

- Source of topsoil
  - Topsoil shall 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 shall 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 shall 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 shall not be removed from the stripped soil.
  - No topsoil which has been stripped shall be buried or in any other way be rendered unsuitable for further use by mixing with spoil or by compaction using machinery.
  - Topsoil shall preferably be stripped when it is in a dry condition in order to prevent compaction.

- Topsoil stockpiling
  - The Consulting Engineer or Environmental Control Officer shall stockpile stripped topsoil in areas, which have been approved. Soil stockpiles may take the form of windows.
  - To prevent erosion, material stockpiled for long periods (2 weeks) should be retained in a bermed area.
  - Topsoil, mulch and subsoil stockpiles must be placed in higher-lying areas of the sit, and must not be positioned within stormwater channels or areas of ponding.
  - Topsoil stripped from different soil zones shall be stockpiled separately and clearly identified as such. Under no circumstances shall topsoil obtained from different soil zones be mixed.
  - Soil stockpiles shall not be higher than 2m or stored for a period longer than one year. The slopes of soil stockpiles shall not be steeper than 1 vertical to 2.5 horizontal.
  - No vehicles shall be allowed access onto the stockpiles after they have been placed. Topsoil stockpiles shall 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 shall apply soil conservation measures to the stockpiles where and as directed by the Consulting Engineer or Environmental Control Officer. This may include the use of erosion control fabric or grass seeding.

- Topsoil replacement
  - Topsoil shall 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 shall follow as soon as construction in an area has ceased.
  - All areas onto which topsoil is to be spread shall be graded to the approximate original landform with maximum slopes of 1:25 and shall be ripped prior to topsoil placement. The entire area shall be ripped parallel to the contours to a minimum depth of 300mm.
  - Topsoil shall be placed in the same soil zone from which it had been stripped. However, if there is insufficient topsoil available from a particular soil zone to produce the minimum specified depth, topsoil may be brought from other soil zones 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 shall obtain suitable substitute material from other sources at no cost to the employer. The suitability of the substitute material shall be determined by means of soil analyses, which are acceptable to the Consulting Engineer or Environmental Control Officer.
  - No vehicles shall be allowed access onto or through topsoil after it has been reinstated.
  - After topsoil reinstatement is complete, cleared and stockpiled vegetative matter shall 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 C

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) The applicant will adhere to all relevant environmental legislation. Any cost incurred by Eskom as a result of non-compliance to any relevant environmental legislation will be charged to the developer.

5) Eskom's underground cables must be placed in sleeves encased in concrete across the width of the servitude, at the applicant's expense. This is only required in certain situations such as where frequent excavations might occur in the cable area. Materials to be used and relevant dimensions shall be determined by the internal assessor and by Project Engineering.

6) All underground cables in or crossing Eskom overhead sub-transmission and transmission servitudes shall be protected by concrete slabs placed 300mm above cables with danger tape markings and cable route/position indicated by standard concrete monuments.

7) No construction or excavation work shall be executed within 11 metres from any Eskom power line structure, and/or within 11 metres from any stay wire.

8) All work within Eskom's servitude areas shall comply with the relevant Eskom standards in force at the time.

9) 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.

10) 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.

11) 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.

12) 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.

13) 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 to Mr. Cyril Nuttall (Tel. 013 693 4144 Fax: 013 693 4180) at Middelburg Technical Service Centre, Eskom Distribution. This allows time for arrangements to be made for supervision and/or precautionary instructions to be issued.

    Note: Where and electrical outage is required, at least fourteen work days are required to arrange it.

14) No work shall commence unless Eskom has received the applicant's written acceptance of the conditions specified in the letter of consent and/pr permit. The applicant or his/her contractor on site must at all times be in possession of the letter of consent. Should the site agent or contractor on site not be able to produce the required approval on inspection all site activities will be stopped.

15) 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.

16) 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.

17) 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).

18) Equipment shall be regarded electrically live and therefore dangerous at all times.

19) 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.

20) Eskom may stipulate any additional requirements to eliminate any possible exposure to Customers or Public coming into contact or be exposed to any dangers of Eskom plant.

21) It is required of the developer to familiarise himself with all safety hazards related to Electrical plant.

22) 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.

23) In the event of an application for the subdivision of land or rezoning it is essential that the conductor to ground clearance of an overhead line be confirmed. The conductor to ground clearance specified for land outside townships varies vastly from that inside townships. It could thus be necessary to increase the height of power lines to remain within the Regulations of the OHS Act.

24) Eskom (responsible professional engineer) requires:

- Proposed design, longitudinal section included in letter of application,
- As-built plans with co-ordinates, once constructed,
- Ownership of the power line shall be clearly marked,
- Where services run parallel to Eskom's, the applicant's power line will maintain a separation distance, centre line to centre line. The distance shall be determined by the internal assessor and must comply with access requirements and Occupation Health and Safety Act clearances and Eskom standards

25) If such permission is granted, the applicant must give at least fourteen work day's prior notice of the commencement of work to Mr. Cyril Nuttall (Tel. 013 693 4144 Fax: 013 693 4180) at Middelburg Technical Service Centre, Eskom Distribution. This allows time for arrangements to be made for supervision of and/or precautionary instructions to be issued in terms of the overhead power line construction.

26) Should the applicant or his contractor damage any of Eskom services during commencement of any work whatsoever, then Eskom's 24 hour Contact Centre Tel: 086 000 1414 must be dialed immediately to report the incident.

Any relocation of Eskom's services, due to the proposed prospecting, will be for the account of the Applicant. The Applicant will also be responsible for granting Eskom an alternative route for the power line.

The Eskom Customer Contact Centre at 08600 37566 must be contacted in connection with any line deviation and costs.

John Geeringh (Pr Sci Nat)

Senior Environmental Advisor
Eskom GC: Land Development

And

Louise Human
Land Development and Environmental Manager

Annexure D

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 SHEQ 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.

Table 1: Roles and responsibilities of archaeological and heritage management when heritage resources are discovered during operations

ROLE	RESPONSIBILITY	IMPLEMENTATION
A responsible specialist needs to be allocated and should attend all relevant meetings, especially when changes in design are discussed, and liaise with SAHRA.	The client	Archaeologist and a competent archaeology support team
If chance finds and/or graves or burial grounds are identified during construction or operational phases, a specialist must be contacted in due course for evaluation.	The client	Archaeologist and a competent archaeology support team
Comply with defined national and local cultural heritage regulations on management plans for identified sites.	The client	Environmental Consultancy and the Archaeologist
Consult the managers, local communities and other key stakeholders on mitigation of archaeological sites, when discovered.	The client	Environmental Consultancy and the Archaeologist
Implement additional programs, as appropriate, to promote the safeguarding of our cultural heritage. (i.e. integrate the archaeological components into the employee induction course).	The client	Environmental Consultancy and the Archaeologist,
If required, conservation or relocation of burial grounds and/or graves according to the applicable regulations and legislation.	The client	Archaeologist, and/or competent authority for relocation services
Ensure that recommendations made in the Heritage Report are adhered to.	The client	The client

Provision of services and activities related to the management and monitoring of significant archaeological sites (when discovered). The client with the specialist needs to agree on the scope and activities to be performed	The client	Environmental Consultancy and the Archaeologist
When a specialist/archaeologist has been appointed for mitigation work on discovered heritage resources, comprehensive feedback reports should be submitted to relevant authorities during each phase of development.	Client and Archaeologist	Archaeologist

Annexure E

Environmental Awareness Presentation Example

ENVIRONMENTAL AWARENESS TRAINING INDUCTION FOR THE [PROJECT DETAILS[

A PROFESSIONAL TEAM DELIVERING CREATIVE PROJECT SOLUTIONS

Presented by: SiVEST

Consulting Engineers • Project Managers • Environmental Consultants • Town and Regional Planners

PRESENTATION DATE:

1

WHAT IS MEANT BY ENVIRONMENT

The surrounding within which humans exist and that are made up of plant and animal life and the interrelationships among and between them and the physical, chemical, aesthetic and cultural properties of the foregoing that influence human health and well being.

2

PURPOSE AND OBJECTIVES OF THE EMP

The Environmental Management Programme (EMPR) has been prepared in order to:

- Meet the requirements of the resource consent condition
- Meet the client's expectations regarding environmental compliance
- Meet the contractor's expectations regarding environmental compliance
- Demonstrate how such compliance will be achieved

3

PURPOSE AND OBJECTIVES OF THE EMPR

Objectives of the EMPR are to:

- Minimize the negative effects of construction on the environmental
- Integrate environmental management into all aspects of the works
- Promote a high level of environmental awareness in all the contractors and staff
- Compliance with the environmental policies
- Provide recommendations and guidelines to which compliance monitoring can be done during construction

4

ROLE AND RESPONSIBILITIES

Designation	Responsibilities
ECO	• Conduct regular visit to be able to report and respond to environmental issues; • Advise the contractor on environmental issues within the defined work area; • Report compliance and non-compliance to the authorities as applicable
Contractor	• Responsible for the overall execution of the activities including compliance with recommendation and conditions of the EMP • Maintain an environmental register which keeps a record of all incidents occurring on site • Responsible for the implementation of corrective measures issued by the ECO, PM and authorities within reasonable or agreed time periods
Contractor's Staff	• Responsible for reporting incidents, defects and other problem areas to senior site staff as they arise on site • Carry out routine maintenance and emergency work when directed • Care for all environmental works • Ensure the site is kept tidy and litter is placed in bins • Act in an environmentally responsible manner at all times to reflect the contractor's commitment to environmentally responsible practices

5

DO'S AND DON'TS

DO's

- Use the toilets facilities provided- report dirty or full facilities(if using chemical ablution facilities)
- Clear your work areas of litter and building rubbish at the end of each day– use the waste bins/ refuse bags provided and ensure that litter will not blow away.
- Report all fuel or oil spill immediately and stop the spill continuing
- Make use of designated smoking area during the smoking breaks allocated and dispose cigarette buds in appropriate bins
- Confine work and storage of equipment to within the immediate work area
- Use all safety equipment and comply with all safety procedures
- Prevent contamination or pollution of streams and water channels
- Ensure a working fire extinguisher is immediately at hand if any "hot work" is undertaken e.g. welding, grinding, gas cutting etc.
- Report any injury of an animal
- Drive on designated routes only in acceptable speed limit
- Prevent excessive dust and noise

6

DO'S AND DON'TS (CONTINUED……)

DON'TS:

- Remove or damage vegetation without direct instruction
- Make and fires
- Injure, trap, feed or harm any animals– this includes birds, frogs, snakes and lizards present.
- Enter any fenced off or marked areas
- Allow cement or cement bags to blow around.
- Speed or drive recklessly
- Allow waste, litter, oils or foreign materials into the stream (if any)
- Litter or leave food laying around

7

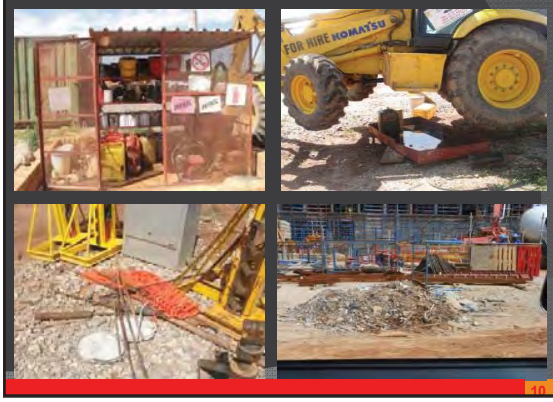
EXAMPLE OF GOOD COMPLIANCE

8

EXAMPLE OF GOOD COMPLIANCE

9

EXAMPLES OF POOR COMPLIANCE



10

EXAMPLES OF POOR COMPLIANCE

11

ACTIVITIES YOU WILL BE AUDITED UPON

- Housekeeping
- Health and Safety
- Existing Wildlife
- Site Clearing
- Site camp Establishment
- Chemical and Hazardous Material Storage
- Ablution Facilities
- Chemical, Fuel and Oil Handling
- Air Pollution
- Traffic
- Noise
- Stormwater Management
- Groundwater
- Erosion Control
- Land Use
- Visual Environment
- Construction Site decommissioning

12

CONCLUSION

SiVEST

Subsequent to this induction, the contractor and the labourers will be expected to comply with and adhere to the requirements and standards outlined in the EMPR, to avoid non-compliance

13

WAY FORWARD

SiVEST

- Monthly audits will be undertaken
- From the audit undertaken, an audit report will be compiled and this will be submitted to the client, project manager and the authority.

14

THANK YOU

SiVEST

Should you have any further comments or questions, please send them to:

[ECO DETAILS]

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